ADB Institute Discussion Paper No. 40

Economic and Social Development in the People's Republic of China's North-East Region: a Comparative Study

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Introduction

This paper aims to provide an evaluation on relative economic and social achievement of the three North-East (NE) provinces of the People's Republic of China (PRC), i.e., Liaoning (LN), Jilin (JL) and Heilongjiang (HLJ), comparing with other provinces. The evaluation uses 80 indicators based on available data from statistics and surveys, in order to find the relative advantages and weaknesses of the NE provinces. Ranks of LN, JL and HLJ among 31 provinces (including five autonomy regions and four municipalities under direct central administration; they are called provinces for short hereafter) are calculated to show their relative achievements in economic and social development.

The evaluation is carried out in the following nine aspects:
I.   The level of economic development
II.   Population and labor force
III. Industrial structure and factor intensity
IV.   Productivity and R&D
V.   Social development
VI.   Infrastructure
VII. Environment protection
VIII.   Natural resources and geographical conditions
IX.   Institutional environment

Major findings of the study and policy implications are summarized at the end of the paper.

The newest data for most indicators are of year 2004, only a few are of 2002 or 2003 and are stated where used. Data used in this paper without indicating sources are from *China Statistical Yearbook* (NBS(a), various years) and *China Population Statistical Yearbook* (NBS(b), various years). Others are from *NERI Index of Marketization of China's Provinces* (Fan, Wang, et al, various years), various provincial statistical yearbooks, enterprise sample surveys by National Economic Research Institute (NERI), and provided by different government departments.

I. The Level of Economic Development

Six indicators are used to evaluate the level of economic development in the NE provinces. They are per capita GDP, per capita urban disposable income, per capita rural net income (all in current prices), the urbanization rate (percentage share of urban population in total), non-agricultural employment ratio (percentage share of non-agricultural employment in total employment), and urban employment ratio (percentage share of urban employment in total employment). The values of the three NE provinces for each indicator, and their average value, are shown in Table 1. The Table also shows the maximum, minimum and average values of the 31 provinces and the names of the provinces with the maximum and minimum values.[1] In Table 2, ranks of LN,

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[1] To help readers to recognize the short names of the 31 provinces, their full names are provided below.

Beijing	BJ	Shanghai	ShH	Hubei	HuB	Yunnan	YN
Tianjin	TJ	Jiangsu	JS	Hunan	HuN	Tibet	Tib
Hebei	HB	Zhejiang	ZhJ	Guangdong	GD	Shaanxi	Sh'X
Shanxi	ShX	Anhui	AH	Guangxi	GX	Gansu	GS
Inner Mongolia	InM	Fujian	FJ	Hainan	HaiN	Qinghai	QH
Liaoning	LN	Jiangxi	JX	Chongqing	CQ	Ningxia	NX
Jilin	JL	Shandong	SD	Sichuan	SC	Xinjiang	XJ

JL and HLJ among the 31 provinces are calculated. The Table also indicates the averages values of their ranks.

Table 1. Indicators on economic development

		LN	JL	HLJ	NE	Max		Min		Aver
GDP per capita	(1000 yuan)	16.3	10.9	13.9	13.7	42.8	(ShH)	4.1	(GZh)	13.2
Urban disposable income	(1000 yuan)	8.0	7.8	7.5	7.8	16.7	(ShH)	7.2	(NX)	9.2
Rural net income	(1000 yuan)	3.3	3.0	3.0	3.1	7.1	(ShH)	1.7	(GZh)	3.2
Urbanization rate	(%)	56.1	53.4	52.6	54.0	94.2	(ShH)	22.6	(YN)	44.9
Non-arg. employment ratio	(%)	63.2	49.9	49.0	54.0	93.1	(BJ)	28.7	(YN)	54.1
Urban employment ratio	(%)	44.5	39.9	41.9	42.1	80.9	(BJ)	12.3	(GZh)	30.3

Table 2. Ranks of NE provinces in economic development

		LN	JL	HLJ	NE
GDP per capita	H-L	9	14	10	11
Urban disposable income	H-L	16	19	27	21
Rural net income	H-L	9	12	11	11
Urbanization rate	H-L	5	6	8	6
Non-arg. employment ratio	H-L	7	12	16	12
Urban employment ratio	H-L	5	6	7	6
Average ranks		9	12	13	11

* H-L means ranked from high to low, and vice versa. The same hereafter.

Indicated by per capita GDP, economic development in NE provinces is generally at the medium level in PRC, slightly higher than national average. However, compared with their historical records, their relative positions fell significantly during the past decades. Table 3 indicates that, LN and HLJ ranked at the fourth and fifth places among the 31 provinces, immediately after the three municipalities, Beijing, Shanghai and Tianjin in 1980. Now they ranked at the 9th and 10th places. JL's position also dropped from 11th to 14th.

Table 3. Ranks of NE provinces in GDP per capita

	LN	JL	HLJ
1980	4	11	5
1990	4	11	8
2000	8	14	10

Heilongjiang	HLJ	Henan	HeN	Guizhou	GZh	

2004	9	14	10

The per capita urban disposable income is relatively low, ranked at the middle-low (LN and JL) and low (HLJ) levels. Rural income ranked higher, generally around the provincial average level, benefited from their richer land resources.

On the average of the three provinces, the urbanization rate is higher than the provincial average by nearly 10 percentage points. This was a historical heritage. Their changes in urbanization rate are actually slower than the provincial average. From 1980 to 2004, the urbanization rate, as the provincial average, increased by 23.7 percentage points, whereas it only increased by 20.5, 20.6, and 15.4, respectively, in LN, JL and HLJ. These indicate weaker urban development in NE regions.

II. Population and Labor Force

The author uses six indicators to measure population-related development and employment issues. They are life expectancy, natural population growth, population dependency ratio (non-working age population to working age population), immigration ratio (the percentage share of population living the towns, townships, and streets without local permanent household registration), registered urban-unemployment rate, and employment-population ratio. The values and ranks are shown in Tables 4 and 5.

Table 4. Population and labor force

		LN	JL	HLJ	NE	Max		Min		Aver
Life expectancy	(years old)	73.3	73.1	72.4	72.9	78.1	(ShH)	64.4	(Tib)	71.2
Natural population growth	(‰)	0.91	1.76	1.82	1.5	11.20	(Tib)	0.00	(ShH)	5.44
Dependency ratio	(%)	30.5	27.1	27.1	28.2	49.4	(GD)	26.7	(BJ)	38.6
Immigration ratio	(%)	10.0	4.7	6.7	7.1	30.3	(BJ)	0.7	(Tib)	9.1
Reg. urb unemp rate	(%)	6.5	4.2	4.5	5.1	6.5	(LN)	1.3	(BJ)	3.9
Empl-pop ratio	(%)	46.3	41.2	42.5	43.3	65.5	(ZhJ)	37.9	(XJ)	49.9

Table 5. Ranks of population and labor force

		LN	JL	HLJ	NE
Life expectancy	H-L	7	9	13	10
Natural population growth	L-H	3	5	6	5
Dependency ratio	L-H	3	4	2	3
Immigration ratio	H-L	9	17	27	18
Reg. urb unemp rate	L-H	21	28	31	27
Empl-pop ratio	H-L	23	30	28	27
Average ranks		11	16	18	15

The tables show that the average life expectancy of NE provinces is 72.9 years old, 1.8 years higher than the provincial average. The natural population growth rate and population dependency ratio is relatively low; these indicate a good situation in population

development and lighter aging burden. However, the low immigration ratio, high unemployment rate and low employment-population ratio indicates under development of labor market and less employment opportunities.

III. Industrial Structure and Factor Intensity

There are total 20 indicators used in this section. Generally speaking, the structure indicators do not have a clearly preferred direction except that they represent certain structural characters of the economy at certain development stages and under certain conditions of factor endowments. For instance, share of the primary industry in an economy is usually decreasing during the industrialization period while share of the secondary industry being increasing, and share of the tertiary industry increases mainly during the post-industrialization period. Therefore these indicators can be used as references for further analysis.

For industrial structure, the indicators are shares of the primary, secondary, and tertiary industries in GDP and in total employment (Tables 6-7).

Table 6. Industrial structure

		LN	JL	HLJ	NE	Max		Min		Aver
Prim.ind. share in GDP	(%)	11.2	19.0	11.1	13.8	36.9	(HaiN)	1.3	(ShH)	15.3
Secon.ind. share in GDP	(%)	47.7	46.6	59.5	51.3	59.5	(HLJ)	23.4	(HaiN)	47.3
Third ind. share in GDP	(%)	41.1	34.4	29.4	35.0	60.0	(BJ)	29.4	(HLJ)	37.5
Prim. Ind. share in employment	(%)	36.8	46.5	49.1	44.1	71.3	(YN)	6.9	(BJ)	45.9
Secon. Ind. share in employment	(%)	24.8	18.6	20.4	21.3	40.1	(TJ)	9.1	(YN)	21.5
Tert. Ind. share in employment	(%)	38.4	34.9	30.5	34.6	66.7	(BJ)	19.6	(YN)	32.6

Table 7. Ranks in industrial structure

		LN	JL	HLJ	NE
Prim.ind. share in GDP	H-L	23	11	24	19
Secon.ind. share in GDP	H-L	17	19	1	12
Third ind. share in GDP	H-L	5	20	31	19
Prim. Ind. share in employment	H-L	25	20	16	20
Secon. Ind. share in employment	H-L	11	19	14	15
Tert. Ind. share in employment	H-L	4	7	20	10

Indicated in the Tables 6 and 7, the proportions of the secondary industry in GDP in LN and JL are around the national average, whereas HLJ represent the highest nation-widely. The tertiary industry share in LN is high, but HLJ is the nation-wide lowest. The exceptional structure of HLJ is mainly due to its large oil industry (classified as secondary industry), and its services sector being less developed. In addition, seeing

from its employment structure, HLJ's oil industry does not help its employment situation very much.

For the ownership structure of the economies, there are shares of non-state owned enterprises (NSEs) in the value of Gross Industrial Output (GIO), in urban employment, and in total investment in fixed assets (Tables 8-9). NSEs include private enterprises, collective-owned enterprises, foreign invested enterprises, and share holding companies, etc. One should note that the GIO statistics, and its NSE components, does not cover those small NSEs with annual sales less than 5 million Yuan, although this does not mean the latter part is small in the economy.

Table 8. Non-state shares in the economy

		LN	JL	HLJ	NE	Max	Min	Aver
NSE share in ind.output	(%)	41.9	24.2	20.6	28.9	86.9 (ZhJ)	18.3 (XJ)	45.1
NSE share in urb.employment	(%)	64.4	55.2	51.7	57.1	78.7 (ZhJ)	40.3 (GS)	56.5
NSE share in total investment	(%)	68.8	61	55.1	61.6	74.9 (ShD)	15.6 (Tib)	59.4

Table 9. Ranks of the Non-state shares

		LN	JL	HLJ	NE
NSE share in ind.output	H-L	18	26	30	25
NSE share in urb.employment	H-L	7	15	21	14
NSE share in total investment	H-L	8	17	23	16

Shown by their shares in GIO, NSEs in all the three provinces are significantly less developed compared with the provincial average, although their shares in employment and investment are higher, especially in LN. This may imply relatively lower efficiencies of these enterprises. Still, NSEs are playing important roles in providing employment opportunities.

For the shares of foreign invested enterprises and enterprises with investment from Chinese Hong Kong, China, Macao and Taipei,China (FIE hereafter for short), the same three indicators are used, i.e., the shares of FIEs in GIO, in urban employment, and in total investment in fixed assets. (Table 10-11)

Table 10. Shares of foreign invested enterprises in the economy

		LN	JL	HLJ	NE	Max	Min	Aver
FIE share in ind. output	(%)	23.7	29.3	6.2	19.7	63.6 (GD)	0.2 (Tib)	19.3
FIE share in urban employment	(%)	4.1	1.5	0.6	2.1	14.9 (TJ)	0.2 (XJ)	3.0
FIE share in total investment	(%)	19.4	15.6	3.6	12.9	40.8 (ShH)	0.1 (Tib)	14.4

Table 11. Ranks of FIE shares

		LN	JL	HLJ	NE
FIE share in ind. output	H-L	8	7	24	13
FIE share in urban employment	H-L	8	12	22	14
FIE share in total investment	H-L	9	11	27	16

The tables show that, in terms of using FDI, LN and JL are at the middle-high levels, and HLJ at a low level. One thing may worth attention: on average, the FIE share in industrial output is 20%, whereas their share in urban employment is only 2%. Compared with this, the average shares of FIEs of the 31 provinces in industrial output is 19%, and that in urban employment is 3%. This indicates nation-widely high capital intensity of FIEs, and it is even higher in NE, which does not contribute much to employment creation.

Three indicators are used for sizes of enterprises. They are the shares of large, medium and small enterprises (LE, ME and SM, respectively) in GIO (Tables 12-13).

Table 12. Firm size

		LN	JL	HLJ	NE	Max	Min	Aver
LE share in ind output	(%)	49.7	60.6	67.9	59.4	67.9 (HLJ)	0.0 (Tib)	38.4
ME share in ind output	(%)	27.0	22.8	17.1	22.3	45.8 (Tib)	17.1 (HLJ)	32.3
SE share in ind output	(%)	23.3	16.6	15	18.3	54.2 (Tib)	15.0 (HLJ)	29.4

Table 13. Ranks in firm size

		LN	JL	HLJ	NE
LE share in ind output	H-L	6	2	1	3
ME share in ind output	H-L	26	28	31	28
SE share in ind output	H-L	22	30	31	28

It is significant that the average share of LE in NE are higher than the national average by 21 percentage points, and the average shares of ME and SE are lower by 10 and 11 percentage points, respectively. HLJ has the highest share of LE and the lowest SME share in PRC. This partially comes from NE's historical feature (NE was PRC's industrial base during the central-planning period since the 1950s, where large SOEs were more developed than other regions), and partially a result of weaker development of SMEs in NE.

Considering that LEs are more capital intensive and less labor intensive, this can explain at least an important part of why there are insufficient employment opportunities.

Some other structural indicators and that for relative capital and labor intensity are shown in Tables 14 and 15. They are trade dependency (proportion of import and export value to GDP), investment ratio (proportion of total investment to GDP), private consumption ratio (to GDP), capital-labor ratio in industry, and value-added ratio (the ratio of value-added to gross output value) in industry.

Table 14. Other structural and factor intensity indicators

		LN	JL	HLJ	NE	Max		Min		Aver
Trade dependent ratio	(%)	48.1	20.9	10.4	26.5	187.5	(GD)	6.5	(Tib)	38.4
Investment ratio (to GDP)	(%)	43.4	39.5	27	36.6	81.7	(NX)	27.0	(HLJ)	47.0
Private consumption ratio	(%)	34.1	43.8	39.9	39.3	47.7	(AnH)	27.5	(TJ)	37.8
K-L ratio in industry	(10000yuan)	41.0	39.7	35.3	38.7	69.6	(QH)	22.7	(HeN)	37.1
Value added ratio in industry	(%)	28.1	30.6	46.8	35.2	57.9	(Tib)	24.1	(ZhJ)	33.5

Table 15. Ranks in other structural and factor intensity indicators

		LN	JL	HLJ	NE
Trade dependent ratio	H-L	8	13	24	15
Investment ratio (to GDP)	H-L	16	23	31	23
Pri consumption ratio	H-L	23	6	14	14
Capital-labor ratio in industry	H-L	9	10	14	11
Value added ratio in industry	H-L	25	19	3	16

One can see the trade dependent ratio is relatively high in LN, and low in HLJ. The investment ratio in HLJ is the national lowest. These may imply a less dynamic economic situation in HLJ. Private consumption ratio is quite low in LN, although one can hardly draw any conclusion from this for the time being.

Capital intensity, relative to labor, in LN and JL is higher than the provincial average, although lower in HLJ, which industry is relatively natural-resource-intensive. Value-added ratio is lower than the provincial average in LN and higher in JL, much higher in HLJ. Provincial data show that value-added ratio is unexceptionally high in less developed provinces and low in more developed provinces. This may reflect a situation that PRC's industrialization and economic growth is generally at the stage mainly driven by inputs other than technological innovation. However, the differences in value-added ratio may indicate the differences in development among the three NE provinces, although the notably high rank of HLJ should be partially due to its oil extraction industry.

IV. Productivity and R&D

Six indicators are used in this section. Productivity indicators include labor productivity (value-added per worker), capital productivity (the ratio of value-added to total value of assets), capital contribution (the ratio of the sum of profit, tax payment and interest expenses to total value of assets) in industry, and per capita fiscal revenue. Indicators for technological innovation are the number of patent application being processed per technical personnel (10 thousand persons), and the transaction value in technical market per technical personnel (1000 Yuan/persons). These are shown in Tables 16 and 17.

Table 16. Productivity and R&D

		LN	JL	HLJ	NE	Max		Min		Aver
Labor productivity in ind	(10000yuan)	9.11	9.91	12.22	10.4	16.04	(XJ)	6.15	(NX)	9.09
Capital productivity in ind	(yuan/yuan)	0.22	0.25	0.35	0.3	0.37	(ShD)	0.138	(QH)	0.25
Capital contribution in ind	(%)	9.1	10.8	25	15.0	25.0	(HLJ)	7.6	(NX)	12.2
Fiscal revenue per capita	(1000 yuan)	1.3	0.6	0.8	0.9	6.4	(ShH)	0.4	(Tib)	1.1
Patent per R&D persons	(item/10Kpersons)	108	41	44	64.2	283	(ShH)	9	(QH)	70
Technology market*	(1000 yuan)	5.5	1.2	1.1	2.6	29.7	(BJ)	0.0	(Tib)	3.9

* Transaction value per R&D persons in tech mkt

Table 17. Ranks in productivity and R&D

		LN	JL	HLJ	NE
Labor productivity in ind	H-L	12	10	5	9
Capital productivity in ind	H-L	21	15	2	13
Capital contribution in ind	H-L	27	19	1	16
Fiscal revenue per capita	H-L	7	17	13	12
Patent per R&D persons	H-L	7	15	14	12
Technology market	H-L	5	18	19	14
Average ranks		13	16	9	13

The indicators show a relatively low productivity of capital in LN and JL, but high in HLJ. Again, this is mainly benefited from HLJ's rich oil resources.

In terms of technological innovation, only LN is more developed, whereas JL and HLJ are far less developed comparing with the provincial average.

V. Social Development

We may examine the achievements in social development from the following sub-aspects: income distribution, education, health facilities, and social security systems.

For social justice and stability, a relatively low income-disparity is preferred. Three indicators are used to measure income disparity or inequality, they are urban and rural Gini coefficients, and urban-rural income gaps (Table 18-19).

Table 18. Income distribution

	LN	JL	HLJ	NE	Max		Min		Aver
Urban Gini coefficient	0.274	0.273	0.338	0.3	0.345	(GD)	0.238	(ShH)	0.286
Rural Gini coefficient	0.354	0.364	0.378	0.4	0.400	(HaiN)	0.214	(ShH)	0.321
Urban-rural income gap	2.42	2.61	2.49	2.5	4.89	(Tib)	2.21	(JS)	3.11

Table 19. Ranks in income distribution

		LN	JL	HLJ	NE
Urban Gini coefficient	L-H	14	10	29	18
Rural Gini coefficient	L-H	21	25	27	24
Urban-rural income gap	L-H	4	9	6	6
Average ranks		13	15	21	16

The data indicate that urban income disparity in LN and JL is at the medium level, but high in HLJ. However, rural income disparity is high in all the three provinces. High income-inequality may lead to social conflicts and instability, being harmful to economic development.

Urban-rural income gap is relatively low, but this is basically due to low urban income compared with the provincial average (see Table 1).

In terms of education, the author calculated the following indicators: average year of schooling, per capita public education expenses, school completion ratios for primary, junior and senior secondary, and tertiary educations, and enrollment rates for primary to junior high, junior high to senior high, and senior high to tertiary educations.[2] These are shown in Tables 20-21.

Table 20. Education

		LN	JL	HLJ	NE	Max		Min		Aver
Aver year of schooling	(year)	7.6	7.8	7.7	7.7	7.8	(JL)	4.2	(Tib)	7.0
Public edu exp per capita	(yuan/persons)	343	327	322	331	1733	(BJ)	172	(JX)	378
Prima sch completion ratio	(%)	100.0	96.1	90.6	95.6	109.1	(GD)	74.8	(Tib)	95.5
Jun high sch completion ratio	(%)	115.2	90.1	97.3	100.9	166.7	(ShH)	78.1	(Gxi)	96.5
Sen high sch completion ratio	(%)	68.4	78.0	85.1	77.2	146.6	(NX)	67.5	(ShH)	98.4
Tert edu completion ratio	(%)	96.2	91.9	95.4	94.5	110.4	(HeB)	79.3	(GZh)	95.0
Enrollment rate Pri-JH	(%)	99.2	97.3	98.9	98.5	102.8	(ZhJ)	87.9	(YN)	97.2
Enrollment rate JH-SH	(%)	69.3	62.7	50.4	60.8	99.5	(ShH)	41.0	(GZh)	55.2
Enrollment rate SH-Uni	(%)	67.1	75.2	71.5	71.3	109.6	(BJ)	28.9	(NX)	54.5

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[2] School completion ratio, take that of primary schools for example, is approximately calculated as: number of students completed six-year education / number of students enrolled primary schools six years earlier×100%. The enrollment rate, take primary to junior secondary schools for example, is calculated as: number of students enrolled in junior secondary schools / number of students graduated from primary schools in the same year×100%.

Table 21. Ranks in education

		LN	JL	HLJ	NE
Aver year of schooling	H-L	5	1	2	3
Public edu expenses per capita	H-L	10	11	12	11
Prima sch completion ratio	H-L	9	18	25	17
Jun high sch completion ratio	H-L	4	18	9	10
Sen high sch completion ratio	H-L	30	26	21	26
Tert edu completion ratio	H-L	13	22	15	17
Enrollment rate Pri-JH	H-L	7	18	8	11
Enrollment rate JH-SH	H-L	11	20	25	19
Enrollment rate SH-Uni	H-L	7	4	5	5
Average ranks		11	15	14	13

Data show that the average year of schooling and the enrollment rate of tertiary education in NE are nation-widely high. However, the completion ratios of primary and secondary schools in JL and HLJ are undesirable, indicating relatively high rate of discontinued primary and secondary studies. The enrollment rate from junior-high to senior-high schools is also low. These imply unequal opportunities in education amongst different resident groups.

In terms of health facilities, indicators used are number of doctors and number of hospital beds per 1000 persons of population. Other indicators include the Engel coefficients (the share of food expenses in consumption expenses) of urban and rural residents. These relate to poverty when the coefficients are high. Popularity of personal computers (number of personal computers in use / population, year 2002 data) is also used here to indicate an important part of social development. (Tables 22-23)

Table 22. Heath facilities and others

		LN	JL	HLJ	NE	Max		Min		Aver
No. doctor per 1000 persons	(persons)	2.2	2.2	1.7	2.0	3.3	(BJ)	0.9	(GZh)	1.6
No hospital beds per 1000 persons	(beds)	4.2	3.2	3.1	3.5	5.2	(BJ)	1.6	(GZh)	2.8
Engel coeff of urban resid	(%)	40.4	35.9	35.4	37.2	46.9	(HaiN)	32.2	(BJ)	38.2
Engel coeff of rural resid	(%)	42.7	46.4	45.6	44.9	64.0	(Sh'X)	32.4	(TJ)	47.6
Computer/population	(%)	5.36	3.40	3.07	3.9	19.35	(BJ)	1.92	(QH)	5.72

Table 23. Ranks in heath facilities and others

		LN	JL	HLJ	NE
No doctor per 1000 persons	H-L	5	6	11	7
No hospital beds per 1000 persons	H-L	3	7	8	6
Engel coeff of urban resid	L-H	23	9	6	13
Engel coeff of rural resid	L-H	10	14	12	12
Computer/population	H-L	12	19	25	19
Average ranks		11	11	12	11

Indicated by number of doctors and hospital beds, health facilities in NE are generally good. It is commonly accepted that the Engel Coefficient negatively relates with income level; however, it is higher in LN, which has a higher income level than JL and HLJ. The reason needs further investigation. The popularity of personal computer in HLJ is notably lower than the provincial average.

In terms of social security systems, three indicators are used. They are coverage of the basic urban pension insurance system, basic urban medical insurance system, and the urban unemployment insurance system, all measured by the number participators divided by urban employment (Tables 24-25). Currently most of the rural residents are not covered by any social security systems except limited areas where rural medical cooperative systems have established. Unfortunately, data for this is unavailable.

Table 24. Coverage of social security systems

		LN	JL	HLJ	NE	Max		Min		Aver
Cover of bas urb pension insu	(%)	88.4	71.0	78.1	79.2	99.8	(GD)	15.5	(Tib)	66.6
Cover of urb unemp insu	(%)	71.0	63.5	70.0	68.2	86.4	(ShH)	23.0	(Tib)	59.7
Cover of basic urb medi insu	(%)	90.3	60.7	80.0	77.0	126.6	(ShH)	24.3	(Tib)	72.3

Table 25. Ranks in coverage of social security systems

		LN	JL	HLJ	NE
Cover of bas urb pension insu	H-L	3	13	11	9
Cover of urb unemp insu	H-L	7	12	9	9
Cover of basic urb medi insu	H-L	4	27	8	13
Aver rank of social security		5	17	9	10
Aver rank of social development		10	15	14	13

As the data indicated, the coverage rate of basic urban pension insurance, medical insurance and unemployment insurance is high in LN (although still far from a full coverage), but low in JL, particularly for the basic medical insurance system, it is ranked at 27th place.

VI. Infrastructure

Seven indicators are used for transport infrastructure conditions. They are highway and railway densities (km/1000 km^2), highway and railway-population ratios (km/1000 persons), port-land ratio (meter/100 km^2), port-population ratio (meter/1000 persons), and village access rate to highway (percentage of villages).[3] They are shown in Tables 26-27.

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[3] All highway and railway length is converted into a standard grade II highway length equivalent. Ports are measured by length of quay lines of major inland ports and seaports.

Table 26. Transport infrastructure

		LN	JL	HLJ	NE	Max		Min		Aver
Highway density, standard	(km/k km2)	250	108	63	140	1105	(ShH)	3.3	(Tib)	210
HW-pop ratio, stand.	(km/k persons)	8.7	7.5	7.6	7.9	16.6	(QH)	2.8	(GZh)	7.0
Railway density, stand.	(km/k km2)	421	279	180	293	984	(BJ)	0	(Tib)	249
RW-pop ratio, stand.	(km/k persons)	14.6	19.3	21.4	18.4	39.1	(InM)	0	(Tib)	10.6
Port-land ratio	(m/100km2)	24	0	0	8	1217	(ShH)	0	(M)	51
Port-population ratio	(m/k persons)	85	0	0	28	580	(ShH)	0	(M)	39
Village access rate to HW	(%)	97.6	100.0	53.1	83.6	100.0	(M)	53.1	(HLJ)	90.8

Sources: data are provided by the Ministry of Transport, and from NBS(a), 2005.

Table 27. Ranks in transport infrastructure

		LN	JL	HLJ	NE
Highway density, stand.	H-L	8	19	25	17
Highway-pop ratio, stand.	H-L	8	11	9	9
Railway density, stand.	H-L	4	9	19	11
Railway-pop ratio, stand.	H-L	7	6	3	5
Port-land ratio	H-L	4	14	14	11
Port-pop ratio	H-L	4	14	14	11
Village access rate to HW	H-L	6	1	31	13
Average ranks		6	11	16	11

Note: 18 provinces ranked at 14th places in port-land ratio and port-population ratio.

International comparative studies found that highway and railway-population ratios are better measurement for transport infrastructure than highway and railway densities, although the latter is also useful. In these measures, NE provinces are advanced in land transport, and LN is advanced in sea transport. However, in terms of village access rate to highway, HLJ ranked at the lowest place; only 53% villages have highway connections. This rate is even lower than Tibet by 19 percentage points although geographic conditions of the latter are much worse (data are of 2003, from Ministry of Transport).

For telecommunication facilities, three indicators are used. They are popularity of mobile phone, and coverage of urban and rural household telephone (number of users per 100 households). See Tables 28-29.

Table 28. Telecommunication facilities

		LN	JL	HLJ	NE	Max		Min		Aver
Mobile phone popularity	(user/100household)	88.7	91.4	83.7	87.9	250.5	(BJ)	41.1	(GZh)	92.7
Urban hous phone cover.	(user/100household)	114.0	83.2	111.1	102.8	154.8	(TJ)	48.8	(JX)	97.5
Rural hous phone cover.	(user/100household)	66.3	48.0	41.4	51.9	78.8	(ZhJ)	8.7	(Tib)	40.2

Table 29. Ranks in telecommunication facilities

		LN	JL	HLJ	NE
Popularity of mobile phone	H-L	10	9	14	11
Coverage of urban hous phone	H-L	8	23	9	13
Coverage of rural hous phone	H-L	6	8	13	9
Average ranks in telecom		8	13	12	11
Average ranks in infrastructure		7	12	14	11

The coverage rates of urban and rural household telephone, and the popularity ratio of mobile phone in NE are higher than or similar to the provincial average, although urban phone coverage in JL is low.

VII. Environment Protection

Four available indicators are used for environment protection, i.e., air quality in provincial capital cities (measured by the percentage of days in the year meeting grade II air quality standard or better), percentage of industrial wastewater meeting discharge standard, percentage of industrial solid wastes being treated or reutilized, and percentage of consumption wastes being treated (Tables 30-31).

Table 30. Environment protection

		LN	JL	HLJ	NE	Max		Min		Aver
Air quality (% days ≤GradeII)	(%)	82.2	94.3	81.4	86.0	100.0	(HaiN)	55.7	(GS)	80.2
% ind wastewater meeting disch. stand.	(%)	93.9	79.4	93.7	89.0	99.4	(TJ)	58.2	(GZh)	86.4
% ind solid wastes treated or reutilized	(%)	73.9	57.3	92	74.4	106.6	(TJ)	20.3	(QH)	76.6
% consumption waste treated	(%)	49.4	52.3	26	42.6	95.4	(QH)	14.7	(ShX)	52.4

Table 31. Ranks in environment protection

		LN	JL	HLJ	NE
Air quality (% days ≤GradeII)	H-L	15	6	17	13
% ind wastewater meeting disch. stand.	H-L	10	24	12	15
% treated&utilized ind solid wastes	H-L	19	26	10	18
% consumption waste treated	H-L	14	13	27	18
Average ranks		15	17	17	16

In general, achievement in environment protection in NE is at a medium or medium-low level in PRC. JL has better air qualities, but lagged far behind in wastewater and solid wastes treatment. HLJ has a low rate in consumption waste treatment.

VIII. Natural Resources and Geographical Conditions

Endowment of natural resources is measured by three available indicators: per capita water resources (surface and ground water), cultivated land area per rural workers, and forest coverage rate. Mineral resources are important, however, the available information is limited, and how to determine their weights is an unsolved issue. For geographical conditions, one indicator is used: the railway distance from the provincial capital city to a major seaport (Tables 32-33).

Table 32. Natural resources and geographical conditions

		LN	JL	HLJ	NE	Max		Min		Aver
Water resource per capita	(100m^2/persons)	7	12	17	12	1703	(Tib)	1	(TJ)	72
Cultivated land per capita	(hectare/persons)	0.39	0.83	1.25	0.8	1.25	(HLJ)	0.09	(ZhJ)	0.37
Forest coverage rate	(%)	33.0	38.1	39.5	36.9	63.0	(FJ)	2.9	(XJ)	26.2
Distance to major port	(km)	397	702	944	681.0	3905	(Tib)	0	(M)	1035

Sources: NBS(a) (2005); People's Transport Publisher (2004); Transport Bureau of the Ministry of Railway (2004).

Table 33. Ranks in natural resources and geographical conditions

		LN	JL	HLJ	NE
Water resource per capita	H-L	21	18	14	18
Cultivated land per capita	H-L	8	4	1	4
Forest coverage rate	H-L	11	10	9	10
Distance to major seaport	L-H	9	15	19	14
Average ranks		12	12	11	12

As the data indicated, per capita water resource in NE is lower than provincial average, but they have better conditions in arable land resources and high rate of forest coverage. Measured by railway distance from the provincial capital to major seaport, LN is in an advanced geographic condition; JL and HLJ is less advanced but generally better than provincial average.

IX. Institutional Environment

The last, but maybe the most important aspect for measurement of economic and social development in this paper is institutional environment. The author uses five available indicators for this purpose. They are: marketization index for provinces (2002 data, Fan and Wang, 2004), legal environment for business (graded by entrepreneurs, 5-1 from best to worst; NERI survey including more than 3000 samples), farmers' tax and non-tax burden (2002 data, Fan and Wang, 2004), non-tax burden of enterprises (non-tax charges to enterprises as percentage of total sales, 2002 data, NERI survey), and the ratio of government intervention on enterprises (measured as entrepreneurs' time proportion sending in dealing with government departments and officials, 2002 data, NERI survey). The latter indicator also involves rent-seeking behavior or corruptions (Table 34-35).

Table 34. Institutional environment

		LN	JL	HLJ	NE	Max		Min		Aver
Marketization index	(10-0)	6.61	5.14	4.98	5.6	9.74	(GD)	3.61	(NX)	5.98
Legal envir for business	(5-1)	3.04	3.12	3.06	3.1	3.49	(ShH)	2.59	(ShX)	3.00
Farmers' burden: tax&fees	(%)	4.2	6.1	9.9	6.7	9.9	(HLJ)	0.5	(BJ)	3.0
Enterp non-tax burden to sales	(%)	2.4	2.6	3.1	2.7	3.3	(HuB)	1.6	(GX)	2.4
Ratio gov interv on enter	(%)	19.8	20.6	19.3	19.9	20.6	(JL)	13.8	(HaiN)	18.0

Sources: Fan and Wang (2004); NERI survey data.

Table 35. Ranks in institutional environment

		LN	JL	HLJ	NE
Marketization index	H-L	9	20	21	17
Legal envir for business	H-L	14	9	12	12
Farmers' burden: tax&fees	L-H	24	29	30	28
Enterp non-tax burden to sales	L-H	8	12	20	13
Ratio gov interv on enter	L-H	25	30	23	26
Average ranks		16	20	21	19

It can be seen from the data that LN is relative advanced in marketization, but JL and HLJ lagged behind. They ranked at 20th and 21st places. Farmers' financial burden and government intervention on enterprises in NE is heavier than average; they ranked very low. In HLJ, non-tax burden of enterprises is also heavy. These indicate that the institutional environment in NE needs to be improved.

X. A Summary of Major Findings: What Need to Improve?

In terms of economic development, the Northeast region was advanced before reform, but now is ranked at the medium level among PRC's 31 provinces.

Urbanization level in NE remains higher than average, but urban economy is less active, employment growth is slow and unemployment rate is high. This is probably due to the following reasons:

Non-state enterprises are less developed in NE, especially small and medium non-state enterprises. Firm size is relatively large, more capital intensive and less labor intensive. Foreign-invested enterprises are more capital intensive and far less labor intensive than domestic enterprises. These factors negatively affect job creation.

Factor productivity, especially capital productivity is relatively low except in HLJ, which benefits mainly from higher returns of its oil extraction. Technical innovation in LN is more active, but far less active in JL and HLJ.

In terms of social development, attention should be paid to high inequality in income distribution for social justice and stability. Education achievement is relatively high, indicated by higher average year of schooling and higher enrollment rate in tertiary education, compared with the average level of other provinces. Medical facilities are relatively good.

However, coverage of primary and secondary education is less desirable, indicated by low completion rates in primary and secondary education in some provinces, e.g., primary education in HLJ, junior secondary education in JL, and senior secondary

education in all the three provinces, particularly in LN. Enrollment rate in senior secondary education is also low in HLJ.

In terms of infrastructure, highway and railway systems are better developed in NE, however, the village-access rate to highway in HLJ ranked at the lowest place among all provinces.

Environment protection needs to be improved, particularly wastewater and solid wastes treatment in JL and consumption wastes treatment in HLJ.

The less desired institutional environment could be a barrier to economic development in NE. Attention should be paid to the low achievement in marketization in JL and HLJ, high burden of farmers and inadequate government intervention (and corruptions) on enterprises in all the three provinces. Efforts should be paid to transformation of the government functions, making transparency in government administration, and creating a market-friendly business environment.

References:

Fan Gang and Wang Xiaolu, 2004, *NERI Index of Marketization of China's Provinces*, Economic Science Press, Beijing.

National Bureau of Statistics (NBS(a)), various years, *China Statistical Yearbook*, China Statistics Press, Beijing.

National Bureau of Statistics (NBS(b)), various years, *China Population Statistical Yearbook* , China Statistics Press, Beijing.

People's Transport Publisher, 2004, *China Transport Atlas*, People's Transport Publisher, Beijing.

Transport Bureau of the Ministry of Railway, 2004, *All China Passenger Train Timetable*, China Railway Press, Beijing.