

Original data and definition of high-skilled talent variables

Province	Year	City	Administrative area (square kilometers)	Number of personnel of the state and party and government organs (persons)	Number of professional and technical personnel (person)	Total number of highly skilled talents (persons)
Shandong Province	2000	Jinan	8154	7764	27958	35722
Shandong Province	2010	Jinan	8177	10815	40617	51432
Shandong Province	2020	Jinan	10244	14652	63610	78262
Shandong Province	2000	Qingdao	10922	12152	32979	45131
Shandong Province	2010	Qingdao	10978	16364	49156	65520
Shandong Province	2020	Qingdao	11293	19026	66101	85127
Shandong Province	2000	Zibo	5938	6004	16893	22897
Shandong Province	2010	Zibo	5965	7705	22252	29957
Shandong Province	2020	Zibo	5965	7184	25292	32476
Shandong Province	2000	Zaozhuang	4550	2756	11061	13817
Shandong Province	2010	Zaozhuang	4563	2304	11972	14276
Shandong Province	2020	Zaozhuang	4564	2997	15371	18368
Shandong Province	2000	Dongying	7923	3009	8936	11945
Shandong Province	2010	Dongying	7923	3464	11758	15222
Shandong Province	2020	Dongying	8243	3626	14957	18583
Shandong Province	2000	Yantai	13746	9640	24563	34203
Shandong Province	2010	Yantai	13746	8234	30692	38926
Shandong Province	2020	Yantai	13865	8074	32018	40092
Shandong Province	2000	Weifang	15859	10215	27274	37489
Shandong Province	2010	Weifang	16140	7847	32730	40577
Shandong Province	2020	Weifang	16143	10157	45914	56071
Shandong Province	2000	Jining	10685	4493	21114	25607
Shandong Province	2010	Jining	11423	4580	23779	28359
Shandong Province	2020	Jining	11187	6703	35285	41988
Shandong Province	2000	Tai'an	7762	5138	16474	21612
Shandong Province	2010	Tai'an	7762	4519	18693	23212
Shandong Province	2020	Tai'an	7762	4938	23358	28296
Shandong Province	2000	Weihai	5436	3859	10548	14407
Shandong Province	2010	Weihai	5797	3587	13710	17297
Shandong Province	2020	Weihai	5800	3781	14606	18387
Shandong Province	2000	Rizhao	5310	2396	7521	9917
Shandong Province	2010	Rizhao	5348	2312	9214	11526
Shandong Province	2020	Rizhao	5371	2385	13228	15613
Shandong Province	2000	Linyi	17184	6704	23034	29738
Shandong Province	2010	Linyi	17191	7520	26480	34000
Shandong Province	2020	Linyi	17191	10246	40333	50579
Shandong Province	2000	Dezhou	10356	2608	12350	14958
Shandong Province	2010	Dezhou	10356	3169	14838	18007
Shandong Province	2020	Dezhou	10358	3635	18393	22028
Shandong Province	2000	Liaocheng	8719	3487	11250	14737
Shandong Province	2010	Liaocheng	8703	2090	12394	14484
Shandong Province	2020	Liaocheng	8628	4328	22642	26970
Shandong Province	2000	Binzhou	9445	3783	9909	13692
Shandong Province	2010	Binzhou	9600	2843	11765	14608
Shandong Province	2020	Binzhou	9660	3860	16271	20131
Shandong Province	2000	Heze	12228	3853	14923	18776
Shandong Province	2010	Heze	12239	2185	16451	18636
Shandong Province	2020	Heze	12155	3902	23404	27306

Province	Year	City	Density of highly skilled personnel (persons/square kilometer)	Number of authorized invention patents (pieces)	Local fiscal general budget expenditure on scientific research (ten thousand yuan)	Per capita GDP (yuan)
Shandong Province	2000	Jinan	4.38	79	1894	17244
Shandong Province	2010	Jinan	6.29	1181	62138	57966
Shandong Province	2020	Jinan	7.64	5830	396473	110199
Shandong Province	2000	Qingdao	4.13	48	1236	17008
Shandong Province	2010	Qingdao	5.97	706	98748	65827
Shandong Province	2020	Qingdao	7.54	8647	468514	123828
Shandong Province	2000	Zibo	3.86	64	3055	15766
Shandong Province	2010	Zibo	5.02	255	48373	63397
Shandong Province	2020	Zibo	5.44	1068	105241	78092
Shandong Province	2000	Zaozhuang	3.04	5	530	7117
Shandong Province	2010	Zaozhuang	3.13	72	15469	36839
Shandong Province	2020	Zaozhuang	4.02	345	26359	44954
Shandong Province	2000	Dongying	1.51	16	4111	26591
Shandong Province	2010	Dongying	1.92	159	20198	116448
Shandong Province	2020	Dongying	2.25	756	58278	135910
Shandong Province	2000	Yantai	2.49	29	1016	13900
Shandong Province	2010	Yantai	2.83	295	106313	62254
Shandong Province	2020	Yantai	2.89	1747	298886	110058
Shandong Province	2000	Weifang	2.36	10	771	8733
Shandong Province	2010	Weifang	2.51	183	72157	34273
Shandong Province	2020	Weifang	3.47	2648	225106	62524
Shandong Province	2000	Jining	2.40	6	880	7555
Shandong Province	2010	Jining	2.48	125	52726	31561
Shandong Province	2020	Jining	3.75	807	78349	53773
Shandong Province	2000	Tai'an	2.78	22	1387	7596
Shandong Province	2010	Tai'an	2.99	182	28131	37390
Shandong Province	2020	Tai'an	3.65	498	35185	50555
Shandong Province	2000	Weihai	2.65	9	383	23184
Shandong Province	2010	Weihai	2.98	88	56150	76778
Shandong Province	2020	Weihai	3.17	702	72522	103829
Shandong Province	2000	Rizhao	1.87	6	200	7810
Shandong Province	2010	Rizhao	2.16	26	9364	36883
Shandong Province	2020	Rizhao	2.91	783	89918	67593
Shandong Province	2000	Linyi	1.73	17	931	5783
Shandong Province	2010	Linyi	1.98	139	32862	23886
Shandong Province	2020	Linyi	2.94	879	85455	43582
Shandong Province	2000	Dezhou	1.44	7	1599	7193
Shandong Province	2010	Dezhou	1.74	39	20095	29772
Shandong Province	2020	Dezhou	2.13	408	93665	54872
Shandong Province	2000	Liaocheng	1.69	12	947	5327
Shandong Province	2010	Liaocheng	1.66	197	20733	28464
Shandong Province	2020	Liaocheng	3.13	639	20481	38925
Shandong Province	2000	Binzhou	1.45	4	198	7780
Shandong Province	2010	Binzhou	1.52	38	23966	41661
Shandong Province	2020	Binzhou	2.08	755	166922	63915
Shandong Province	2000	Heze	1.54	3	330	2507
Shandong Province	2010	Heze	1.52	81	18478	14841
Shandong Province	2020	Heze	2.25	227	23915	39599

Province	Year	City	Total retail sales of consumer goods (ten thousand yuan)	The ratio of the proportion of the added value of the tertiary industry to the proportion of the added value of the secondary industry to the GDP (%)
Shandong Province	2000	Jinan	3547100	1.05
Shandong Province	2010	Jinan	18024610	1.26
Shandong Province	2020	Jinan	44691335	1.77
Shandong Province	2000	Qingdao	3077000	0.8
Shandong Province	2010	Qingdao	19611331	0.95
Shandong Province	2020	Qingdao	52034957	1.75
Shandong Province	2000	Zibo	1849400	0.58
Shandong Province	2010	Zibo	10056751	0.56
Shandong Province	2020	Zibo	11346781	0.98
Shandong Province	2000	Zaozhuang	853900	0.68
Shandong Province	2010	Zaozhuang	4228513	0.52
Shandong Province	2020	Zaozhuang	8977992	1.23
Shandong Province	2000	Dongying	681100	0.15
Shandong Province	2010	Dongying	3887417	0.33
Shandong Province	2020	Dongying	6533972	0.68
Shandong Province	2000	Yantai	2561100	0.65
Shandong Province	2010	Yantai	14126854	0.57
Shandong Province	2020	Yantai	27999504	1.27
Shandong Province	2000	Weifang	2600100	0.73
Shandong Province	2010	Weifang	12148004	0.60
Shandong Province	2020	Weifang	23897737	1.31
Shandong Province	2000	Jining	1664100	0.87
Shandong Province	2010	Jining	10042495	0.64
Shandong Province	2020	Jining	21273058	1.25
Shandong Province	2000	Tai'an	1345900	0.83
Shandong Province	2010	Tai'an	6874247	0.69
Shandong Province	2020	Tai'an	10223532	1.28
Shandong Province	2000	Weihai	1515900	0.61
Shandong Province	2010	Weihai	6839866	0.65
Shandong Province	2020	Weihai	11664058	1.34
Shandong Province	2000	Rizhao	578800	0.94
Shandong Province	2010	Rizhao	3116303	0.65
Shandong Province	2020	Rizhao	5847849	1.17
Shandong Province	2000	Linyi	1747800	0.70
Shandong Province	2010	Linyi	11587531	0.77
Shandong Province	2020	Linyi	25282022	1.49
Shandong Province	2000	Dezhou	1227900	0.73
Shandong Province	2010	Dezhou	6456204	0.61
Shandong Province	2020	Dezhou	11144369	1.23
Shandong Province	2000	Liaocheng	505000	0.62
Shandong Province	2010	Liaocheng	5585951	0.52
Shandong Province	2020	Liaocheng	8010428	1.49
Shandong Province	2000	Binzhou	492100	0.60
Shandong Province	2010	Binzhou	4311579	0.65
Shandong Province	2020	Binzhou	7179440	1.22
Shandong Province	2000	Heze	752300	0.87
Shandong Province	2010	Heze	6655095	0.55
Shandong Province	2020	Heze	16373454	1.24

Province	Year	City	Average annual salary of on-the-job employees (yuan)	Number of industrial enterprises above designated size (number)	The number of hospitals and health clinics (natural)
Shandong Province	2000	Jinan	10422	1038	231
Shandong Province	2010	Jinan	37853.89	2021	277
Shandong Province	2020	Jinan	109535	2215	284
Shandong Province	2000	Qingdao	10178	1504	231
Shandong Province	2010	Qingdao	37803.49	5674	254
Shandong Province	2020	Qingdao	115410	3856	460
Shandong Province	2000	Zibo	9302	986	187
Shandong Province	2010	Zibo	33896.67	3413	218
Shandong Province	2020	Zibo	86198	1775	154
Shandong Province	2000	Zaozhuang	6874	530	138
Shandong Province	2010	Zaozhuang	30440.82	1795	119
Shandong Province	2020	Zaozhuang	78166	739	82
Shandong Province	2000	Dongying	15330	187	92
Shandong Province	2010	Dongying	41197.76	895	107
Shandong Province	2020	Dongying	110945	845	70
Shandong Province	2000	Yantai	8892	1624	266
Shandong Province	2010	Yantai	34193.93	3447	277
Shandong Province	2020	Yantai	89907	2188	186
Shandong Province	2000	Weifang	7556	1157	282
Shandong Province	2010	Weifang	33710.57	5089	244
Shandong Province	2020	Weifang	80512	3521	232
Shandong Province	2000	Jining	8183	521	258
Shandong Province	2010	Jining	35820.8	3907	253
Shandong Province	2020	Jining	88758	1941	218
Shandong Province	2000	Tai'an	6962	430	159
Shandong Province	2010	Tai'an	30904.21	1665	160
Shandong Province	2020	Tai'an	74258	1097	108
Shandong Province	2000	Weihai	8024	1120	87
Shandong Province	2010	Weihai	31913.04	1812	92
Shandong Province	2020	Weihai	75671	1073	69
Shandong Province	2000	Rizhao	7550	183	81
Shandong Province	2010	Rizhao	33522.17	854	72
Shandong Province	2020	Rizhao	87824	797	61
Shandong Province	2000	Linyi	7236	729	290
Shandong Province	2010	Linyi	31724.03	4027	285
Shandong Province	2020	Linyi	84941	3421	221
Shandong Province	2000	Dezhou	6365	610	227
Shandong Province	2010	Dezhou	24262.28	3248	168
Shandong Province	2020	Dezhou	80790	1496	120
Shandong Province	2000	Liaocheng	7022	346	187
Shandong Province	2010	Liaocheng	25783.32	2403	198
Shandong Province	2020	Liaocheng	75514	1436	142
Shandong Province	2000	Binzhou	7509	338	126
Shandong Province	2010	Binzhou	28004.78	1246	140
Shandong Province	2020	Binzhou	76989	1316	99
Shandong Province	2000	Heze	5728	249	259
Shandong Province	2010	Heze	21959.38	2088	283
Shandong Province	2020	Heze	72197	1908	237

Province	Year	City	The number of regular institutions of higher learning (institutions)	The total collection of public libraries in municipal districts (thousand volumes)	Data sources
Shandong Province	2000	Jinan	18	5917	1. The data of high-skilled talents comes from the "Chinese Census by County"
Shandong Province	2010	Jinan	66	9412	
Shandong Province	2020	Jinan	44	16920	
Shandong Province	2000	Qingdao	6	1958	
Shandong Province	2010	Qingdao	25	4442	
Shandong Province	2020	Qingdao	27	8400	
Shandong Province	2000	Zibo	3	1279	
Shandong Province	2010	Zibo	9	2234	
Shandong Province	2020	Zibo	7	3160	
Shandong Province	2000	Zaozhuang	1	641	
Shandong Province	2010	Zaozhuang	3	1043	
Shandong Province	2020	Zaozhuang	3	1830	
Shandong Province	2000	Dongying	2	240	
Shandong Province	2010	Dongying	5	729	
Shandong Province	2020	Dongying	4	3390	
Shandong Province	2000	Yantai	5	1745	
Shandong Province	2010	Yantai	10	5128	
Shandong Province	2020	Yantai	16	6720	
Shandong Province	2000	Weifang	2	1707	
Shandong Province	2010	Weifang	11	2092	
Shandong Province	2020	Weifang	16	7410	
Shandong Province	2000	Jining	5	1265	
Shandong Province	2010	Jining	7	1692	
Shandong Province	2020	Jining	7	5420	
Shandong Province	2000	Tai'an	4	367	
Shandong Province	2010	Tai'an	7	1103	
Shandong Province	2020	Tai'an	9	1960	
Shandong Province	2000	Weihai	2	697	
Shandong Province	2010	Weihai	7	1180	
Shandong Province	2020	Weihai	11	3780	
Shandong Province	2000	Rizhao	2	278	
Shandong Province	2010	Rizhao	2	354	
Shandong Province	2020	Rizhao	3	1520	
Shandong Province	2000	Linyi	2	1200	
Shandong Province	2010	Linyi	3	5506	
Shandong Province	2020	Linyi	5	3860	
Shandong Province	2000	Dezhou	2	615	
Shandong Province	2010	Dezhou	4	966	
Shandong Province	2020	Dezhou	4	2380	
Shandong Province	2000	Liaocheng	1	418	4.Definition of highly skilled talents: According to the "Occupational Classification of the People's Republic of China (2022 Edition)" and referring to previous literature, this article defines highly skilled talents as two types of practitioners: "heads of state organs, Party and mass organizations, and enterprises and public institutions" and "professional and technical personnel"
Shandong Province	2010	Liaocheng	3	5421	
Shandong Province	2020	Liaocheng	2	4170	
Shandong Province	2000	Binzhou	2	690	
Shandong Province	2010	Binzhou	3	1205	
Shandong Province	2020	Binzhou	3	2350	
Shandong Province	2000	Heze	3	587	
Shandong Province	2010	Heze	3	634	
Shandong Province	2020	Heze	4	1980	

Data after cleaning and processing instructions

Province	Year	City	Administrative area (square kilometers)	Number of personnel of the state and party and government organs (persons)	Number of professional and technical personnel (person)	Total number of highly skilled talents (persons)
Shandong Province	2000	Jinan	8154	7764	27958	35722
Shandong Province	2010	Jinan	8177	10815	40617	51432
Shandong Province	2020	Jinan	10244	14652	63610	78262
Shandong Province	2000	Qingdao	10922	12152	32979	45131
Shandong Province	2010	Qingdao	10978	16364	49156	65520
Shandong Province	2020	Qingdao	11293	19026	66101	85127
Shandong Province	2000	Zibo	5938	6004	16893	22897
Shandong Province	2010	Zibo	5965	7705	22252	29957
Shandong Province	2020	Zibo	5965	7184	25292	32476
Shandong Province	2000	Zaozhuang	4550	2756	11061	13817
Shandong Province	2010	Zaozhuang	4563	2304	11972	14276
Shandong Province	2020	Zaozhuang	4564	2997	15371	18368
Shandong Province	2000	Dongying	7923	3009	8936	11945
Shandong Province	2010	Dongying	7923	3464	11758	15222
Shandong Province	2020	Dongying	8243	3626	14957	18583
Shandong Province	2000	Yantai	13746	9640	24563	34203
Shandong Province	2010	Yantai	13746	8234	30692	38926
Shandong Province	2020	Yantai	13865	8074	32018	40092
Shandong Province	2000	Weifang	15859	10215	27274	37489
Shandong Province	2010	Weifang	16140	7847	32730	40577
Shandong Province	2020	Weifang	16143	10157	45914	56071
Shandong Province	2000	Jining	10685	4493	21114	25607
Shandong Province	2010	Jining	11423	4580	23779	28359
Shandong Province	2020	Jining	11187	6703	35285	41988
Shandong Province	2000	Tai'an	7762	5138	16474	21612
Shandong Province	2010	Tai'an	7762	4519	18693	23212
Shandong Province	2020	Tai'an	7762	4938	23358	28296
Shandong Province	2000	Weihai	5436	3859	10548	14407
Shandong Province	2010	Weihai	5797	3587	13710	17297
Shandong Province	2020	Weihai	5800	3781	14606	18387
Shandong Province	2000	Rizhao	5310	2396	7521	9917
Shandong Province	2010	Rizhao	5348	2312	9214	11526
Shandong Province	2020	Rizhao	5371	2385	13228	15613
Shandong Province	2000	Linyi	17184	6704	23034	29738
Shandong Province	2010	Linyi	17191	7520	26480	34000
Shandong Province	2020	Linyi	17191	10246	40333	50579
Shandong Province	2000	Dezhou	10356	2608	12350	14958
Shandong Province	2010	Dezhou	10356	3169	14838	18007
Shandong Province	2020	Dezhou	10358	3635	18393	22028
Shandong Province	2000	Liaocheng	8719	3487	11250	14737
Shandong Province	2010	Liaocheng	8703	2090	12394	14484
Shandong Province	2020	Liaocheng	8628	4328	22642	26970
Shandong Province	2000	Binzhou	9445	3783	9909	13692
Shandong Province	2010	Binzhou	9600	2843	11765	14608
Shandong Province	2020	Binzhou	9660	3860	16271	20131
Shandong Province	2000	Heze	12228	3853	14923	18776
Shandong Province	2010	Heze	12239	2185	16451	18636
Shandong Province	2020	Heze	12155	3902	23404	27306

Province	Year	City	Density of highly skilled personnel (persons/square kilometer)	Number of authorized invention patents (pieces)	Local fiscal general budget expenditure on scientific research (ten thousand yuan)	Per capita GDP (yuan)
Shandong Province	2000	Jinan	4.38	79	7.546446	9.755219
Shandong Province	2000	Jinan	6.29	1181	11.03711	10.96761
Shandong Province	2000	Jinan	7.64	5830	12.89036	11.61004
Shandong Province	2000	Qingdao	4.13	48	7.119636	9.741439
Shandong Province	2000	Qingdao	5.97	706	11.50033	11.09479
Shandong Province	2000	Qingdao	7.54	8647	13.05732	11.72665
Shandong Province	2000	Zibo	3.86	64	8.024535	9.665611
Shandong Province	2000	Zibo	5.02	255	10.7867	11.05717
Shandong Province	2000	Zibo	5.44	1068	11.56401	11.26564
Shandong Province	2000	Zaozhuang	3.04	5	6.272877	8.870241
Shandong Province	2000	Zaozhuang	3.13	72	9.646593	10.51431
Shandong Province	2000	Zaozhuang	4.02	345	10.17957	10.7134
Shandong Province	2000	Dongying	1.51	16	8.321422	10.18833
Shandong Province	2000	Dongying	1.92	159	9.913339	11.6652
Shandong Province	2000	Dongying	2.25	756	10.97298	11.81975
Shandong Province	2000	Yantai	2.49	29	6.923629	9.539644
Shandong Province	2000	Yantai	2.83	295	11.57414	11.03898
Shandong Province	2000	Yantai	2.89	1747	12.60782	11.60876
Shandong Province	2000	Weifang	2.36	10	6.647688	9.074864
Shandong Province	2000	Weifang	2.51	183	11.1866	10.44211
Shandong Province	2000	Weifang	3.47	2648	12.32433	11.04331
Shandong Province	2000	Jining	2.40	6	6.779922	8.929965
Shandong Province	2000	Jining	2.48	125	10.87286	10.35968
Shandong Province	2000	Jining	3.75	807	11.26893	10.89253
Shandong Province	2000	Tai'an	2.78	22	7.234899	8.935377
Shandong Province	2000	Tai'an	2.99	182	10.24463	10.52916
Shandong Province	2000	Tai'an	3.65	498	10.46838	10.83082
Shandong Province	2000	Weihai	2.65	9	5.948035	10.05122
Shandong Province	2000	Weihai	2.98	88	10.93578	11.24867
Shandong Province	2000	Weihai	3.17	702	11.19165	11.5505
Shandong Province	2000	Rizhao	1.87	6	5.298317	8.963161
Shandong Province	2000	Rizhao	2.16	26	9.144628	10.51551
Shandong Province	2000	Rizhao	2.91	783	11.40665	11.12126
Shandong Province	2000	Linyi	1.73	17	6.836259	8.662678
Shandong Province	2000	Linyi	1.98	139	10.40007	10.08105
Shandong Province	2000	Linyi	2.94	879	11.35575	10.6824
Shandong Province	2000	Dezhou	1.44	7	7.377134	8.880863
Shandong Province	2000	Dezhou	1.74	39	9.908226	10.30132
Shandong Province	2000	Dezhou	2.13	408	11.44748	10.91276
Shandong Province	2000	Liaocheng	1.69	12	6.853299	8.580544
Shandong Province	2000	Liaocheng	1.66	197	9.939482	10.2564
Shandong Province	2000	Liaocheng	3.13	639	9.927253	10.56939
Shandong Province	2000	Binzhou	1.45	4	5.288267	8.959311
Shandong Province	2000	Binzhou	1.52	38	10.08439	10.63732
Shandong Province	2000	Binzhou	2.08	755	12.02528	11.06531
Shandong Province	2000	Heze	1.54	3	5.799093	7.826842
Shandong Province	2000	Heze	1.52	81	9.824336	9.605149
Shandong Province	2000	Heze	2.25	227	10.08226	10.58656

Province	Year	City	Total retail sales of consumer goods (ten thousand yuan)	The ratio of the proportion of the added value of the tertiary industry to the proportion of the added value of the secondary industry to the GDP (%)
Shandong Province	2000	Jinan	15.08164	1.05
Shandong Province	2010	Jinan	16.70725	1.26
Shandong Province	2020	Jinan	17.61529	1.77
Shandong Province	2000	Qingdao	14.93947	0.8
Shandong Province	2010	Qingdao	16.79162	0.95
Shandong Province	2020	Qingdao	17.76743	1.75
Shandong Province	2000	Zibo	14.43037	0.58
Shandong Province	2010	Zibo	16.12375	0.56
Shandong Province	2020	Zibo	16.24444	0.98
Shandong Province	2000	Zaozhuang	13.65757	0.68
Shandong Province	2010	Zaozhuang	15.25736	0.52
Shandong Province	2020	Zaozhuang	16.01029	1.23
Shandong Province	2000	Dongying	13.43146	0.15
Shandong Province	2010	Dongying	15.17326	0.33
Shandong Province	2020	Dongying	15.69253	0.68
Shandong Province	2000	Yantai	14.75595	0.65
Shandong Province	2010	Yantai	16.46359	0.57
Shandong Province	2020	Yantai	17.1477	1.27
Shandong Province	2000	Weifang	14.77106	0.73
Shandong Province	2010	Weifang	16.31268	0.60
Shandong Province	2020	Weifang	16.98929	1.31
Shandong Province	2000	Jining	14.32479	0.87
Shandong Province	2010	Jining	16.12234	0.64
Shandong Province	2020	Jining	16.87295	1.25
Shandong Province	2000	Tai'an	14.11257	0.83
Shandong Province	2010	Tai'an	15.74329	0.69
Shandong Province	2020	Tai'an	16.1402	1.28
Shandong Province	2000	Weihai	14.23152	0.61
Shandong Province	2010	Weihai	15.73828	0.65
Shandong Province	2020	Weihai	16.27202	1.34
Shandong Province	2000	Rizhao	13.26871	0.94
Shandong Province	2010	Rizhao	14.95216	0.65
Shandong Province	2020	Rizhao	15.58158	1.17
Shandong Province	2000	Linyi	14.37387	0.70
Shandong Province	2010	Linyi	16.26544	0.77
Shandong Province	2020	Linyi	17.0456	1.49
Shandong Province	2000	Dezhou	14.02082	0.73
Shandong Province	2010	Dezhou	15.68055	0.61
Shandong Province	2020	Dezhou	16.22644	1.23
Shandong Province	2000	Liaocheng	13.13231	0.62
Shandong Province	2010	Liaocheng	15.53577	0.52
Shandong Province	2020	Liaocheng	15.89625	1.49
Shandong Province	2000	Binzhou	13.10644	0.60
Shandong Province	2010	Binzhou	15.27681	0.65
Shandong Province	2020	Binzhou	15.78673	1.22
Shandong Province	2000	Heze	13.53089	0.87
Shandong Province	2010	Heze	15.71089	0.55
Shandong Province	2020	Heze	16.61117	1.24

Province	Year	City	Average annual salary of on-the-job employees (yuan)	Number of industrial enterprises above designated size (number)	The number of hospitals and health clinics (natural)
Shandong Province	2000	Jinan	9.251675	6.945051	5.442418
Shandong Province	2010	Jinan	10.54149	7.611348	5.624018
Shandong Province	2020	Jinan	11.604	7.703008	5.648974
Shandong Province	2000	Qingdao	9.227983	7.315884	5.442418
Shandong Province	2010	Qingdao	10.54016	8.64365	5.537334
Shandong Province	2020	Qingdao	11.65625	8.257385	6.131227
Shandong Province	2000	Zibo	9.137984	6.893656	5.231109
Shandong Province	2010	Zibo	10.43107	8.135347	5.384495
Shandong Province	2020	Zibo	11.3644	7.481556	5.036952
Shandong Province	2000	Zaozhuang	8.835502	6.272877	4.927254
Shandong Province	2010	Zaozhuang	10.32354	7.49276	4.779123
Shandong Province	2020	Zaozhuang	11.26659	6.605298	4.406719
Shandong Province	2000	Dongying	9.637567	5.231109	4.521789
Shandong Province	2010	Dongying	10.62614	6.796824	4.672829
Shandong Province	2020	Dongying	11.61679	6.739336	4.248495
Shandong Province	2000	Yantai	9.092907	7.392648	5.583496
Shandong Province	2010	Yantai	10.4398	8.14526	5.624018
Shandong Province	2020	Yantai	11.40653	7.690743	5.225747
Shandong Province	2000	Weifang	8.930098	7.053586	5.641907
Shandong Province	2010	Weifang	10.42557	8.534837	5.497168
Shandong Province	2020	Weifang	11.29616	8.1665	5.446737
Shandong Province	2000	Jining	9.009814	6.25575	5.552959
Shandong Province	2010	Jining	10.48628	8.270525	5.53339
Shandong Province	2020	Jining	11.39367	7.570959	5.384495
Shandong Province	2000	Tai'an	8.848222	6.063785	5.068904
Shandong Province	2010	Tai'an	10.33865	7.417581	5.075174
Shandong Province	2020	Tai'an	11.2153	7.000334	4.682131
Shandong Province	2000	Weihai	8.990192	7.021084	4.465908
Shandong Province	2010	Weihai	10.37077	7.502186	4.521789
Shandong Province	2020	Weihai	11.23415	6.978214	4.234107
Shandong Province	2000	Rizhao	8.929303	5.209486	4.394449
Shandong Province	2010	Rizhao	10.41996	6.749931	4.276666
Shandong Province	2020	Rizhao	11.38309	6.680855	4.110874
Shandong Province	2000	Linyi	8.886824	6.591674	5.669881
Shandong Province	2010	Linyi	10.36483	8.300777	5.652489
Shandong Province	2020	Linyi	11.34971	8.137689	5.398163
Shandong Province	2000	Dezhou	8.75857	6.413459	5.42495
Shandong Province	2010	Dezhou	10.09668	8.085794	5.123964
Shandong Province	2020	Dezhou	11.29961	7.31055	4.787492
Shandong Province	2000	Liaocheng	8.856803	5.846439	5.231109
Shandong Province	2010	Liaocheng	10.15748	7.784473	5.288267
Shandong Province	2020	Liaocheng	11.23207	7.269617	4.955827
Shandong Province	2000	Binzhou	8.923858	5.823046	4.836282
Shandong Province	2010	Binzhou	10.24013	7.127694	4.941642
Shandong Province	2020	Binzhou	11.25142	7.182352	4.59512
Shandong Province	2000	Heze	8.653122	5.517453	5.556828
Shandong Province	2010	Heze	9.99695	7.643962	5.645447
Shandong Province	2020	Heze	11.18715	7.553811	5.46806

Province	Year	City	The number of regular institutions of higher learning (institutions)	The total collection of public libraries in municipal districts (thousand volumes)	Data Processing Instructions
Shandong Province	2000	Jinan	2.890372	8.685585	The data processing in this study was carried out using Stata software. And only perform logarithmic processing on The following variables: The number of regular institutions of higher learning 、 The total collection of public libraries in municipal districts 、 Local fiscal general budget expenditure on scientific research 、 Total retail sales of consumer goods 、 Per capita GDP 、 Average annual salary of on-the-job employees 、 Number of industrial enterprises above designated size 、 The number of hospitals and health clinics. The processing code is as follows: gen new_var = ln(var)
Shandong Province	2010	Jinan	4.189655	9.149741	
Shandong Province	2020	Jinan	3.78419	9.736252	
Shandong Province	2000	Qingdao	1.791759	7.579679	
Shandong Province	2010	Qingdao	3.218876	8.39886	
Shandong Province	2020	Qingdao	3.295837	9.035987	
Shandong Province	2000	Zibo	1.098612	7.153834	
Shandong Province	2010	Zibo	2.197225	7.711549	
Shandong Province	2020	Zibo	1.94591	8.058328	
Shandong Province	2000	Zaozhuang	0	6.463029	
Shandong Province	2010	Zaozhuang	1.098612	6.949856	
Shandong Province	2020	Zaozhuang	1.098612	7.512071	
Shandong Province	2000	Dongying	0.6931472	5.480639	
Shandong Province	2010	Dongying	1.609438	6.591674	
Shandong Province	2020	Dongying	1.386294	8.128585	
Shandong Province	2000	Yantai	1.609438	7.46451	
Shandong Province	2010	Yantai	2.302585	8.542471	
Shandong Province	2020	Yantai	2.772589	8.812843	
Shandong Province	2000	Weifang	0.6931472	7.442492	
Shandong Province	2010	Weifang	2.397895	7.645876	
Shandong Province	2020	Weifang	2.772589	8.910585	
Shandong Province	2000	Jining	1.609438	7.142828	
Shandong Province	2010	Jining	1.94591	7.433667	
Shandong Province	2020	Jining	1.94591	8.597851	
Shandong Province	2000	Tai'an	1.386294	5.905362	
Shandong Province	2010	Tai'an	1.94591	7.005789	
Shandong Province	2020	Tai'an	2.197225	7.5807	
Shandong Province	2000	Weihai	0.6931472	6.546785	
Shandong Province	2010	Weihai	1.94591	7.07327	
Shandong Province	2020	Weihai	2.397895	8.237479	
Shandong Province	2000	Rizhao	0.6931472	5.627621	
Shandong Province	2010	Rizhao	0.6931472	5.869297	
Shandong Province	2020	Rizhao	1.098612	7.326466	
Shandong Province	2000	Linyi	0.6931472	7.090077	
Shandong Province	2010	Linyi	1.098612	8.613594	
Shandong Province	2020	Linyi	1.609438	8.258423	
Shandong Province	2000	Dezhou	0.6931472	6.421622	
Shandong Province	2010	Dezhou	1.386294	6.873164	
Shandong Province	2020	Dezhou	1.386294	7.774856	
Shandong Province	2000	Liaocheng	0	6.035481	
Shandong Province	2010	Liaocheng	1.098612	8.598036	
Shandong Province	2020	Liaocheng	0.6931472	8.335671	
Shandong Province	2000	Binzhou	0.6931472	6.536692	
Shandong Province	2010	Binzhou	1.098612	7.094235	
Shandong Province	2020	Binzhou	1.098612	7.762171	
Shandong Province	2000	Heze	1.098612	6.375025	
Shandong Province	2010	Heze	1.098612	6.452049	
Shandong Province	2020	Heze	1.386294	7.590852	