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The Inter–provincial Disparity in China's Agricultural Labor Productivity

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This paper examines the evolution of inter–provincial disparity in China's agricultural productivity by using the convergence test, and investigates the factors which affect the disparity by employing the regression–based disparity decomposition approach. The convergence test finds that there is no existence of absolute convergence but merely conditional convergence for China's agricultural labor productivity over the period 1986–2005. The decomposition results indicate that production input is the dominant factor for both the inter–provincial disparity itself and the increase in it in China's agricultural labor productivity, and the total factor productivity also plays the important role. Among the input factors, intermediate input makes the major contribution to enlarging disparity, and farmland plays a remarkable role of deceleration for the increase in disparity, while the total factor productivity plays a significant role of acceleration.

INTRODUCTION

With the rapid growth of China's national economy, the share of agriculture in national economy shows a downward trend. But as the basic industry, China's Agriculture is critical to China's development whether in the past or in the future. Against the background of increasingly enlarged regional disparity in China's overall economy (Lin and Liu, 2003; Xu and Li, 2006; etc.), the regional gap in China's agriculture sector is widening, and the issue of regional disparity in China's agricultural labor productivity (ALP) also attracts more and more attentions. The enlarging regional disparity in ALP might not only result in enlarging regional disparity in agricultural economy but also lead to substantial regional inequality in national economy.

One earlier empirical research (Tian, 1987) on the issue of regional disparity in China's ALP focuses on the two main driving forces for ALP, production input and production efficiency, which finds that there is large inequality across provinces over the period 1981–1984 and production input, is the dominant factor for the disparity. In recent researches, Chen and Yang (2005) and McErlean and Wu (2003) give empirical studies on the convergence issue of China's ALP, but the two conclusions are not all in agreement due to different samples and approaches. Chen and Yang (2005)'s analysis concludes that it is of not only conditional β–convergence but also σ–convergence distinctly for China's ALP. While McErlean and Wu (2003)'s study indicates that China's ALP diverges over the period 1985–1992, and conditionally converges over the period 1992–2000. Additionally, Xin and Qin (2007)'s research finds that the regional disparity in China's ALP is widening, and the contribution of inner–regional disparity to the overall disparity is decreasing, nevertheless the contribution of inter–regional disparity is increasing.

After the period 1978–1984 with the most rapid growth rate, the disparity in China's regional ALP across three regions (Eastern, Central and Western) becomes larger and larger (Xin and Liu, 2007). While few empirical literature focuses on the issue of inter–provincial disparity in China's ALP, which is an important content in the regional inequality research. Given the absence and importance of studying this issue, this paper aims to investigate the evolution and determinants of inter–provincial disparity in China's ALP. The rest of the article is organized as follows. Section Ⅱ describes the level of China's ALP and analyzes the evolution of inter–provincial disparity over the past two decades by using the convergence test. Section Ⅲ investigates the sources of disparity by employing the regression–based decomposition approach. Section Ⅳ highlights the conclusions.

DESCRIPTIVE ANALYSIS AND CONVERGENCE TEST

How wide is the inter–provincial disparity gap in China's ALP? And how is the change tendency of the disparity gap? The above two questions are to be answered in this section. Firstly, a descriptive analysis on China's ALP is given. Then, convergence test is used to study the evolution of inter–provincial disparity in China's ALP empirically.

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Descriptive analysis

ALP is defined as output of agricultural products per agricultural worker. Agricultural output (Y) measures the gross value of agricultural output which includes farming, forestry, animal husbandry, and fishery. Gross value of agricultural output is measured at 1990 constant price to eliminate the influence of price inflation. The data is taken from various issues of *China Rural Statistical Yearbook*. The sample includes 30 provinces, autonomous regions and municipalities in mainland China from 1986 to 2005. While Chongqing City was separated from Sichuan Province as a new municipality in 1997, this paper still merges it into Sichuan Province. In 1986 Hainan Province was established and separated from Guangdong Province, thus only the data after 1987 of these two provinces is available.

Descriptive statistical indicators of China's ALP over the period 1986–2007, such as minimum, maximum, mean, standard deviation, coefficient of variation and rate of extreme gap, are reported in Table 1, through which we can observe the trend of the regional disparity in ALP. It is showed that the mean level of China's ALP in 2005 is nearly 3 times higher than that in 1986, which indicates there is a huge rise in China's ALP in recent two decades years. But meanwhile, the growing trends of standard deviation, coefficient of variation and the rate of extreme gap, reflecting the absolute or relative level of disparity respectively, show the inter–provincial disparity is enlarging.

Sigma (σ) convergence

σ–convergence belongs to the concept of absolute convergence. σ–convergence occurs if the dispersion in the level of ALP across provinces is declining across the sample period. The standard deviation is one of the main measures used to test σ–convergence. σ–convergence test holds if the standard deviation of the logarithm of ALP decreases over time. The standard deviation of the logarithm of ALP across the 30 regions in China, calculated for each year from 1986 to 2005, is presented in Fig. 1. The evidence in this figure, except for some points going down which can not change the overall upward trend, suggests a substantial steady increase in standard deviation indicating σ–convergence. The dispersion level increases from 0.327 at the beginning of the period to 0.460 in 2005.

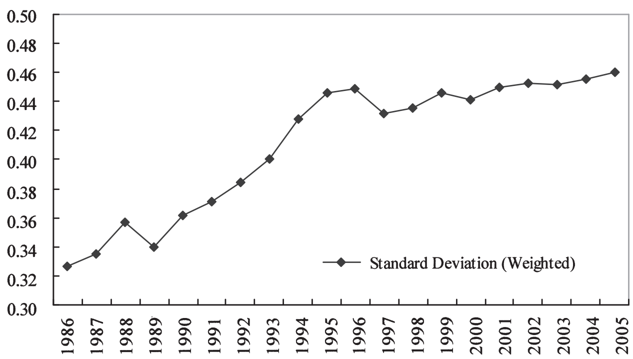

Fig. 1. Standard deviation of the Log ALP in China.
Source: Calculated from China Rural Statistical Yearbook (various issues)
Note: China's ALP is calibrated by 1990 constant price.

Table 1. Descriptive statistics of the data

Year	Min	Max	Mean	S. D.	C. V.	Rate of Extreme Gap	Number of Sample
1986	1252.77	6326.49	2700.12	1350.95	0.50	5.05	28
1987	1226.45	7182.59	2881.09	1484.07	0.52	5.86	30
1988	1190.85	8387.30	3051.50	1747.44	0.57	7.04	30
1989	1190.05	8885.48	3070.85	1822.63	0.59	7.47	30
1990	1160.79	9544.00	3294.41	2032.47	0.62	8.22	30
1991	1272.29	10797.12	3411.46	2289.38	0.67	8.49	30
1992	1254.53	12009.08	3700.95	2596.26	0.70	9.57	30
1993	1290.46	12047.62	3994.37	2682.63	0.67	9.34	30
1994	1349.30	13292.58	4400.13	3026.20	0.69	9.85	30
1995	1386.46	13931.40	4828.09	3234.04	0.67	10.05	30
1996	1433.97	14992.42	5209.77	3337.38	0.64	10.46	30
1997	1460.33	14376.89	5193.36	3245.74	0.62	9.84	30
1998	1458.80	14024.90	5427.02	3297.98	0.61	9.61	30
1999	1469.81	14008.44	5542.28	3213.69	0.58	9.53	30
2000	1586.62	16154.95	5839.96	3554.61	0.61	10.18	30
2001	1610.03	17820.32	6205.89	3902.34	0.63	11.07	30
2002	1667.78	20982.84	6660.67	4356.87	0.65	12.58	30
2003	1828.15	24806.72	7277.50	5063.26	0.70	13.57	30
2004	1924.60	25594.20	7839.42	5205.74	0.66	13.30	30
2005	2071.52	25369.35	8305.93	5244.02	0.63	12.25	30

Source: Calculated from China Rural Statistical Yearbook (Various Issues)
Note: China's ALP is calibrated by 1990 constant price.

Unconditional Beta (β) convergence

β–convergence considers the growth of ALP. In other words, β–convergence considers the speed with which the logarithm of ALP tends to its steady–state value from some initial condition in different economies. Unconditional β–convergence occurs if economies converge to the common ALP steady–state, and conditional β–convergence occurs if economies converge to different (but, parallel) output steady–states. Unconditional β–convergence also belongs to the concept of absolute convergence. Unconditional β–convergence can be tested on the basis of ordinary least squares (OLS) regression. In order to eliminate the impact of business cycle fluctuations on the data, generally the entire sample period is subdivided into several shorter time periods. For each time period, the average is used as the variable value. In this paper, the entire sample period is divided into five time periods evenly which are 1986–1989, 1990–1993, 1994–1997, 1998–2001, 2002–2005, separately.

Following Mankiw, Romer and Weil (1992), the test equation of unconditional β–convergence can be written as the following specification:

$$(\ln LP_{i5} - \ln LP_{i1})/\tau = \alpha + \beta \ln LP_{i1} + \varepsilon \quad \text{...........(1)}$$

where $LnLP_{it}$ represents the average of the logarithm of ALP in the i^{th} province during the corresponding time period, where i=1, 2, 3, …, 30, and t=1, 2, 3, …, 5. For example, the value of $lnLP_{i1}$ is the average of the logarithm of ALP in the i^{th} province over 1986–1989, and the value of $lnLP_{i5}$ is that in the i^{th} province over 2002–2005. τ, the number of years between two time periods, is equal to 16. When the β–convergence coefficient is negative and significant, convergence is accepted. When the β–convergence coefficient is insignificant, convergence (and divergence) is rejected. The estimated convergence speed λ can be calculated as follows once the $\hat{\beta}$ parameter has been estimated,

$$\lambda = -\log(1+\beta\tau)/\tau \quad \text{...........(2)}$$

The OLS estimation results for unconditional β–convergence are reported in equation (3):

$$(\ln LP_5 - \ln LP_1)/16 = -0.0436 + \underset{(2.13)^*}{0.0125} \ln LP_1 \quad \text{...........(3)}$$

The value of t is in parentheses, and * denotes statistical significance at 5% level. Adjusted R^2 is 0.11[1], and λ is –0.0114. The positive sign of $\hat{\beta}$, the estimated unconditional β–convergence coefficient for the period 1986–2005, indicates divergence. The annual divergence rate is 1.14%.

Conditional β–convergence

Conditional β–convergence can be tested on the basis of fixed effects model of panel data (Islam, 1995). The conditional β–convergence test is conducted by estimating regressions with the growth rate as the dependent variable and the previous level of ALP as the explanatory variable as follows:

$$d\ln LP_{it} = \ln LP_{it} - \ln LP_{it-1} = \alpha + \beta \ln LP_{it-1} + \varepsilon_{it} \quad \text{...........(4)}$$

where i=1, 2, 3, …, 30, and t=1, 2, 3, …, 5. $lnLP_{it}$ represents the average of the logrithm ALP in the i^{th} province during the corresponding time period. The speed of convergence is given by $\lambda = -\log(1+\beta\tau)$, where τ, the number of years each time period contains, is equal to 4.

The estimates for unconditional β–convergence are reported in equation (5):

$$\ln LP_t - \ln LP_{t-1} = 4.1815 - \underset{(-6.38)^{**}}{0.5417} \ln LP_{t-1} \quad \text{...........(5)}$$

The value of t is in parentheses, and **denotes statistical significance at 1% level. Adjusted R^2 is 0.34, and λ is 0.1951. The negative sign of $\hat{\beta}$ indicates the conditional convergence of APL. The annual divergence rate is 19.51%.

Based on the above evidences, we can draw the following conclusions that there is no existence of absolute convergence but merely conditional convergence for China's ALP over the period 1986–2005. The existence of conditional convergence shows that ALP in each province is moving to its own steady–state, whereas the rejection of absolute convergence indicates that the disparity gap in ALP across provinces will not be decreased. Then which is the dominant factor affecting the inter–provincial disparity in China's ALP, production input factors or TFP? This question will be discussed in the third section.

DECOMPOSITION OF INTER–PROVINCIAL DISPARITY IN CHINA'S ALP

Model specifications

Following the traditional literature, an aggregate agricultural production function is assumed of the following form:

$$Y(t) = A(t)F(L(t), K(t), N(t)) \quad \text{...........(6)}$$

where capital (K(t)), land (N(t)), and labor (L(t)) are the inputs in aggregate production in period t, technical progress is reflected in the term A(t), and Y(t) is output. In the earlier literature, Y(t) usually refers to value added

[1] Although the value of R^2 is lower, as Woodridge (2009) argues OLS regression is not unuseful and still the estimates obtained by OLS regression can be reliable. As the usual practice in the literature of convergence, not the value of R^2, but whether the β–convergence coefficient is significant or not is attracted as the rule of accepting or rejecting the convergence or divergence. Some literature on the convergence issues of national economy or agricultural sector in China such as McErlean and Wu (2003), Peng (2005), Xu and Shu (2004), etc. also gets the lower values of R^2 when testing for the convergence.

term and K(t) refers to accumulated fixed capital. However, in the application to China's agricultural economy, it is difficult to attain relatively reliable data on the accumulated fixed capital. There are several reasons. One is that after the introduction of the household responsibility system (HRS) in 1978, a large of fixed capital investment by the collective and central government was laid idle and lacked maintains. Another reason is that the fixed investments by small rural households are hard to measure since some of the activities are not marked by price. For instance, farmers could build a small scale irrigation system for household use with family labor and self prepared materials. To deal with this problem we assume that the fixed capital (accumulated) is held constant, and the depreciation is supplemented by new investment. The fixed capital will not be considered in the statistical regression process. Agricultural gross output is chosen as the dependent variable. Capital input includes only the intermediate input.

We assume that each province has the same production function at a given time, but that the provinces lie at different points on the production surface. That is to assume that the coefficients are the same across provinces. Following standard procedures in the literature, we assume that the aggregate production functions are of Cobb–Douglas form as follows:

$$Y = A(t) L^{\beta 1} K^{\beta 2} N^{\beta 3} E^{\beta 4} \qquad \ldots\ldots\ldots\ldots(7)$$

In equation (7), Labor (L), Capital (K) and Farmland (N) are traditional inputs in agricultural production, and Education (E) as an input is suggested by the new growth theory to capture the growth impact of human capital (Barro and Sala–i–Martin, 1995).

Both output and conventional input (excluding education) in equation (7) are divided by the number of laborers L, to yield:

$$\frac{Y}{L} = A(t) L^{\delta-1} \left(\frac{L}{L}\right)^{\beta 1} \left(\frac{K}{L}\right)^{\beta 2} \left(\frac{N}{L}\right)^{\beta 3} E^{\beta 4} \qquad \ldots\ldots\ldots\ldots(8)$$

where $\delta = \sum_{i=1}^{3} \beta i$.

Notably, labor still appears on the right–hand side of equation (8) unless constant returns to scale (CRS) is imposed on the production function so that δ is equal to 1. As the standard practice in the literature (Zhang and Zhang, 2003), we assume constant returns to scale. The logarithmic form of equation (8) thus is given by:

$$y = \beta_0 + \beta_2 k + \beta_3 n + \beta_4 \phi(AEdu) + \beta_5 t + \beta_6 t^2 + \varepsilon \qquad \ldots\ldots\ldots\ldots(9)$$

where lower cases indicate logarithms. An error term ε is added to represent the stochastic shocks to output and is assumed to be unrelated to the other variables. Following Shorrocks (1982), the variance of y in equation (9) can be decomposed as:

$$\begin{aligned} \sigma^2(y) &= \mathrm{cov}(y, \beta_2 k) + \mathrm{cov}(y, \beta_3 n) \\ &\quad + \mathrm{cov}(y, \beta_4 \phi(AEdu)) + \mathrm{cov}(y, \beta_0 + \beta_5 t + \beta_6 t^2) \\ &\quad + \mathrm{cov}(y, \varepsilon) \\ &= \beta_2 \mathrm{cov}(y, k) + \beta_3 \mathrm{cov}(y, n) \\ &\quad + \beta_4 \mathrm{cov}(y, \phi(AEdu)) + \beta_5 \mathrm{cov}(y, t) \\ &\quad + \beta_6 Cov(y, t^2) + \sigma^2(\varepsilon) \end{aligned} \qquad \ldots\ldots\ldots\ldots(10)$$

where $\sigma^2(y)$ is the variance of y and cov(y,·) represents the covariance of y with other variables. Since the right–hand side variables in equation (9) are not correlated with the error term, the covariance of y and ε is equal to the variance of ε. Considering that y is already in the logarithmic form, $\sigma^2(y)$ is a standard inequality measure known as the logarithmic variance (Cowell, 1995). It has the property of invariance to scale. According to Shorrocks (1982), the covariance terms on the right hand side of equation (10) can be regarded as the contributions of the factor components to total inequality. Zhang and Zhang (2003), Zhang and Fan (2004), etc. also employ this variance decomposition method to study the issues of disparity in China's national economy and rural economy.

The equations (9) and (10) constitute the basis for the analysis of this section. In particular, the ALP function specified in equation (9) is estimated first. Then, the disparity is able to be decomposed into the components of production factors following equation (10).

Data

Agricultural output (Y), gross value of agricultural output, is measured at 1990 constant price to eliminate the influence of price inflation. Labor (L) is the number of agricultural workers at the year–end. Capital (K) is the cost of intermediate input including seeds, fertilizer, and pesticides and soon on. Considering the simultaneous increase in the value of gross agricultural production and the price of intermediate input, the cost of intermediate input is deflated by the price index of gross value of agricultural output to eliminate the influence of price inflation or deflation (Xin and Qin, 2011). Farmland (N) is the cultivated area of major crops. Education (E), following Peng (2005), is specified as the function of average years of education, that is $E = e^{\phi(AEdu)}$. Here, $\phi(AEdu)$ is a piecewise function with the value separately is 0.16, 0.134 and 0.151 when the average years of education is 0–6, 6–12 and more than 12 years. When calculating the average years of education, the weights are as follows: illiterate, 0 year; primary school, 6 years; junior secondary school, 9 years; senior secondary school, 12 years; technical secondary school, 14 years, and college and higher level, 16 years. Time trend variable (t) is the value 1–20 from 1986 to 2005 respectively.

The sample, same as the second section, also includes the data on agricultural production of 30 provinces, autonomous regions and municipalities in mainland. All the data is taken from various issues of *China* the *Rural Statistical Yearbook*, and Table 2 presents descriptive statistics of the data set.

Additionally, in yearbooks there is no provincial data of the education structure of the agricultural workers in 1986 and 1987, but only the data on national level.

Table 2. Descriptive statistics of the data

Variables			Mean	S. D.	Min	Max	Number of Sample
(Nationwide)							
Agricultural output (0.1 billion)*	*Y*	Overall	597.37	611.88	9.92	3741.80	*N* = 598
		Between		453.99	33.93	1644.13	*n* = 30
		Within		418.52	–685.57	2695.05	*T–bar* = 19.93
Numbers of Laborers (10 thousand)	*L*	Overall	1074.63	917.40	57.90	4333.00	*N* = 598
		Between		924.18	71.43	3802.64	*n* = 30
		Within		116.42	365.54	1643.21	*T–bar* = 19.93
Average education years (Year)	*Edu*	Overall	6.92	1.46	1.46	10.23	*N* = 598
		Between		1.27	2.31	9.09	*n* = 30
		Within		0.76	5.17	9.12	*T–bar* = 19.93
Intermediate material (0.1 billion)*	*K*	Overall	156.57	158.34	0.93	1421.40	*N* = 598
		Between		125.72	5.45	522.56	*n* = 30
		Within		98.88	–170.15	1055.41	*T–bar* = 19.93
Sown area (1 thousand hectares)	*N*	Overall	4834.45	3592.95	32.53	14330.00	*N* = 598
		Between		3460.56	212.36	12795.30	*n* = 30
		Within		1141.03	–5681.24	6846.69	*T–bar* = 19.93

Source: Calculated from China Rural Statistical Yearbook (various issues)
Note: *at 1990 constant price

Table 3. Estimation results of agricultural Cobb–Douglas production function

Dependent Variables	Intermediate Input K	Farmland N	Education ϕ (*AEdu*)	Time Trend	
				T	T^2
Coefficient	0.5138	0.2621	0.2256	0.0045	0.0008
T Value	27.33**	7.1**	1.99*	1.18	6.62**

Source: Self calculation
Note: *and ** separately denote statistical significance at 5% and 1% level, respectively. Adjusted–R^2 = 0.96.

Through data analysis, it is found that over the period 1986–1988 the overall improvement of education is very slow throughout the whole nation, and the average education years varies slightly, thus the growth rate of the average national workers' education years is used as the substitution of the provincial growth rate in 1986 and 1987. The robustness of such substitution is further tested, and proved eligible[2].

Empirical results and discussions

The regression estimates of the production function are reported in Table 3. The high value of adjusted R^2 shows the high capability of explanation for the agricultural production over the period 1988–2003. Coefficients of all variables, except T, are above confidence level of 0.05.

Given the estimated coefficients for labor productivity function, we can now apply the disparity decomposition method outlined in equation (10) to quantify the contributions of production input factors to inter–provincial disparity in labor productivity.

Table 4 reports the overall disparity and the contributions from input factors. According Table 4, Figure 2 describes the trends of inter–provincial disparity in China's ALP and the contribution shares of production input factors. It is indicated that production input is the dominant factor behind the increase in the inter–provincial disparity in China's ALP with the contribution share of more than 70% over the years. Among production input factors, the contribution of intermediate input accounts for major share, more than 50% over the years. The next are farmland and education in turn. For the other share that production input factors can not explain accounts for a large proportion of inter–provincial disparity, about 30%, which part is called total factor productivity (TFP) following Solow Residual definition. Thus we can say TFP also plays the important role in regional disparity.

The disparity index, measured as the logarithm variance, in the second column in Table 4 has increased from 0.198 in 1986 to 0.368 in 2005, indicating a widening gap in ALP over the period. The total growth in disparity index is 86.42 percent, in which the contributions of intermediate input, farmland, education and the other share that production input factors can not be explained are 60.49 percent, −4.41 percent, 3.95 percent, and 39.97 percent, respectively. Obviously, production input is the main contributor to the enlargement of inter–provincial disparity in China's ALP with the contribution share of 60.03%, while TFP also is an important source

[2] Not reported in this article. Detailed test process and results can be found in Xin and Liu (2007), Regional Disparity of Factor Endowment and Agricultural Labor Productivity in China, World Economic Papers, 5: 1–18.

Table 4. Disparity decomposition by factors

Year	Disparity	Intermediate Input		Farmland		Education		Other Factors	
1986	0.198	0.115	(58.11)	0.035	(17.75)	0.009	(4.35)	0.039	(19.79)
1987	0.214	0.123	(57.67)	0.034	(15.77)	0.009	(4.23)	0.048	(22.33)
1988	0.247	0.141	(56.92)	0.039	(15.61)	0.010	(4.06)	0.058	(23.42)
1989	0.243	0.146	(60.26)	0.036	(15.03)	0.010	(4.25)	0.050	(20.46)
1990	0.275	0.163	(59.53)	0.041	(15.05)	0.011	(4.17)	0.058	(21.26)
1991	0.303	0.178	(58.87)	0.042	(13.87)	0.011	(3.78)	0.071	(23.47)
1992	0.326	0.198	(60.88)	0.045	(13.79)	0.012	(3.74)	0.070	(21.59)
1993	0.322	0.195	(60.53)	0.043	(13.27)	0.012	(3.77)	0.072	(22.43)
1994	0.352	0.214	(60.92)	0.043	(12.27)	0.014	(3.93)	0.080	(22.87)
1995	0.364	0.218	(59.91)	0.042	(11.54)	0.015	(4.09)	0.089	(24.45)
1996	0.354	0.209	(59.00)	0.042	(11.86)	0.014	(4.06)	0.089	(25.08)
1997	0.337	0.199	(58.95)	0.038	(11.19)	0.014	(4.20)	0.086	(25.66)
1998	0.331	0.196	(59.08)	0.034	(10.28)	0.014	(4.31)	0.087	(26.34)
1999	0.332	0.195	(58.78)	0.030	(9.10)	0.014	(4.23)	0.093	(27.89)
2000	0.341	0.203	(59.41)	0.028	(8.07)	0.014	(4.01)	0.097	(28.51)
2001	0.357	0.213	(59.73)	0.027	(7.49)	0.013	(3.50)	0.105	(29.28)
2002	0.367	0.219	(59.56)	0.025	(6.88)	0.015	(4.00)	0.109	(29.55)
2003	0.385	0.247	(64.12)	0.026	(6.82)	0.015	(3.92)	0.097	(25.14)
2004	0.375	0.223	(59.47)	0.027	(7.15)	0.015	(3.96)	0.110	(29.42)
2005	0.368	0.218	(59.22)	0.028	(7.48)	0.015	(4.17)	0.107	(29.14)
Growth	86.42%	52.28%		–3.81%		3.41%		34.54%	
Contribution	100.00%	60.49%		–4.41%		3.95%		39.97%	

Source: Self calculation

Note: ①Contribution shares to the overall disparity by intermediate input, farmland, education and unexplained factors are in parentheses.

②The total increase in disparity can be expressed as follows: $\frac{y_t}{y_{t-1}} = \sum_i \frac{x_{it-1}}{y_{t-1}} \cdot \frac{\Delta x_{it}}{x_{it-1}} = \sum_i S_{it-1} \cdot \frac{\Delta x_{it}}{x_{it-1}}$, where $\sum_i S_{it-1}$ is the share of the i^{th} factor's contribution to overall disparity in year t–1 and $\frac{\Delta x_{it}}{x_{it-1}}$ is the growth rate of the i^{th} factor's contribution from t–1 to t.

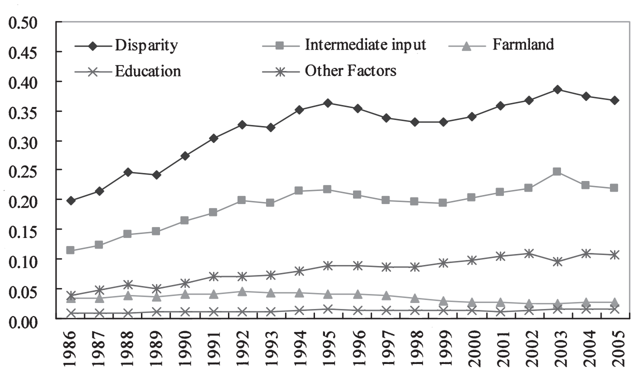

Fig. 2. Contribution shares of production factors to regional disparity.
Source: Disparity decomposition results conducted by authors

for the enlargement of inter–provincial disparity in China's ALP with the contribution share of about 40%.

From the trends of production factors' contribution to overall inter–provincial disparity in Figure 2, it is showed that the contribution shares of both intermediated input and education have decreased or increased so small. The contribution share of farmland has decreased from 17.75 percent in 1986 to 7.48 percent in 2005, which indicates that farmland plays the remarkable role of deceleration for the enlargement of disparity. While the contribution share of TFP has increased from 19.79 percent in 1986 to 29.14 percent in 2005, which indicates that the growth speed of inter–provincial disparity in TFP is significantly faster than that of inter–provincial disparity in ALP and then TFP plays the significant role of acceleration for the enlargement of disparity. Additionally, even though the change of contribution share of intermediate input in inter–provincial disparity is so small, the contribution share of intermediate input in the increase in inter–provincial disparity is 60.49% which denotes intermediate input is the main source of the increase in inter–provincial disparity.

CONCLUSIONS

This paper studies the evolution trend of inter–provincial disparity in China's ALP by using the convergence test. The test results suggest that there is no existence of absolute convergence but merely conditional convergence for ALP in China over the period 1986–2005. This paper investigates the factors which affect the disparity by employing the regression–based decomposition approach. The decomposition results indicate that production input factors contribute more to both the inter–provincial disparity itself and the increase of it in China's ALP, while TFP also plays the important role. Among the input factors, immediate input is the main source of the increase in disparity, and farmland plays the role of deceleration for the increase in disparity, while TFP plays the role of acceleration. Improving efficiency to promote TFP and increasing production input are significant ways to promote ALP for lagging provinces and narrow the inter–provincial gap.

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