Appendix A: Chinese reforms, multidimensional development, and provincial inequality

Chinese reforms were launched in 1978, after Mao's death, by Deng Xiaoping, removing those elements of the Maoist system that reduced personal incentives, produced inefficient resource allocations within and between provinces, and hampered the potential growth of the economy (Yang, 1990; Tsui, 1993; Shue Wong 2007).[1] These reforms evolved over time in a gradual and pragmatic way compared to other transition economies, allowing the government to control and orientate the type of the development of the country. Deng's aim was to build a "Xiaokang society": a "moderately prosperous" society that is not exclusively concerned with economic aspects of development. Yet during the first stage of reforms, income achievements (particularly for the coastal richer provinces) were the main target of policymakers (Shue and Wong, 2007). Chinese leaders believed that the fast economic and technological development of coastal provinces would enhance also the economic development of interior provinces. Regional disparities were therefore considered as necessary for modernisation. In 1992 this concept was summarised by Deng Xiaoping with the necessity to "let some people get rich first" (Naughton 1993, p. 501).

Taxation and finance policies were decentralised, favouring the Special Economic Zones (SEZ) and the coastal provinces (Gooodman and Segal, 2002). The banking system was reformed in 1984 in favour of a less centralised approach allowing different provincial interest rates. From 1979 the "Open Door" facilitated the opening of the first four Special Economic Zones, with the aim of attracting foreign direct investments (FDI) and technology to some coastal areas. These policies helped coastal areas to raise and handle capital but promoted unbalanced regional economic development too (Yang, 1990; Hansheng et al., 1996). The Coastal region (eastern provinces), besides advantages in location, human capital, infrastructure and FDI, was encouraged to develop industrial and technological capabilities, and increasing investments were planned in this direction. The centre and western regions were pushed to specialise in low technology production, raw materials, energy production and agricultural products.

[1] Despite these mistakes, China managed to achieve some significant economic results as well as some important social progress in several well-being domains. Important results involved domains such as education, health, environment (Fan et al., 2011; UNDP China, 2016).

The result of this decentralization was the emergence of inequality in the economic and social opportunities faced by individuals. Indeed, the people living in urban areas and in coastal provinces enjoyed the creation of new and better payed jobs, receiving at the same time the support of local governments in terms of health, education, and social security services. On the contrary, rural areas and western provinces experienced a much weaker growth, both in terms of economic dynamism and institutional support. The relaxation of the rules about domestic migration (the hukou system) produced large scale migration from the inner provinces and rural areas to the urban coastal areas. Top-down policies of the central government were thus a major driver of the strong regional disparities (Zhao and Tong, 2000).

From the 1990s the strategy of the central government started to change, increasingly targeting a balanced regional development through the redistribution in favour of poorest provinces.[2] In 1999 the Central Government launched a "Go-West strategy" campaign, followed by the "Rise of Central China Plan" in 2004 to reverse the widening economic and social divergences across China. Besides these policy efforts (which culminated in the HS project), Fang et al. (2009) suggest that a "flying gees" process of industrial development contributed to alleviate the provincial divide in the new millennium. Indeed, backward provinces benefit from transfers of capital and technology from more advanced ones, being more competitive in labour-intensive industries and "exploiting the backwardness advantages". Both structural and political factors can therefore promote economic and social convergence across provinces.

REFERENCES

Fan S., Kanbur R., & Zhang X., (2011). China's regional disparities: Experience and policy. *Review of Development Finance*, 1(1), 47–56.

Goodman, D. S., & Segal, G. (2002). *China deconstructs: Politics, trade and regionalism*. Routledge.

Hansheng, J., Mingtai, F., Shuzhuang, Y., & Chunping, Z. (1996). An Evaluation and Analysis of the Disequilibrium Development Strategy of China's Regional Economy. *China's Regional Economic Development, The Chinese University of Hong Kong press, Hong Kong*.

Lin, J. Y. (2011). *Demystifying the Chinese economy*. Cambridge University Press.

[2] In 1994, the fiscal and financial system was revisited and partly centralised again, marking a discontinuity with the policies implemented under the Seventh Five Year Plan (1986-1990) to promote unbalanced regional economic development (Yang, 1990).

Naughton, B. (1993). Deng Xiaoping: the economist. *The China Quarterly*, *135*, 491-514.

Shue, V., & Wong, C. (Eds.). (2007). *Paying for progress in China: Public finance, human welfare and changing patterns of inequality*. Routledge.

Tsui, K. Y. (1993). Decomposition of China' s regional inequalities. *Journal of Comparative Economics*, *17*(3), 600-627.

UNDP China, & Development Research Center of the State Council of China (2016). *China National Human Development Report 2016: Social Innovation for Inclusive Human Development*. China Publishing Group Corporation, China Translation & Publishing House, China.

Yang, D. (1990). Patterns of China's regional development strategy. *The China Quarterly*, *122*, 230-257.

Zhao, X. B., & Tong, S. P. (2000). Unequal economic development in China: spatial disparities and regional policy reconsideration, 1985-1995. *Regional studies*, *34*(6), 549-561.

Appendix B: The normalisation of the unidimensional provincial achievements

The normalisation technique adopted in this paper takes account of the regional difference across China and possible asymmetries across data.

In traditional normalizations, the score x_{pvt}, relative to the performance of province p in terms of variable v at time t, is transformed into the normalised variable z_{pvt} through a comparison with the value a (the lowest value achievable, i.e. the "zero") and value b (the highest value achievable, i.e. the "one") using the formula:

$$z_{pvt} = \frac{x_{pvt} - a_v}{b_v - a_v} \qquad \text{(I)}$$

a_v and b_v, can be identified with the minimum and the maximum values recorded in the sample for each v. We refined this normalization technique according to two criteria. Firstly, to improve comparability, we excluded five "outlier provinces" in the setting of the parameters a_v and b_v.[3] Secondly, to favour the interpretability of the aggregated scores and reduce the problem of asymmetric distributions,[4] we added a third parameter c_v (the average value of v), which corresponds to 0.5. Therefore, the parameters a_v, b_v and c_v are respectively: the minimum, highest and average values of x_v for any of the 26 comparable provinces in a given year. In order to compare the outcomes across different provinces and different years, these parameters are not year-specific nor province-specific: they only depend on the variable v considered. Equation II describes the normalization:

$$\begin{cases} z_{pvt} = 0 & if\ x_{pvt} < a_v \\ z_{pvt} = \dfrac{x_{pvt} - a_j}{2\left(c_v - a_j\right)} & if\ a_v \le x_{pvt} \le c_v \\ z_{pvt} = 0.5 + \dfrac{x_{pvt} - c_j}{2\left(b_v - c_v\right)} & if\ c_v < x_{pvt} \le b_v \\ z_{pvt} = 1 & if\ x_{pvt} > b_v \end{cases} \qquad \text{(II)}$$

[3] In other words, a_v and b_v are set independently of the achievements of Tibet, Beijing, Shanghai, Tianjin, Chongqing.

[4] If not positively addressed, aggregating asymmetrically distributed normalized variables could implicitly outweigh positively-skewed variables.

In other words, the normalization (II) improves equation (I) in a twofold way. Firstly, it allows the winsorization[5] of outliers in the interval [0; 1] defined by $[a_v; b_v]$[6]. Secondly, the normalization is split into two parts: lower-than-average outcomes are normalized within [0; 0.5]; higher-than-average outcomes are normalized within [0.5; 1].

[5] I.e. lower values were lifted to 0; higher values were decreased to 1.

[6] We brought to zero values lower than a_v and we brought to one the values higher than b_v. By construction, this involved only outlier provinces: $a_v \leq x_{pvt} \leq b_v \ \ \forall\, p \neq$ Tibet, Beijing, Tianjin, Shanghai, Chongqing.

Appendix C: Factors that influence development (different specifications)

In order to explore the differences amongst the various specifications of development adopted, an explorative econometric analysis indicates which are the elements significantly associated with the HMI, HED and HSD indexes (i.e. considering development as overall, economic-only, and social-only domains). This analysis was carried out with random effect panel regression, [7] and was replicated for the period before and after the launching of the HS.

The regression considers those covariates[8] that can influence development: geography (two dummies distinguishes Centre and West regions; the East is the benchmark); presence of State Owned Enterprises (SOEs; measured by the share of total provincial investments made by these institutions); commerce (the sum of provincial exports and imports over GDP); investments (the ratio of investments over GDP); agriculture (the share of GDP from the primary sector); expenditure (the share of GDP managed by regional authorities). Moreover, through the variable "Trend" it is possible to observe the growth trend over time.

These covariates were chosen consistently with the literature about Chinese economic development (among the others, see Lin, 2011). Commerce and investments are traditionally considered as major engines of Chinese economic development, while SOEs, agriculture and governmental expenditure would curb growth. These results are confirmed by the regression about HED (Table D6), despite significant differences emerge looking at HSD and distinguishing before and after 2005.

This econometric analysis is only explorative: investigating the root of Chinese multidimensional development is beyond the scope of this paper, and the results (Table D6) allows only a preliminary analysis. Yet, it is important to underline the following findings:

- All the indexes grow more rapidly after 2005 (see variable "Trend");
- Central and western provinces are significantly disadvantaged, ceteris paribus, before 2005. After the introduction of HS, the gap substantially reduces and is no longer significant for HMI and HSD;

[7] The suitability of this approach was tested and approved through a Hausman test.

[8] Importantly, all the factors that contribute to economic and social development which are already included in HMI, HED, HSD (e.g. years of education) could not be considered as covariates in the regression.

- SOEs have a significant negative impact only in HMI and HED after 2005;
- Commerce has been a strong engine before 2005; its impact is no longer significant thereafter;
- Investments and agriculture coefficients are respectively significantly positive and negative, as expected, in both periods and for all dependent variables;
- The intervention of local governments (as a share of GDP) is detrimental for most of the dependent variables, especially in the social domains.

Appendix D: Further data analysis

Table D1: Summary of Domains and variables (standardized values)

	1993			2016			Source	Notes
	East	Centre	West	East	Centre	West		
Economy	0.31	0.17	0.17	0.82	0.77	0.76	Calculation	Normalised Score
GDP/c	0.31	0.15	0.11	0.90	0.77	0.73	NBS	Natural logarithm of ¥ per capita; deflated with national CPI in 2000.
Household Consumption	0.30	0.22	0.28	0.68	0.64	0.67	NBS; Brandt & Holz (2006)	Natural logarithm of ¥; deflated with regional prices in 2000.
Investments	0.31	0.14	0.11	0.87	0.88	0.87	NBS	Natural logarithm of ¥ per capita; deflated with national CPI in 2000.
Innovation	0.34	0.25	0.23	0.74	0.60	0.59	Calculation	Normalised Score
Patents	0.06	0.02	0.02	0.75	0.55	0.55	NBS	Accepted items per capita.
R&D Expenditure	0.46	0.31	0.25	0.87	0.74	0.64	NBS; CSY	Natural logarithm of deflated ¥ per capita; only State-owned founds before 2000.
Technical Market	0.50	0.43	0.42	0.60	0.52	0.58	NBS; CSY; Comp.	Value of contractual inflows in domestic technical markets over GDP.
Infrastructure	0.21	0.10	0.07	0.73	0.65	0.62	Calculation	Normalised Score
Highways	0.24	0.17	0.11	0.78	0.72	0.55	NBS	Km over Km².
Paved Roads	0.43	0.14	0.10	0.72	0.67	0.62	NBS; CSY	Coverage Rate; simple average between cities before 1995.
Power	0.13	0.09	0.06	0.57	0.56	0.60	NBS	Power generation (kwh) per capita.
Telephone	0.02	0.00	0.00	0.83	0.67	0.72	NBS	Diffusion of fixed/mobile phone.
Labour	0.73	0.78	0.68	0.42	0.48	0.48	Calculation	Normalised Score
Unemployment	0.73	0.71	0.57	0.55	0.50	0.49	NBS	Unemployment Rate.
Labour Share	0.46	0.65	0.50	0.45	0.47	0.52	NBS	Compensation of employee over GDP.
Labour Disputes	0.98	0.98	0.98	0.27	0.46	0.43	CLY	Number of labour disputes cases officially accepted by a court (cases mediated in 1996–97) over population.
Environment	0.53	0.64	0.66	0.61	0.67	0.61	Calculation	Normalised Score
Sulphur Emissions	0.55	0.75	0.58	0.80	0.77	0.62	NBS; CSY	Ton per capita.
Waste Water	0.40	0.56	0.73	0.25	0.50	0.51	NBS; CSY	Ton per 10,000 people.
Solid Waste	0.80	0.81	0.86	0.49	0.47	0.48	NBS; CSY	Ton per capita.
Environmental Emergencies	0.37	0.45	0.45	0.91	0.92	0.81	NBS; Comp.	Events/1mln person
Urban Facilities	0.44	0.37	0.30	0.85	0.74	0.70	Calculation	Normalised Score
Floor	0.31	0.16	0.16	0.84	0.79	0.74	CSY	Floor per capita; residential floor sold since 2009.

Access to Water	0.78	0.89	0.45	0.94	0.78	0.67	NBS; CSY	Coverage Rate; simple average between cities before 1995.
Access to Gas	0.45	0.34	0.32	0.96	0.83	0.73	NBS; CSY	Coverage Rate; simple average between cities before 1995.
Public Buses	0.37	0.29	0.39	0.76	0.61	0.66	NBS; CSY	Coverage Rate; simple average between cities before 1995.
Green Areas	0.29	0.18	0.17	0.77	0.67	0.71	NBS; CSY	Coverage Rate; simple average between cities before 1995.
Health	0.36	0.31	0.28	0.83	0.81	0.86	Calculation	Normalised Score
Hospital Beds	0.35	0.33	0.29	0.77	0.83	0.90	NBS	Per 1000 People.
Medical Personnel	0.41	0.36	0.29	0.82	0.73	0.77	NBS	Per 1000 People.
Health Expenditure	0.31	0.24	0.26	0.88	0.86	0.90	NBS; Comp.	Natural logarithm of deflated ¥ per capita; aggregated to education before 1996.
Education	0.27	0.27	0.24	0.80	0.75	0.71	Calculation	Normalised Score
Primary Education	0.38	0.38	0.21	0.82	0.81	0.61	NBS; CSY	Percentage of population with at least primary education.
Tertiary Education	0.13	0.11	0.19	0.83	0.69	0.64	NBS; CSY	Percentage of population with at least tertiary education.
Student/Teacher Ratio	0.34	0.46	0.41	0.66	0.68	0.71	NBS	Ratio.
Education Expenditure	0.23	0.14	0.16	0.89	0.83	0.88	NBS; Comp.	Natural logarithm of deflated ¥ per capita; aggregated to health before 1996.
Equity	0.55	0.55	0.53	0.72	0.69	0.68	Calculation	Normalised Score
Urban Bias	0.53	0.52	0.39	0.81	0.74	0.67	NBS	Urban household consumption over rural household consumption.
Gender Bias	0.35	0.34	0.37	0.90	0.82	0.88	NBS; CSY	Differences in diffusion of tertiary education.
Wage Bias	0.79	0.79	0.81	0.45	0.51	0.48	NBS; CSY	Average wage in banking and insurance sector over average wage.
Stability	0.71	0.78	0.74	0.33	0.43	0.40	Calculation	Normalised Score
Food Inflation	0.90	0.90	0.92	0.17	0.29	0.24	NBS; Brandt & Holz (2006)	Regional inflation calculated with 2000 as baseline year.
Traffic Deaths	0.45	0.63	0.60	0.65	0.73	0.66	NBS	Per capita.
Divorces	0.81	0.79	0.71	0.26	0.27	0.34	NBS	Per couple.
1-Person Household	0.69	0.81	0.75	0.26	0.45	0.35	NBS; CSY	Over Total Household.

Source: Authors' calculations. All values are weighted averages across provinces (weighted according to the population). NBS refers to the online yearly provincial database of the National Bureau of Statistics of China; CSY refers to the yearly *China Statistical Yearbooks*; Comp. refers to the *China Compendium of Statistics*; CLY refers to the *China Labour Yearbooks*.

Table D2: Unidimensional Domains in 1993

Province (1993)		Economy	Innovation	Infrastr.	Labour	Environ.	Urban S.	Health	Education	Equity	Stability
Beijing	East	0.58	0.67	0.24	0.77	0.57	0.57	0.81	0.64	0.80	0.74
Shanghai	East	0.63	0.48	0.27	0.58	0.36	0.41	0.77	0.58	0.79	0.68
Tianjin	East	0.52	0.47	0.22	0.73	0.54	0.42	0.68	0.43	0.69	0.88
Fujian	East	0.34	0.23	0.20	0.85	0.71	0.44	0.25	0.25	0.58	0.76
Guangdong	East	0.35	0.39	0.21	0.79	0.64	0.59	0.27	0.20	0.48	0.65
Guangxi	East	0.17	0.19	0.20	0.78	0.53	0.22	0.16	0.18	0.49	0.85
Hainan	East	0.47	0.24	0.18	0.68	0.75	0.57	0.47	0.22	0.38	0.80
Hebei	East	0.20	0.23	0.18	0.75	0.57	0.48	0.27	0.18	0.60	0.70
Jiangsu	East	0.29	0.32	0.13	0.68	0.49	0.42	0.30	0.32	0.45	0.76
Liaoning	East	0.39	0.38	0.17	0.67	0.26	0.45	0.62	0.39	0.63	0.71
Shandong	East	0.20	0.31	0.26	0.68	0.65	0.52	0.24	0.26	0.66	0.73
Zhejiang	East	0.36	0.29	0.15	0.64	0.59	0.36	0.30	0.23	0.58	0.62
Anhui	Centre	0.13	0.15	0.10	0.82	0.69	0.40	0.14	0.22	0.45	0.79
Heilongjiang	Centre	0.29	0.30	0.11	0.65	0.70	0.43	0.49	0.38	0.60	0.81
Henan	Centre	0.07	0.24	0.10	0.77	0.78	0.36	0.18	0.21	0.58	0.81
Hubei	Centre	0.19	0.29	0.10	0.76	0.64	0.36	0.39	0.26	0.48	0.80
Hunan	Centre	0.14	0.31	0.09	0.74	0.57	0.44	0.21	0.24	0.55	0.72
Inner Mongolia	Centre	0.30	0.20	0.09	0.82	0.58	0.15	0.44	0.39	0.63	0.78
Jiangxi	Centre	0.15	0.18	0.05	0.90	0.61	0.39	0.24	0.26	0.61	0.86
Jilin	Centre	0.32	0.31	0.11	0.85	0.66	0.35	0.52	0.37	0.65	0.72
Shanxi	Centre	0.25	0.26	0.17	0.75	0.57	0.41	0.48	0.42	0.63	0.78
Gansu	West	0.18	0.26	0.08	0.68	0.60	0.32	0.28	0.22	0.56	0.88
Guizhou	West	0.07	0.13	0.04	0.77	0.66	0.48	0.14	0.16	0.49	0.84
Ningxia	West	0.38	0.23	0.18	0.61	0.51	0.32	0.40	0.32	0.55	0.79
Qinghai	West	0.39	0.18	0.10	0.80	0.66	0.35	0.49	0.29	0.69	0.77
Shaanxi	West	0.20	0.30	0.10	0.82	0.65	0.30	0.34	0.33	0.42	0.78
Sichuan	West	0.08	0.26	0.06	0.55	0.67	0.27	0.24	0.22	0.59	0.65
Xinjiang	West	0.38	0.18	0.05	0.74	0.74	0.42	0.45	0.36	0.66	0.71
Yunnan	West	0.19	0.14	0.05	0.71	0.70	0.38	0.27	0.23	0.47	0.83
Chongqing	West	0.21	0.26	0.07	0.66	0.74	0.38	0.24	0.26	0.52	0.75
Tibet	West	0.36	0.08	0.10	0.84	0.94	0.28	0.32	0.24	0.53	0.66

Source: Authors' calculations.

Table D3: Unidimensional Domains in 2016

Province (2016)		Economy	Innovation	Infrastr.	Labour	Environ.	Urban S.	Health	Education	Equity	Stability
Beijing	East	0.92	0.97	0.64	0.50	0.69	0.87	0.94	0.96	0.66	0.26
Shanghai	East	0.90	0.88	0.66	0.24	0.65	0.80	0.91	0.93	0.68	0.37
Tianjin	East	0.99	0.95	0.72	0.26	0.72	0.87	0.79	0.94	0.82	0.43
Fujian	East	0.88	0.57	0.66	0.48	0.63	0.87	0.77	0.73	0.72	0.40
Guangdong	East	0.77	0.77	0.71	0.48	0.67	0.86	0.77	0.79	0.66	0.21
Guangxi	East	0.74	0.43	0.57	0.59	0.72	0.72	0.79	0.70	0.66	0.44
Hainan	East	0.85	0.29	0.66	0.60	0.77	0.73	0.80	0.78	0.64	0.50
Hebei	East	0.74	0.46	0.68	0.53	0.66	0.83	0.75	0.74	0.79	0.43
Jiangsu	East	0.89	0.83	0.83	0.39	0.58	0.91	0.85	0.79	0.74	0.32
Liaoning	East	0.73	0.65	0.63	0.35	0.56	0.78	0.87	0.89	0.75	0.40
Shandong	East	0.82	0.69	0.82	0.40	0.62	0.91	0.84	0.74	0.75	0.35
Zhejiang	East	0.88	0.77	0.76	0.43	0.64	0.89	0.89	0.78	0.75	0.27
Anhui	Centre	0.75	0.67	0.72	0.46	0.72	0.81	0.71	0.68	0.67	0.43
Heilongjiang	Centre	0.74	0.56	0.52	0.45	0.69	0.68	0.82	0.85	0.82	0.43
Henan	Centre	0.73	0.46	0.67	0.56	0.72	0.65	0.81	0.67	0.65	0.46
Hubei	Centre	0.80	0.74	0.69	0.53	0.63	0.79	0.89	0.77	0.68	0.34
Hunan	Centre	0.75	0.53	0.61	0.48	0.72	0.74	0.84	0.73	0.65	0.47
Inner Mongolia	Centre	0.90	0.39	0.68	0.39	0.55	0.83	0.87	0.88	0.82	0.48
Jiangxi	Centre	0.76	0.54	0.62	0.41	0.67	0.77	0.73	0.71	0.65	0.50
Jilin	Centre	0.82	0.57	0.59	0.47	0.71	0.66	0.83	0.89	0.77	0.39
Shanxi	Centre	0.75	0.46	0.65	0.53	0.55	0.74	0.81	0.86	0.78	0.44
Gansu	West	0.73	0.61	0.54	0.70	0.68	0.68	0.78	0.76	0.73	0.49
Guizhou	West	0.73	0.40	0.63	0.53	0.62	0.68	0.85	0.64	0.60	0.35
Ningxia	West	0.91	0.44	0.77	0.42	0.46	0.77	0.87	0.78	0.76	0.56
Qinghai	West	0.90	0.57	0.51	0.52	0.41	0.71	0.90	0.68	0.78	0.48
Shaanxi	West	0.82	0.78	0.65	0.45	0.55	0.74	0.92	0.79	0.68	0.46
Sichuan	West	0.71	0.60	0.60	0.43	0.68	0.68	0.87	0.67	0.83	0.33
Xinjiang	West	0.80	0.37	0.59	0.63	0.56	0.80	0.94	0.85	0.73	0.46
Yunnan	West	0.70	0.44	0.60	0.57	0.66	0.66	0.79	0.68	0.54	0.43
Chongqing	West	0.86	0.66	0.70	0.31	0.60	0.80	0.87	0.78	0.57	0.39
Tibet	West	0.87	0.11	0.45	0.82	0.84	0.39	0.75	0.57	0.52	0.57

Source: Authors' calculations.

Table D4: Multidimensional Index in 1993, 2005 and 2016

	1993			2005			2016		
	HMI	HED	HSD	HMI	HED	HSD	HMI	HED	HSD
Beijing	**0.62**	0.54	0.71	**0.66**	0.63	0.69	**0.71**	0.72	0.70
Shanghai	**0.53**	0.45	0.63	**0.61**	0.53	0.69	**0.67**	0.63	0.71
Tianjin	**0.53**	0.47	0.60	**0.61**	0.55	0.67	**0.72**	0.68	0.75
Fujian	**0.40**	0.40	0.41	**0.48**	0.48	0.48	**0.66**	0.63	0.68
Guangdong	**0.42**	0.43	0.40	**0.51**	0.55	0.47	**0.64**	0.67	0.62
Guangxi	**0.31**	0.31	0.30	**0.40**	0.36	0.44	**0.62**	0.60	0.65
Hainan	**0.43**	0.41	0.45	**0.46**	0.44	0.48	**0.65**	0.61	0.68
Hebei	**0.36**	0.33	0.40	**0.49**	0.43	0.55	**0.65**	0.61	0.69
Jiangsu	**0.38**	0.34	0.42	**0.51**	0.51	0.51	**0.69**	0.68	0.69
Liaoning	**0.44**	0.34	0.55	**0.54**	0.49	0.58	**0.64**	0.57	0.72
Shandong	**0.40**	0.37	0.44	**0.47**	0.49	0.45	**0.67**	0.65	0.69
Zhejiang	**0.38**	0.37	0.39	**0.51**	0.51	0.52	**0.68**	0.68	0.68
East	**0.31**	0.38	0.44	**0.51**	0.51	0.51	**0.67**	0.65	0.68
Anhui	**0.41**	0.27	0.34	**0.41**	0.43	0.40	**0.65**	0.66	0.65
Heilongjiang	**0.43**	0.35	0.52	**0.47**	0.41	0.53	**0.64**	0.58	0.70
Henan	**0.33**	0.28	0.37	**0.44**	0.43	0.46	**0.63**	0.62	0.64
Hubei	**0.37**	0.32	0.42	**0.47**	0.47	0.47	**0.67**	0.67	0.67
Hunan	**0.34**	0.29	0.39	**0.45**	0.43	0.47	**0.64**	0.61	0.68
Inn. Mongolia	**0.37**	0.32	0.43	**0.48**	0.43	0.54	**0.65**	0.55	0.76
Jiangxi	**0.34**	0.27	0.42	**0.42**	0.41	0.44	**0.63**	0.59	0.66
Jilin	**0.44**	0.38	0.50	**0.50**	0.44	0.56	**0.65**	0.62	0.69
Shanxi	**0.43**	0.35	0.52	**0.48**	0.42	0.54	**0.64**	0.58	0.71
Centre	**0.36**	0.31	0.42	**0.45**	0.43	0.47	**0.65**	0.63	0.67
Gansu	**0.34**	0.29	0.40	**0.43**	0.43	0.44	**0.66**	0.65	0.68
Guizhou	**0.28**	0.22	0.35	**0.35**	0.34	0.35	**0.59**	0.57	0.60
Ningxia	**0.39**	0.35	0.45	**0.44**	0.41	0.47	**0.65**	0.57	0.74
Qinghai	**0.42**	0.35	0.49	**0.49**	0.43	0.56	**0.62**	0.56	0.70
Shaanxi	**0.37**	0.33	0.40	**0.45**	0.43	0.48	**0.67**	0.63	0.70
Sichuan	**0.30**	0.25	0.36	**0.41**	0.38	0.43	**0.62**	0.59	0.65
Xinjiang	**0.42**	0.33	0.50	**0.51**	0.44	0.59	**0.65**	0.57	0.74
Yunnan	**0.32**	0.26	0.39	**0.43**	0.40	0.46	**0.60**	0.59	0.61
Chongqing	**0.35**	0.31	0.39	**0.42**	0.46	0.38	**0.63**	0.60	0.66
Tibet	**0.35**	0.34	0.38	**0.38**	0.37	0.39	**0.55**	0.55	0.55
West	**0.33**	0.28	0.38	**0.42**	0.41	0.44	**0.63**	0.61	0.65

Source: Authors' calculations.

Table D5: HMI and Sub-Indexes, Correlation Matrix

Correlations	SD	IS	ED	ES	HED	HSD	HMI
SD	1.0000						
IS	-0.3770	1.0000					
ED	0.9191	-0.4772	1.0000				
ES	-0.6228	0.2733	-0.7358	1.0000			
HED	0.9045	-0.4872	0.9536	-0.5371	1.0000		
HSD	0.9705	-0.1577	0.8579	-0.5988	0.8479	1.0000	
HMI	0.9749	-0.3370	0.9433	-0.5903	0.9621	0.9602	1.0000

Source: Authors' calculations.

Note: All the results are significant at 0.01 level. IS and ES are significantly positively correlated with each other and negatively correlated with all the remaining indexes. This result confirms the lack of full synergy across sub-indexes, as described in the subsection "Results and Discussion - Synergies of different provincial development patterns". A wider correlation matrix (not reported for space concerns), containing the 10 domains and the 36 proxies confirms that, with few exceptions, the elements grouped together are significantly positively correlated.

Table D6: Factors that influence HMI, HED and HSD before and after 2005

	(1) HMI Before	(2) HED Before	(3) HSD Before	(4) HMI After	(5) HED After	(6) HSD After
Trend	0.00678***	0.00813***	0.00505***	0.0110***	0.0100***	0.0122***
	(17.11)	(19.35)	(8.37)	(18.30)	(16.70)	(13.85)
Centre	-0.0428*	-0.0495**	-0.0343	-0.0125	-0.0317*	0.0108
	(-2.47)	(-3.18)	(-1.40)	(-0.86)	(-2.08)	(0.44)
West	-0.0554**	-0.0669***	-0.0430	-0.0232	-0.0394*	-0.00362
	(-3.16)	(-4.20)	(-1.72)	(-1.54)	(-2.51)	(-0.15)
SOEs	0.0000210	-0.0000138	0.0000545	-0.0569*	-0.0957***	-0.0184
	(1.14)	(-0.70)	(1.93)	(-2.45)	(-4.13)	(-0.54)
Commerce	0.249***	0.255***	0.252**	0.0851	-0.0311	0.245
	(4.11)	(3.97)	(2.73)	(1.01)	(-0.37)	(1.96)
Investments	0.0143	0.0640***	-0.0393	0.0760***	0.0641***	0.0876***
	(0.96)	(4.02)	(-1.73)	(8.35)	(7.06)	(6.61)
Agricolture	-0.161***	-0.165***	-0.188**	-0.460***	-0.413***	-0.487***
	(-3.94)	(-3.91)	(-3.05)	(-6.83)	(-6.06)	(-4.78)
Expenditure	-0.0723*	-0.0227	-0.112*	-0.0551**	-0.0211	-0.0871**
	(-2.27)	(-0.68)	(-2.32)	(-2.79)	(-1.06)	(-2.96)
Constant	0.442***	0.375***	0.517***	0.415***	0.422***	0.399***
	(28.16)	(24.64)	(22.55)	(19.93)	(20.02)	(12.62)
Observations	403	403	403	372	372	372

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Authors' calculations.

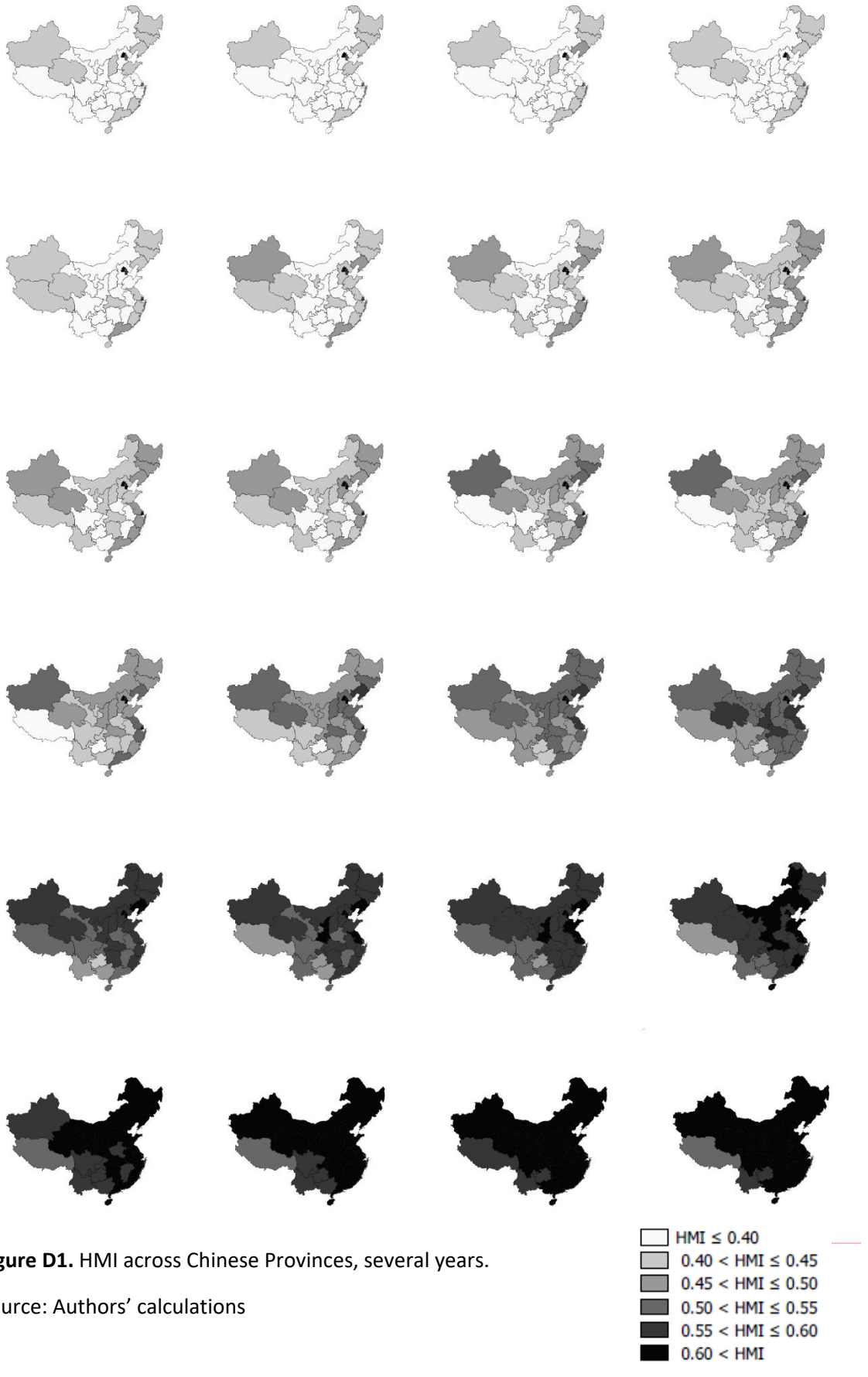

Figure D1. HMI across Chinese Provinces, several years.

Source: Authors' calculations