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An Empirical Evaluation of New Socialist Countryside Development in China

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Abstract
China prioritized a New Socialist Countryside reform policy in 2005 to address the growing disparities in incomes and living standards between rural and urban populations. These policies are evaluated to provide a base line index of reform concerning farmer, agricultural, and rural economic development. Aggregate index scores are computed to rank provincial progress. Rankings indicate the progression of rural economic reform is moderate, at best, and mostly isolated to well-developed eastern provinces. Reform growth is also uneven across similarly, rural provinces indicating a need for continued attention in these poorer areas. More importantly, as reform efforts continue, the empirical framework established can be used to track relative performance over time.

Key words: China, Factor Analysis, New Socialist Countryside, Policy Evaluation

Empirical Research on the Development of a New Socialist Countryside in China

I. Introduction

Villages and cities in China show a striking contrast in terms of economic and social development. Per capita incomes in urban areas are considerably higher than those in rural areas, and the spread between them is growing (Table 1). Furthermore, the proportion of total consumption expenditures spent on food, as an indication of poverty, shows consistently higher levels in rural areas. In order to accelerate the development of the agricultural and rural economy and the growth of farmers' income, the Communist Party of China (CPC) prioritized the creation of a New Socialist Countryside (NSC) in 2005. While overall continued strong economic growth remains a priority, the new generation of leadership has taken on the task of closing the widening income gap between those in the urban and rural areas (Guo, X., 2005).

The development of objective methods to evaluate the progress of these reform policies is needed. Several studies have discussed key issues and factors that will likely affect NSC reform (e.g., Gu and Huang, 2006; Qin, 2007; Gao, 2007, Han, 2007), but none have attempted to quantify and empirically analyze progress across provinces. We develop an indexing approach by which to categorize reform through the evaluation of key observable variables at alternative market levels.

Factor analysis is employed to succinctly evaluate contributions to improving farmer incomes, agricultural development, and rural economic growth. These factors are utilized to compute provincial index scores of reform progress. The comprehensive indexing and scoring framework provides immediate implications for the relative performance of reform progress across provinces. While reform progress takes time, the development of an objective model can be used to initially benchmark or provide baseline levels of reform progress, and then be utilized over time to measure continued progress.

To set the stage for the empirical evaluation, we continue with a general description of China's NSC reform policies. This is followed by a description of the empirical model, data used, and results to evaluate policy reform. We end with some conclusions and implications of our results in a larger context.

II. China's New Socialist Countryside Policy

In the 11th Five-Year Plan (2006-2010) for National Economic and Social Development, approved in 2005, the CPC emphasized the building of a NSC aimed at balancing the economic and social development between urban and rural areas. The Plan, developed every five years, provides a roadmap describing China's national strategic intensions, priorities of government work, and behavior of market entities. In the latest Plan, the building of a NSC addresses significant goals towards the development and modernization of agriculture. Key components of the plan include: (*i*) developing modern agriculture by improving production capacity, promoting agriculture restructuring, strengthening the agricultural service system, and improving the rural distribution system; (*ii*) increasing farmers' income by exploring ways of increasing agricultural and non-agricultural income, and improving policies that serve to increase income levels; (*iii*) improving the appearance of the countryside by strengthening rural infrastructure, improving rural environmental protection, improving rural healthcare and sanitation, and developing the rural social security system; (*iv*) assisting new farmers by improving rural education, increasing labor skill training, and improving rural cultural development; (*v*) increasing investment in agricultural and rural areas; and (*vi*) deepening rural reform (NDRC, 2005).

It is clear that distinct market levels are characterized with priority areas for growth. The variation in incomes across villages and the inability to increase income levels are particular obstacles at the farm level, along with the ability to keep land in production and retention of landowner rights (Li, et al., 2007). Science, technology, and modernization are stressed as the primary forces driving agricultural industry development (Li, 2006). Democratic management of village governance, increased cultural opportunities, improved environmental facilities, and government income supports are emphasized at the rural economy level (Guo, 2005).

In the course of industrialized development and modernized construction, agricultural development is a necessary and significant component. Structural changes in agricultural production and consumer demands require comparable policy adjustments directed towards the development of agricultural and rural economies. To achieve the new rural conditions put forth in China's NSC strategy, improvements in networking and coordination of the agricultural and food production system and acceptance of democratic management will be required, while at the same time respecting Chinese culture and traditions.

III. Methodology

With an expansive agenda towards agricultural and rural economic reform, evaluating achievement is complicated. What measures serve as key indicators of reform? How many measures are needed? How are the various measures weighted in terms of total impact? Many social, market, and economic characteristics can be used to assess improvement. Chen (2004) provides some insights into alternative methods for policy evaluation in China. To provide structure to the problem, we develop an index system focused on key market levels and priority focus areas, and correlate them to representative, observable variables (Table 2).

Index System and Data

Cross-section data are collected for all provinces in China, for the year ending 2005. Data were collected from published statistics from the National Bureau of Statistics (2006a, 2006b) and the State Statistical Bureau (2006a, 2006b) in China. Overall, data for eighteen variables were collected for each province, with each representing a particular focus area (Table 2). Under new farmer development ($A_{1,1}$), there are three priority focus areas. First, improved farmer qualities ($A_{2,1}$) are measured by the average farmer education level ($A_{3,1}$), the amount of continuing education and cultural consumption ($A_{3,2}$), and the level of agricultural labor productivity ($A_{3,3}$). Second, farmer living standards ($A_{2,2}$) are measured by the level of household net income ($A_{3,4}$) and total household consumption expenditures ($A_{3,5}$). Third, the level of farmer employment ($A_{2,3}$) is measured by the province's rural employment rate ($A_{3,6}$).

Under agricultural industry development, there are three priority focus areas. First, the degree of agricultural modernization ($A_{2,4}$) is measured by the aggregated agricultural machinery power in rural areas (in kilowatts) per hectare of cultivated land ($A_{3,7}$) and the level of advanced input technologies utilized on cropland (e.g., improved seed varieties, applications of herbicides and pesticides, and use of cropland irrigation) ($A_{3,8}$). Second, sustainable agricultural development ($A_{2,5}$) is measured by amount of cultivated land per capita in rural areas ($A_{3,9}$). Third, agricultural industrialization ($A_{2,6}$) is measured by the amount of rural farm product processing ($A_{3,10}$).

Under rural development, there are four priority focus areas. First, economic development ($A_{2,7}$) is measured by the growth rate in the value of agricultural production ($A_{3,11}$) and the contribution of value added agriculture to total provincial gross domestic product ($A_{3,12}$). Second, an harmonious rural society ($A_{2,8}$) is measured by the amount of government low-income, relief fund payments to farmers ($A_{3,13}$) and the number of doctors and health officers available for medical treatment ($A_{3,14}$). Third, the level of rural civilization ($A_{2,9}$) is determined by the government's investment in cultural and entertainment activities ($A_{3,15}$) and the rural legal birth rate for each province ($A_{3,16}$). Finally, the extent of countryside beautification ($A_{2,10}$) is measured by the percent of the rural population with access to potable drinking water and waste sanitation facilities ($A_{3,17}$) and the proportion of forest cover ($A_{3,18}$).

Empirical Model

Given the large number of variables to consider, it is useful to summarize them into more general, parsimonious, and evaluative constructs. Factor Analysis (FA) is one approach to examine the data and determine whether the observed variables can be reduced into a smaller set of unobserved (latent) uncorrelated variables, called factors, to facilitate a better interpretation of the data.

FA has often been used to rank various patterns of development, productivity, and performance from a variety of perspectives (e.g., Cheung, 1999, Ramrattan, et al., 2003). Similar to this application, FA has been commonly used to develop composite measures and rankings of social or economic development (e.g., Adelman and Dalton, 1971, McGranahan, 1972; Ghaus, et al., 1996). While purely a statistical technique, the approach allows the researcher to examine and analyze the interdependence among a number of variables and the level of economic development. Given collinearity issues that may arise in econometric models and in identifying independent sources of variation, FA can be used to develop composite set factors for subsequent analysis.

Consider a set of k observed variables that we would like to reduce into a more parsimonious set of underlying factors m. Each of k observed variables (y_i) can be expressed as a weighted composite of a set of latent factors (F_m) such that:

$$y_i = \lambda_{i1}F_1 + \lambda_{i2}F_2 + ... + \lambda_{im}F_m + e_i, \; i = 1, 2, \ldots, k, \qquad (1)$$

where λ_{im} is the m^{th} factor score, or factor loading, on variable i (Pett, et al., 2003). Given the assumption that the residuals are uncorrelated across observed variables, the correlations among the observed variables are accounted for by the factors; i.e., any correlation between a pair of observed variables can be explained in terms of their relationships with the latent factors (Pett, et al., 2003). Each original variable is standardized to have a mean zero and unit variance to eliminate the influence of scale effects. The residual term, e_i, is therefore assumed with zero mean, and variance k, uncorrelated across i and factors F_m.

To begin, one computes the k x k correlation matrix (R) and determines the factorability of the data. Factorability evaluates if the degree of correlations among the original variables is sufficient to proceed, and is usually determined by two tests - the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. The KMO test compares the magnitudes of the correlation coefficients to the magnitudes of the partial correlation coefficients:

$$\text{KMO} = \left(\sum_{i \neq j} \sum r_{ij}^2 \right) \Bigg/ \left(\sum_{i \neq j} \sum r_{ij}^2 + \sum_{i \neq j} \sum a_{ij}^2 \right), \qquad (2)$$

where r_{ij} and a_{ij} are the Pearson correlation and partial correlation coefficients between i and j, respectively (Pedhazur and Schmelkin, 1991). If the variables share common factors, then we would expect that the partial correlations between pairs of variables would be small. By general convention, a minimum KMO score 0.6 is sufficient (Pett, et al., 2003).

Similarly, Bartlett's test of sphericity tests the null hypothesis that the correlation matrix is an identity matrix, i.e., there is no relationship among the variables and that the non-zero correlations in the sample matrix are due to sampling error. The test is distributed chi-square with test statistic $\chi^2 = -[(N\text{-}1) - 2k + 5/6)]\text{x}[\log|R|]$, where N is the sample size, k is the number of variables, $|R|$ is the determinant of the correlation matrix, and degrees of freedom (df) = $k(k\text{-}1)/2$ (Pedhazur and Schmelkin, 1991).

Given adequate factorability, the initial solution is extracted. Factor eigenvalues, λ, are computed by solving the eigenfunction $| R - \lambda I | = 0$, where I is an identity matrix. Factor loadings represent the correlations between the observed variables and the latent factors. Given the standardized original variables with unit variances, a useful factor must have an eigenvalue greater than one, and establishes an initial condition on the appropriate number of factors to extract. However, additional, subjective criteria are often employed. Related to the KMO measure, the minimum proportion of the total variance explained is often set. For example, a KMO of 0.7 would imply a reasonable targeted minimum variance explained by the combined factors to be around 70%. Finally, the interpretability of the factors extracted must be conceptually meaningful to facilitate a broader interpretation.

The key to interpreting what the factors measure is related to the factor loadings. For each factor F_m, one evaluates which variables load (correlate) the highest on that factor and low on the other factors. In evaluating the high loading variables, one determines what these variables have in common. If interpretation of the factors is ambiguous, the factor pattern can oftentimes be clarified by rotating the factors in m-dimensional space (Pedhauzur and Schmelkin, 1991). There are various methods that can be used in factor rotation and are commonly explained in any relevant statistical text.

For our analysis, factor scores are estimated and used to develop scales on which the underlying observations can be rated (or scored) with respect to reform progress. Factor scores are composite measures that are computed for each observation on each factor. They are standardized measures with zero mean and unit variance, and are computed from the factor score coefficient matrix. The factor coefficient matrix is computed by multiplying R and the factor loading matrix. Each observation's vector of standardized variables is multiplied by the coefficient matrix to provide a vector of factor scores (Pett, et. al, 2003). The factor loadings thus serve as weights in aggregating the original characteristic measures. Aggregate scores are then computed by summing each provinces factor scores, weighted by the factor's proportion of total variance explained.

4. Empirical Results

The data used in this application was from the year ending 2005, the same year that the new reform policy was officially approved and implemented. While some reform efforts were already underway by 2005, the empirical results estimated here can more readily be interpreted as base line levels of reform. As subsequent data become available, the framework established can be applied as a way to track reform progress

Extracted Factors

The provincial variables reflecting measures of farmer, agricultural, and rural economic development were standardized with zero mean and unit variance. Results of the KMO and Bartlett tests demonstrated significant common variances, or correlations, among the variables and indicating the data were sufficient for conducting meaningful FA (Table 3). The initial solution was extracted using the *Factor Analysis* function in SPSS, version 11.5, and is shown in Table 4. The extraction of five factors with eigenvalues above one, explains over 77% of the variation in the original data. Oblique rotations of the factor matrix were conducted to improve variable loadings and improved interpretability. While not shown, the communality, or percent of each variable's variance that can be explained by the five factors, is relatively strong, ranging from 0.62 to 0.94.

The final factor loadings are shown in Table 5 and represent the correlations between the variables and the factors. Ideally, one would like a single significant loading for each variable on only one factor (i.e., looking across the rows). However, split loadings are not uncommon, and pose no problem if the factor they both represent is interpretable. In order to name and interpret the factors, one needs to identify the variables with significant loadings for each factor (i.e., looking down the columns). Again, some subjective evaluation enters here, but generally we define primary variable-factor pairs to include: (1) factor loading values above 0.6, (2) the variable coincidentally loads lower on other factors, and (3) the variable loading is strong relative to others based on the first two test conditions. From the original eighteen variables, we present a parsimonious set of five factors and interpret them below.

Primary loadings on the first factor include: years of farmer education (0.86), amount of continuing education and cultural experiences (0.81), rural legal birth rate (0.80), and the percent of the rural population with access to potable water and waste sanitation facilities (0.66). While the first two elements clearly relate to farmer knowledge and cultural exposure, the rural legal birth rate relates to adherence and knowledge of population control regulations. Likewise, access to improved health facilities requires continuing education and knowledge of rural improvements available to the public. Accordingly, we define this factor as the level of <u>farmer knowledge and social exposure</u> (Table 5).

Primary variable loadings on the second factor include: value of farm product processing enterprises (0.93), adoption and use of improved farm input technologies (0.88), and rural employment rate (0.72). Clearly, the level of rural employment will depend on the amount of value-added processing and farm enterprises in the region will be in direct correlation to the level of employment. Farm income levels are supported by the use and availability of new input technologies and, thereby, improving employment opportunities. While not listed above given their high loadings on other factors, the household income and consumptions measures (correlated high with employment) are also improved with the availability of improved technologies. Accordingly, we define this factor as the availability of improved agricultural technologies (Table 5).

Primary variable loadings on the third factor include: rural household net income (0.88), rural household consumption expenditures (0.83), government relief fund payments (0.88), and government investments in cultural and entertainment assets (0.76). Overall household income is clearly the enjoining theme, whether from farm income or supplemental government support. Government investments in cultural activities support public enrichment with lower personal expenses. Accordingly, we define this factor as rural income standards and government support (Table 5).

Primary variable loadings on the fourth factor include: the number of doctors and health officers (0.78), the relative agricultural machinery endowment (0.73), rural forest cover area (-0.72), and agriculture's contribution to total GDP in the province (-0.67). Common influences among these variables are related to the availability of modern equipment and health services. Rural areas with a higher number of medical care providers are clearly associated with availability of improved health service. Improved agricultural infrastructure, also associates with improved transportation technologies. The negative loading on the ratio of agricultural value-added to total GDP makes sense, since areas with higher agricultural production value, ceterus paribus, are often associated with lower population densities, and most medical services are provided in urban, densely populated areas. Similar logic can be applied to the negative loading on the forest cover variable. Accordingly, we define this factor as the availability of modern infrastructure and health services (Table 5).

Finally, primary variable loadings on the fifth factor include: agricultural labor productivity (0.90) and, to a lesser degree, the amount of cultivated land per capita (0.45). These two variables combined relate to the level of a farmer's management ability to effectively utilize employees and keep viable agricultural lands in production. The loading on the latter variable is relatively low, and is likely more an indication that keeping agricultural land in production has historically been determined by the provincial government and not a farm manager's decision. In any event, we define this factor as the level of farmer labor and management skills.

From a larger set of 18 variables that reflected proxy measures for farmer, agricultural industry, and rural development growth, the empirical analysis has determined five broadly interpreted constructs. The reduced number of factors clarifies the important categories for evaluation of NSC reform and appears well correlated with the defined NSC policy goals describe above. Reform progress will be evaluated in the next section by considering the provinces' (1) level of farmer knowledge and cultural exposure, (2) use of improved agricultural technologies, (3) rural income standards and level of government support, (4) availability of modern infrastructure and health services, and (5) the level of farmer labor and management skills.

Provincial Factor Scores

Individual factor scores are computed for each province by multiplying the province's vector of standardized variables (Table 2) with the factor coefficient matrix; i.e., the factor loadings serve as the weights when summing the observed variables. Given the nature of the variables originally selected, higher values indicate higher levels of NSC reform progress; i.e., the higher the level of the variable the better. Since the variables were standardized with mean zero, computed scores greater than zero imply that the level of progress with respect to the particular factor is higher than the average level of the whole country. Scores less than zero indicate below average performance.

By comparing the individual factor scores across columns, it is clear that the relative ranking of the province reform differs by factor (Table 6). For example, Beijing ranks as the top performer with respect to farmer knowledge and cultural experiences (factor 1) and rural incomes and government support (Factor 3), but ranks near the bottom in rural infrastructure and health services (factor 4). In general, the rankings seem most different between the factors associated with rural education, technology, and income levels (factors 1 through 3) and those associated with modern rural infrastructure and health services, and labor and management skill levels (factors 4 and 5). The differences in rankings across factors make it difficult to generally conclude on the relative overall progress towards NSC reform.

Aggregate Index Ranking

Individual factor scores were added together to determine an overall index measure of NSC reform progress (Table 6). The percentages of variance explained by each factor (Table 4) were used to weight the individual factor scores. The composite rankings are most similar to the rankings for factor 1, given its higher relative weight proportion. However, non-weighted rankings were also computed and resulted in relatively similar rankings, particularly at the upper and lower extremes. Based on the aggregate index scores, it appears that the overall progress towards NSC policies is moderate, at best. Seventeen (55%) of the 31 provinces exhibit performance less than the country average, and only the few relatively strong urban, industrial provinces show significant development in their rural economies. While, by design (i.e., variable standardization), there will always be scores above and below zero (the average), the important implications of the immediate scores are in their rankings and relative differences across provinces.

Provinces were categorized as either well developed (total index scores from 0.5 and above), moderately developed (index scores between 0 and 0.5), less developed (index scores from 0 to -0.3), and poorly developed (index scores less than -0.3). Provinces categorized as well developed include Shanghai, Beijing, Jiangsu, Tianjin, Shandong, and Zhejiang. These provinces are generally strong in terms of urban growth and productivity as well, and are predominantly located in the south-eastern provinces of China.

Moderate levels of development are estimated for the provinces of Liaoning, Heilongjiang, Jilin, Fujian, Inner Mongolia, Shanxi, and Hebei. These provinces are generally located in the more central-eastern and north-eastern regions. Less developed improvements are estimated for the provinces of Hubei, Shaanxi, Henan, Hunan, Anhui, Jiangxi, Chongqing, and Sichuan. These provinces are generally located in the central-regions and exhibit lower levels of farmer education (factor 1) and management skills (factor 5), then the two previous categories.

Finally, the provinces that are exhibiting poor rural countryside development include Gansu, Guangxi, Hainan, Xinjiang, Ningxia, Qinghai, Yunnan, Guizhou, and Tibet. While Xinjiang is located in the northwest region with relatively good agricultural conditions, others are located in more southern and southwest regions characterized by poor quality natural resources and difficult topography. Overall, these provinces are characterized by poor rankings in farmer education and management skills, government and other income support, and the use of improved agricultural technologies.

V. Conclusions

In 2005, the Chinese government prioritized a NSC reform policy to address the growing disparities in incomes and living standards between rural and urban populations. A comprehensive indexing framework is developed to appropriately structure and measure farmer, agricultural industry, and rural economic development. Factor analysis is conducted to describe the key underlying factors of reform achievement and computed individual provincial index scores illustrate the relative levels of rural progress and base line conditions for subsequent analysis.

A large number of observable farm, industry, and rural economy indicators were reduced to identify five important underlying correlations and constructs of reform. These factors included the level of farmer knowledge and cultural exposure, the use of improved agricultural technologies, rural income standards and the level of government support, the availability of modern infrastructure and health services, and the level of farmer labor and management skills.

Based on the aggregate index scores, it appears that the progression of rural economic reform is moderate, at best. However, given that the new policy agenda was not approved until 2005, it is likely too early to gage the success of these efforts with existing data. It is clear, however, that the gaps in reform levels at these base index levels vary substantially by geographic region. Except for a few eastern developed provinces, most central and western provinces indicate below average progress. The levels of agricultural and rural investments and farmer incomes remain well below their eastern counterparts. Reform growth is also uneven across similarly, rural provinces indicating a need for continued attention in these poorer areas.

As reform efforts continue (or not) across provinces, the empirical framework established will be useful as it can be replicated to track performance over time. Continued applications of the index and scoring procedure will provide useful insights as time progresses and reform efforts continue, indicating what strategies have been successful and providing guidance to alter strategies that have not been successful.

References

Adelman, I., Dalton, G. (1971) A factor analysis of modernization in villiage india, *Economics Journal*, **81**, 563-79.

Chen, X. (2004) Some comprehensive evaluation methods' contrast and demonstration analysis, *Journal of Jiangxi Finance and Economics University*, **3**, 20-23.

Cheung, S-O. (1999) Critical factors affecting the use of alternative dispute resolution processes in construction, *International Journal of Project Management*, **17**, 189-194.

Ghaus, A., Pasha, H.A., Ghaus, R. (1996) Social development ranking of districts of Pakistan, *Pakistan Development Review*, **35**, 593-614.

Gao, F. (2007) New rural construction: an analysis from political economy perspective, *Modern Economic Science*, **1**, 34-39.

Guo, X. (2005) Meanings and achievement path of new rural construction of socialism, *Heilongjiang Daily*, October 14.

Gu, Y., Huang, C. (2006) Theory and practice in building the new socialist countryside, *Issues in Agricultural Economics*, **10**, 29-34.

Han, J. (2007) Building a new countryside: a long-term task in China's modernization drive, *China Economics*, **6**, 93-111.

Li, J., Han, J., Qin, Z., Zhang, Y. (2007) General report of promoting new countryside construction in China, *Reform*, **6**, 5-17.

Li, X. (2006) Bring in to play the supporting role of scientific and technological progress in the construction of a new socialist countryside, *China Soft Science*, **7**, 1-5.

McGranahan, D.V. (1972) *Contents and Measurements of Socioeconomic Development: A Study of the United Nations Research Institute on Social Development (UNRISD)*, Praeger, New York, NY.

National Bureau of Statistics. (2006a) *China Statistical Yearbook 2006*, China Statistics Press, Beijing, PRC.

National Bureau of Statistics. (2006b) *China Yearbook 2006 – Rural Household Survey*, China Statistics Press, Beijing, PRC.

National Development and Reform Commission (NDRC). (2005) *The Outline of the 11th Five-year Plan for National, Economic, and Social Development of the People's Republic of China*, China Statistics Press, Beijing, PRC.

Pedhazur, E.J., Schmelkin, L.P. (1991) *Measurement, Design, and Analysis: An Integrated Approach*, Erlbaum, Hillsdale, NJ.

Pett, M.A., Lackey, N.R., Sullivan, J.J. (2003) *Making Sense of Factor Analysis: The Use of Factor Analysis for Instrument Development in Health Care Research*, Sage Publications, Thousand Oaks, CA.

Qin, F. (2007) Some important issues in building a new socialist countryside in China, *Issues in Agricultural Economics*, **1**, 37-43.

Ramrattan, L.B., Szenberg, M. (2003) Ranking of economic journals: a statistical survey and analysis. *American Economics*, *47*, 82-90.

State Statistical Bureau. (2006a) *China Agriculture Yearbook 2006*, China Statistics Press, Beijing, PRC.

State Statistical Bureau. (2006b) *China Rural Statistical Yearbook 2006*, China Statistics Press, Beijing, PRC.

Table 1. Rural and urban incomes per capita, by year

	Income Per Capita			Engel Coefficient[a]	
Year	Rural (R)	Urban (U)	R:U	Rural	Urban
1978	137	343	1:2.50	67.7	57.5
1980	191	478	1:2.50	61.8	56.9
1985	398	739	1:1.86	57.8	53.3
1990	686	1,510	1:2.20	58.8	54.2
1995	1,577	4,283	1:2.72	58.6	50.1
2000	2,253	6,280	1:2.79	49.1	39.4
2005	3,255	10,493	1:3.22	45.5	36.7
2006	3,587	11,760	1:3.28	43.0	35.8

Source: National Bureau of Statistics (2006a)
[a] The Engel coefficient represents the proportion of total household expenditures spent on food.

Table 2. Index system of New Socialist Countryside reform in China

Focus Area	Observed Variable
New Farmer Development ($A_{1,1}$)	
Farmer qualities ($A_{2,1}$)	Farmer education, years ($A_{3,1}$)
	Continuing education and culture, % of consumption ($A_{3.2}$)
	Agricultural labor productivity, yuan/laborer ($A_{3,3}$)
Living standards ($A_{2,2}$)	Rural household net income per capita, yuan ($A_{3,4}$)
	Rural consumption expenditures, yuan/person ($A_{3,5}$)
Employment level ($A_{2,3}$)	Rural employment rate, % ($A_{3,6}$)
Agricultural Industry Development ($A_{1,2}$)	
Modernization ($A_{2,4}$)	Agricultural machinery power, kw/ha. ($A_{3,7}$)
	Improved input technology adoption, % acres ($A_{3,8}$)
Sustainable development ($A_{2,5}$)	Cultivated land per capita, ha. ($A_{3,9}$)
Industrialization ($A_{2,6}$)	Value-added farm processing, 10,000 yuan ($A_{3,10}$)
Rural Countryside Development ($A_{1,3}$)	
Rural econ. development ($A_{2,7}$)	Agricultural production value growth rate, % ($A_{3,11}$)
	Value added agriculture to total GDP, % ($A_{3,12}$)
Rural society harmony ($A_{2,8}$)	Relief fund payments, yuan/person ($A_{3,13}$)
	Number of doctors and health officers ($A_{3,14}$)
Rural civilization ($A_{2,9}$)	Cultural and entertainment investments, yuan ($A_{3,15}$)
	Rural legal birth rate, % ($A_{3,16}$)
Rural beautification ($A_{2,10}$)	Population with potable water, sanitation, % ($A_{3,17}$)
	Forest cover of total land area, % ($A_{3,18}$)

Sources: National Bureau of Statistics (2006a, 2006b) and State Statistical Bureau (2006a, 2006b)

Table 3. Kaiser-Meyer-Olkin Measure and Bartlett's Test Results

Test		Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.66
Bartlett's Test of Sphericity	Chi-Square	778.41
	degrees of freedom	153
	p-value	0.00

Table 4. Initial solution, computed eigenvalues, and total variance explained[a]

	Original Eigenvaues			Extraction Sums of Squared Loadings (SSL)			Rotated SSL
Factor	Total	% of Variance	Cumul-ative %	Total	% of Variance	Cumul-ative %	Total
1	7.28	40.45	40.45	7.28	40.45	40.45	4.94
2	2.31	12.81	53.26	2.31	12.81	12.81	5.59
3	1.99	11.06	64.32	1.99	11.06	11.06	5.65
4	1.30	7.21	71.53	1.30	7.21	7.21	3.08
5	1.04	5.76	77.29	1.04	5.76	5.76	1.94
6	0.92	5.12	82.41				
7	0.81	4.50	86.91				
8	0.69	3.85	90.76				
9	0.45	2.48	93.24				
10	0.36	1.98	95.23				
11	0.26	1.46	96.69				
12	0.23	1.28	97.97				
13	0.16	0.90	98.87				
14	0.11	0.60	99.47				
15	0.05	0.26	99.73				
16	0.02	0.13	99.86				
17	0.02	0.11	99.97				
18	0.01	0.03	100.00				

[a] Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization, rotation convergence in 17 iterations.

Table 5. Rotated factor loadings and interpretative constructs[a]

	Factor Number and Interpretation				
	1	2	3	4	5
Variable	Farmer knowledge and cultural exposure	Improved agricultural technologies	Rural income standards and government support	Modern infrastructure and health services	Farmer labor, management skills
Farmer education	0.86	0.39	0.46	0.08	0.31
Continuing education/culture	0.81	0.25	0.31	-0.00	-0.05
Agriculture labor productivity	0.06	-0.14	-0.04	-0.10	0.90
Rural net income	0.67	0.74	0.88	0.37	0.40
Rural consumption	0.61	0.80	0.83	0.24	0.31
Rural employment	0.09	0.72	0.15	-0.11	-0.31
Agricultural machinery capacity	-0.11	-0.08	0.26	0.73	0.16
Input technology improvements	0.47	0.88	0.59	0.35	0.18
Cultivated land per capita	0.23	-0.53	-0.37	-0.07	0.45
Value-added farm processing	0.55	0.93	0.63	0.39	0.23
Agricultural production growth	-0.21	-0.68	-0.69	-0.28	0.16
Value-add agriculture to GDP	-0.61	-0.44	-0.66	-0.67	0.01
Government support payments	0.63	0.57	0.88	0.37	0.28
Number of doctors/health officers	0.33	0.23	0.23	0.77	-0.14
Cultural investments	0.32	0.31	0.76	0.18	0.04
Rural legal birth rate	0.80	0.44	0.47	0.41	0.44
Potable water and sanitation	0.66	0.64	0.58	0.16	0.18
Forest cover	0.09	-0.12	-0.07	-0.72	0.07

[a] Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization, rotation convergence in 17 iterations.

Table 6. Factor and total scores of NSC reform, by province

	Factor Scores[a]					Total	Final	Development
Province	1	2	3	4	5	Score	Rank	Category
Shanghai	1.64	4.39	2.15	1.19	0.62	1.58	1	Well
Beijing	1.78	0.17	3.33	1.26	0.71	1.24	2	Well
Jiangsu	0.99	1.23	1.05	1.22	0.55	0.80	3	Well
Tianjin	0.85	0.14	1.01	1.98	0.83	0.66	4	Well
Shandong	0.70	0.86	0.10	1.67	-0.01	0.53	5	Well
Zhejiang	0.59	1.25	1.51	-0.99	0.37	0.52	6	Well
Guangdong	-0.01	-0.10	0.56	-0.66	0.14	0.51	7	Well
Liaoning	1.08	-0.21	-0.06	0.23	0.99	0.48	8	Moderate
Heilongjiang	1.13	-0.84	-0.98	-0.05	1.10	0.30	9	Moderate
Jilin	0.91	-0.85	-0.74	-0.25	1.70	0.26	10	Moderate
Fujian	0.18	0.01	0.65	-0.46	0.21	0.13	11	Moderate
Inner Mongolia	0.69	-0.88	-1.13	0.23	1.21	0.12	12	Moderate
Shanxi	0.33	-0.45	0.20	0.70	-1.82	0.05	13	Moderate
Hebei	-0.05	-0.10	-0.12	1.09	0.15	0.04	14	Moderate
Hubei	-0.03	0.17	-0.24	-0.39	-0.23	-0.06	15	Less
Shaanxi	0.54	-0.94	-0.80	-0.41	-1.17	-0.09	16	Less
Henan	-0.36	0.43	-0.51	0.50	-0.25	-0.12	17	Less
Hunan	-0.11	0.13	-0.16	-0.94	-0.28	-0.13	18	Less
Anhui	-0.41	0.04	0.94	-0.49	-0.99	-0.15	19	Less
Jiangxi	-0.02	-0.26	-0.26	-0.93	-0.40	-0.16	20	Less
Chongqing	-0.00	0.08	-0.71	-0.64	-0.87	-0.17	21	Less
Sichuan	-0.30	-0.09	-0.63	-0.69	-0.60	-0.29	22	Less
Gansu	-0.20	-0.67	-0.79	-0.13	-1.02	-0.32	23	Poor
Guangxi	-0.38	0.00	-0.67	-1.27	-0.59	-0.35	24	Poor
Hainan	-1.00	-0.15	-0.34	-2.19	1.85	-0.51	25	Poor
Xinjiang	-0.99	-1.26	-0.54	-0.11	2.05	-0.51	26	Poor
Ningxia	-1.06	-0.59	-0.37	0.54	-0.57	-0.54	27	Poor
Qinghai	-1.37	-0.31	-0.35	1.20	-0.74	-0.59	28	Poor
Yunnan	-0.81	-0.18	-0.89	-1.16	-1.16	-0.60	29	Poor
Guizhou	-1.18	-0.19	-0.92	-1.12	-1.72	-0.78	30	Poor
Tibet	-3.13	-0.82	-0.31	1.05	-0.08	-1.33	31	Poor

[a] Original variables standardized with zero mean and unit variance. Total scores are the sum of factors scores, weighted by the factor proportion of variance explained (Table 4). Factor scores are defined as: (1) farmer knowledge and cultural exposure, (2) improved agricultural technologies, (3) rural income standards and government support, (4) modern infrastructure and health services, and (5) farmer labor and management skills.