Appendix to “Place-based Land Policy and Spatial Misallocation: Theory and Evidence from China” *

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March 27, 2024
latest version

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*This is the online appendix to Fang et al. (2022). If you have any questions or inquiries, please get in touch with Min Fang (minfang@ufl.edu), Department of Economics, University of Florida. All errors are ours.

A Supplements to the Empirical Analysis

In this section, we implement six groups of robustness checks for our empirical analysis. We also investigate the policy effect on some other outcome variables in the last subsection to provide preliminary empirical evidence for the mechanism and motivate our quantitative model.

A.1 Robustness Checks for Productivity Estimation Method

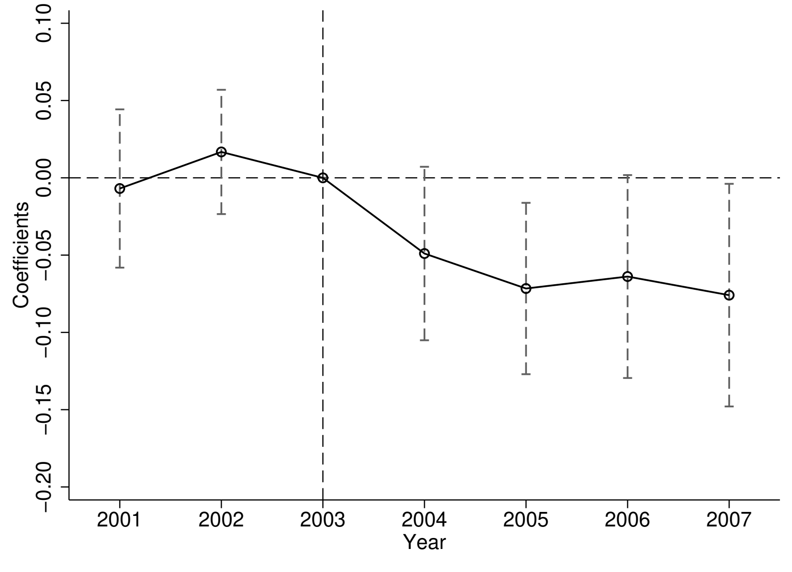
First, we implement the empirical analysis using productivity calculated with methods proposed by Levinsohn and Petrin (2003) and Ackerberg, Caves, and Frazer (2015). Table A1 shows the main regression results. Figures A1 and A2 show the results of the event study regression. All results are very similar to the results when we calculate productivity using the OP method. The event study regressions detect no evidence for unparalleled pre-trend.

Table A1: DID Results on Productivity (LP and ACF)

	(1) LP	(2) ACF
Post2003×East	-0.0516*	-0.0836**
	(0.0296)	(0.0343)
Province × Time Trend	Y	Y
GDP Per Capita × Time Trend	Y	Y
Industry Share × Time Trend	Y	Y
Year FE	Y	Y
Prefecture FE	Y	Y
Observations	1,792	1,792
R-squared	0.6351	0.6381

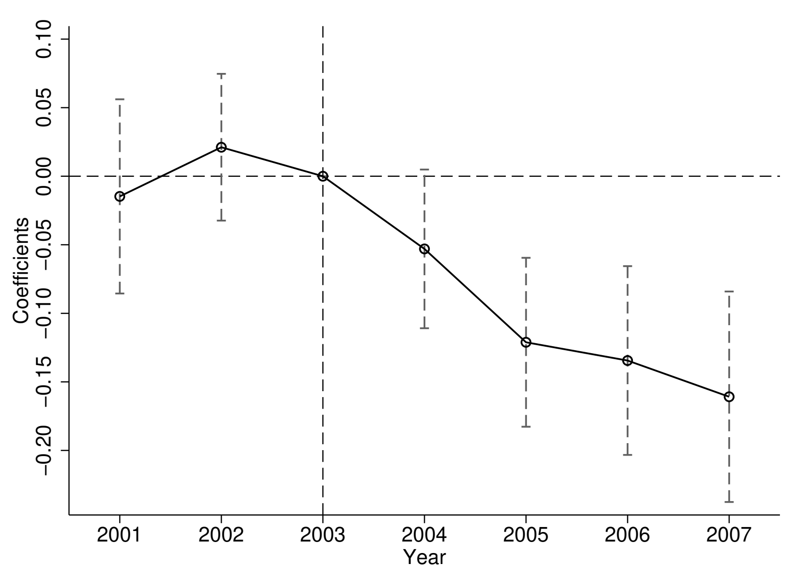
Notes: The dependent variables are prefecture-level average firm productivity measured by the Levinsohn and Petrin (2003) and the Ackerberg, Caves, and Frazer (2015) method. The regression specifications are identical to column (3) of Table 2. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Figure A1: **Event Study - Productivity (LP)**



Notes: The dependent variable is the prefecture-level average firm productivity in different prefectures calculated using the Levinsohn and Petrin (2003) method. The corresponding confidence interval is 95%.

Figure A2: **Event Study - Productivity (ACF)**



Notes: The dependent variable is the prefecture-level average firm productivity in different prefectures calculated using the Ackerberg, Caves, and Frazer (2015) method. The corresponding confidence interval is 95%.

A.2 Using Quota Changes as Treatment

Second, we change the regression specification and directly use the quota change as the treatment variable to run the following regression:

$$ln(Prod_{jt}) = \alpha + \delta_1 Post2003_t \times QS_j + \phi_j + \gamma_t + \epsilon_{jt} \tag{1}$$

QS_j is the change (the 2000-2002 share minus the 2003-2007 share) in the quota share of the province where prefecture j is located before and after the policy. Compared with the main regression, we use QS_j instead of $East_j$ as the treatment variable. This exposure design considers prefectures with larger quota changes as experiencing larger policy shocks. Unfortunately, we do not have prefecture-level quota data and have to use province-level quota to approximate this exposure. Similar to the main regression, we find that prefectures in provinces with larger land quota losses experienced larger productivity reductions after the policy in 2003. Figures A3, A4, and A5 demonstrate the dynamic effect using event study regressions, taking quota shares as the treatment. We find no evidence of different pre-trends in productivity for regions with different quota changes.

Another straightforward way to estimate the effect of the quota changes on TFP is to directly regress prefecture-level TFP on the absolute quota level of the province (where the prefecture is located) in each year. Table A3 shows that province quota level is positively correlated with prefecture TFP. This indicates that policy-driven quota reductions lead to TFP declines for prefectures in that province.

Table A2: Quota Regression

	(1) OP	(2) LP	(3) ACF
Post2003×QS	-0.0132*	-0.0122	-0.0195**
	(0.0069)	(0.0075)	(0.0087)
Province × Time Trend	Y	Y	Y
GDP Per Capita × Time Trend	Y	Y	Y
Industry Share × Time Trend	Y	Y	Y
Year FE	Y	Y	Y
Prefecture FE	Y	Y	Y
Observations	1,792	1,792	1,792
R-squared	0.7527	0.6350	0.6379

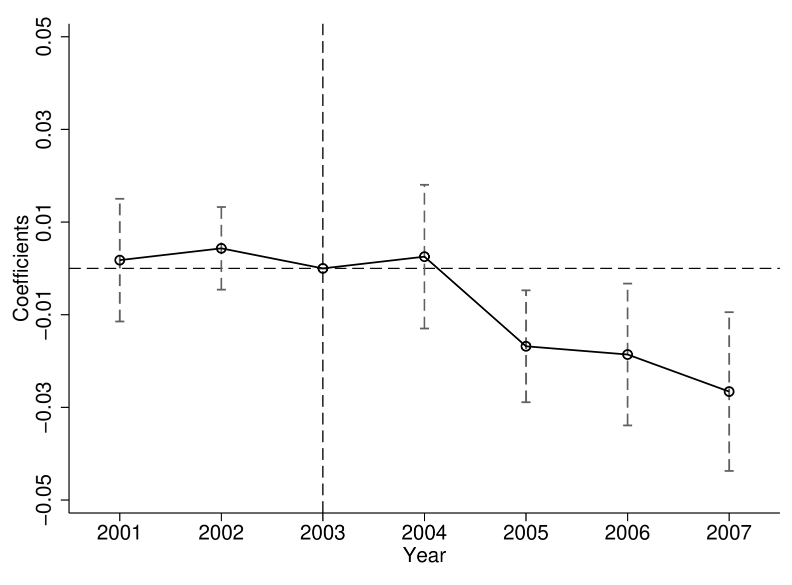
Notes: The dependent variables are prefecture-level average firm productivity measured by the Olley and Pakes (1992), the Levinsohn and Petrin (2003) and the Ackerberg, Caves, and Frazer (2015) methods. We use quota changes in each province as the treatment variable. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Table A3: Quota Regression

	(1) OP	(2) LP	(3) ACF
Quota Level	0.0117**	0.0063	0.0157*
	(0.0056)	(0.0055)	(0.0088)
Province × Time Trend	Y	Y	Y
GDP Per Capita × Time Trend	Y	Y	Y
Industry Share × Time Trend	Y	Y	Y
Year FE	Y	Y	Y
Prefecture FE	Y	Y	Y
Observations	1,792	1,792	1,792
R-squared	0.7519	0.6338	0.6364

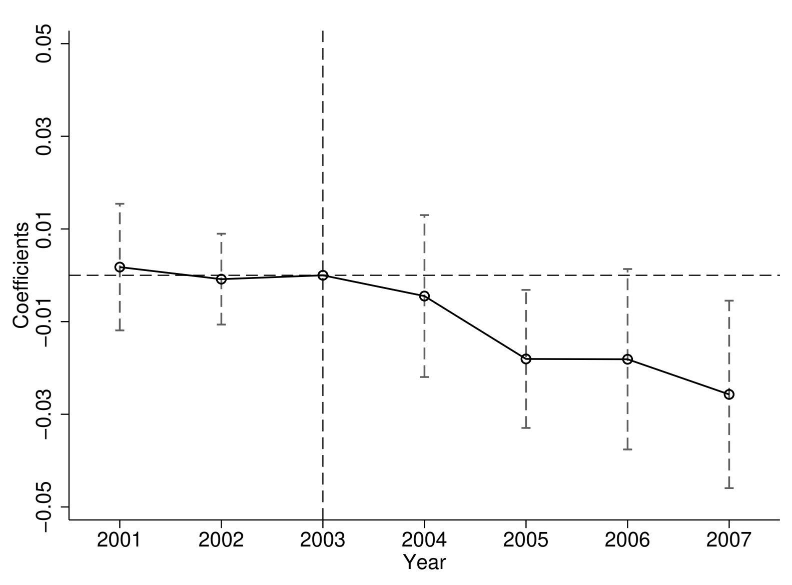
Notes: The dependent variables are prefecture-level average firm productivity measured by the Olley and Pakes (1992), the Levinsohn and Petrin (2003) and the Ackerberg, Caves, and Frazer (2015) methods. We use quota level (10 thousand hectare) in each province as the treatment variable. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Figure A3: **Province Quota Event Study - Productivity (OP)**



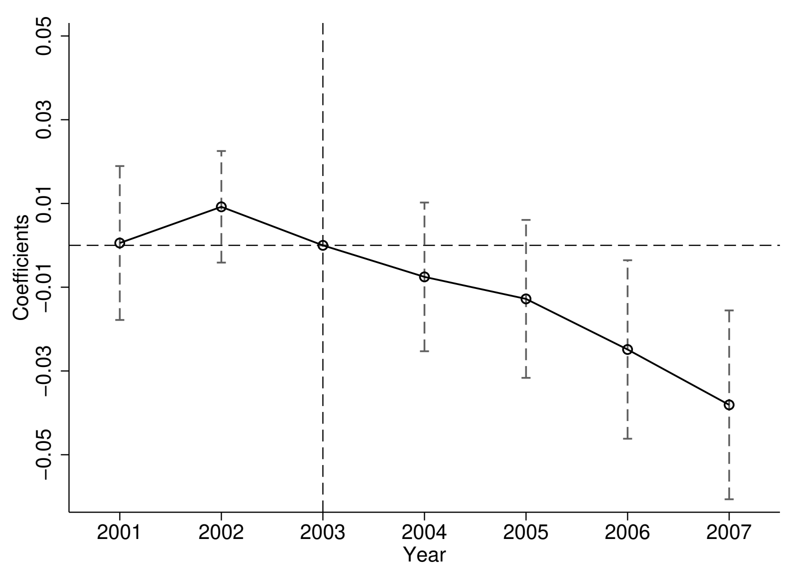
Notes: This is the province quota event study regression. The dependent variable is the average firm productivity in different prefectures calculated using the Olley and Pakes (1992) method. The corresponding confidence interval is 95%.

Figure A4: **Province Quota Event Study - Productivity (LP)**



Notes: This is the province quota event study regression. The dependent variable is the average firm productivity in different prefectures calculated using the Levinsohn and Petrin (2003) method. The corresponding confidence interval is 95%.

Figure A5: **Province Quota Event Study - Productivity (ACF)**



Notes: This is the province quota event study regression. The dependent variable is the average firm productivity in different prefectures calculated using the Ackerberg, Caves, and Frazer (2015) method. The corresponding confidence interval is 95%.

A.3 Excluding the Year of 2003 from the Treatment

Third, in the main context, we include 2003 in the treatment group. However, the policy was officially enacted in the middle of 2003 when the new administration of Jintao Hu and Jiabao Wen took office, which left limited time for the market to respond. In this robustness check, we exclude 2003 from the treatment and implement the main regression. Table A4 shows that the results are moderately amplified but not changed qualitatively.

Table A4: The Year of 2003 in Control Group

	(1) OP	(2) LP	(3) ACF
Post2003×East	-0.0985***	-0.0673**	-0.1139***
	(0.0264)	(0.0312)	(0.0329)
Province × Time Trend	Y	Y	Y
GDP Per Capita × Time Trend	Y	Y	Y
Industry Share × Time Trend	Y	Y	Y
Year FE	Y	Y	Y
Prefecture FE	Y	Y	Y
Observations	1,792	1,792	1,792
R-squared	0.7560	0.6364	0.6409

Notes: The dependent variables are prefecture-level average firm productivity measured by the Olley and Pakes (1992), the Levinsohn and Petrin (2003) and the Ackerberg, Caves, and Frazer (2015) methods. We exclude 2003 from the treatment group and consider the policy effect to start from 2004. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

A.4 Robustness Checks for The WTO Effect

Fourth, China joined the WTO at the end of 2001, significantly changing the country's economic structure. While two years before the inland-favoring land supply policy, we are still concerned about the potential confounding effects of reducing trade barriers, which may have influenced eastern and inland prefectures differently. In column (1) of Table A5, we run the main regression while controlling for prefecture-level exporting. In column (2) of the same table, we calculate the average productivity for each prefecture, restricting our analysis to firms that report zero exports. This approach is based on the premise that firms with no export activity will likely be the least affected by any WTO-related effects. We do not detect any qualitative changes when eliminating WTO-related influences.

Table A5: Eliminating WTO Effects

	(1)	(2)
Post2003×East	-0.0747***	-0.0819***
	(0.0277)	(0.0308)
ln(Export)	0.0065	
	(0.0042)	
Province × Time Trend	Y	Y
GDP Per Capita × Time Trend	Y	Y
Industry Share × Time Trend	Y	Y
Year FE	Y	Y
Prefecture FE	Y	Y
Observations	1,792	1,792
R-squared	0.7468	0.7422

Notes: The dependent variable is prefecture-level average firm productivity measured by the Olley and Pakes (1992) method. In column (1), we control for prefecture-level export aggregated from the firm dataset. In column (2), we drop all firms involved in exporting when calculating TFP. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

A.5 Robustness Checks for Subsidy and Tax Policies

Fifth, we attempt to rule out the effects of other concurrent subsidy and tax policies that may have been implemented alongside the land reform. Apart from the land supply policy, the Chinese government also enacted other inland-favoring measures to promote inland economic growth, such as manufacturing subsidies. We calculate average government subsidies, financing costs (interest cost divided by total debt), and taxes for firms in different prefectures. Then, we conduct the DID regression using these prefecture-level variables as the outcomes to check whether government support for firms in other dimensions changed differently for eastern and inland regions around 2003. Table A6 indicates that firms in each region experienced similar government subsidies, financing costs, and taxes before and after 2003. We then estimate the productivity regressions with these three variables as additional controls. Table A7 demonstrates that the main results are consistent across all regression settings.

Table A6: Effect on Subsidies, Financing Costs, and Taxes

	(1) Subsidies	(2) Financing Costs	(3) Taxes
Post2003×East	0.4830	-0.1246	0.3864
	(0.5411)	(0.1028)	(0.5967)
Province × Time Trend	Y	Y	Y
GDP Per Capita × Time Trend	Y	Y	Y
Industry Share × Time Trend	Y	Y	Y
Year FE	Y	Y	Y
Prefecture FE	Y	Y	Y
Observations	1,792	1,792	1,792
R-squared	0.4372	0.7380	0.5782

Notes: The dependent variables are prefecture-level average firm subsidies, financing costs, and taxes. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Table A7: Main Regression Controlling for Other Policies

	(1) OP	(2) LP	(3) ACF
Post2003×East	-0.0702***	-0.0492*	-0.0743**
	(0.0257)	(0.0296)	(0.0322)
Subsidy	-0.0027**	-0.0021*	-0.0013
	(0.0011)	(0.0012)	(0.0015)
Financing Cost	0.0702***	0.0464***	0.0893***
	(0.0097)	(0.0104)	(0.0103)
Tax	-0.0027	-0.0009	-0.0013
	(0.0021)	(0.0021)	(0.0025)
Province × Time Trend	Y	Y	Y
GDP Per Capita × Time Trend	Y	Y	Y
Industry Share × Time Trend	Y	Y	Y
Year FE	Y	Y	Y
Prefecture FE	Y	Y	Y
Observations	1,792	1,792	1,792
R-squared	0.7664	0.6500	0.6669

Notes: The dependent variable are prefecture-level average firm productivity measured by the Olley and Pakes (1992), the Levinsohn and Petrin (2003) and the Ackerberg, Caves, and Frazer (2015) method. We also control government subsidies, financing costs, and taxes. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

A.6 Robustness Checks for Rural Reforms

During the early 2000s, there were two other important reforms happening in rural China, the passage of the Rural Land Contracting Law (Chari et al., 2021) and the removal of the agricultural tax (Wang and Shen, 2014). We further check the robustness of our main results by controlling for the effect of these two policies.

For the passage of the Rural Land Contracting Law (RLCL), we additionally control for a traditional staggered DID dummy term of whether the treated province started to implement this policy in a given year in the main regression. For the removal of the agricultural tax, we additionally employ an exposure design to add an interaction term between the agricultural tax share before the policy year (average of 1999 to 2005) and the starting policy year (2006) indicator. The agricultural tax share is calculated by dividing the average annual agricultural tax income from 1999 to 2005 by the average annual government total income in the prefecture. That is, prefectures with higher agricultural tax share before the reform were more exposed to the abolition of the tax. Table A8 shows that when we control for these two rural reform policies, the main regression result is not changed. In addition, we do not detect any effects of these two rural reforms on prefecture-level TFP gaps between the eastern and the inland regions.

Table A8: Main Regression Controlling for Rural Reforms

	(1) OP	(2) LP	(3) ACF	(4) OP	(5) LP	(6) ACF	(7) OP	(8) LP	(9) ACF
Post2003×East	-0.0725***	-0.0493	-0.0818**	-0.0931***	-0.0698**	-0.0979***	-0.0908***	-0.0677**	-0.0963***
	(0.0270)	(0.0301)	(0.0346)	(0.0274)	(0.0283)	(0.0357)	(0.0275)	(0.0283)	(0.0356)
Agricultural Tax Share × Abolition	-0.0019	-0.0018	-0.0014				-0.0015	-0.0014	-0.0011
	(0.0024)	(0.0027)	(0.0029)				(0.0023)	(0.0026)	(0.0028)
RLCL Passing Dummy				0.0011	-0.0364	0.0247	0.0008	-0.0366	0.0245
				(0.0217)	(0.0231)	(0.0286)	(0.0216)	(0.0230)	(0.0285)
Province × Time Trend	Y	Y	Y	Y	Y	Y	Y	Y	Y
GDP Per Capita × Time Trend	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Share × Time Trend	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Prefecture FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,792	1,792	1,792	1,789	1,789	1,789	1,789	1,789	1,789
R-squared	0.7540	0.6353	0.6382	0.7565	0.6412	0.6396	0.7567	0.6414	0.6396

Notes: The dependent variable are prefecture-level average firm productivity measured by the Olley and Pakes (1992), the Levinsohn and Petrin (2003) and the Ackerberg, Caves, and Frazer (2015) method. We also control for the effect of two rural reform policies, the passage of the Rural Land Contracting Law and the abolition of the agricultural tax. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

A.7 Additional Results for Mechanism Validation

This section investigates the inland-favoring land supply policy's effect on other variables, illustrating the potential channels to validate our mechanism in the quantitative model. First, we use land transaction data to examine the direct effect on land prices. Second, we consider the transmission channels on prefecture-level wages and housing prices from the City Statistical Yearbooks. Finally, we show the resulting indirect effect on across-region migrations using the Chinese Population Census data. Our findings indicate that, in comparison to inland regions, the 2003 inland-favoring land supply policy resulted in a notable increase in relative land prices in eastern areas. This policy then suppressed relative wages and elevated relative housing prices in these regions. The combined effect of reduced labor demand and increased living costs subsequently acted as a deterrent to migration toward eastern regions.

A.7.1 Additional Data for Additional Results

The land transaction data is the only dataset used in this section, which has not been introduced in the main context. We provide a brief summary below. To estimate the effect of the inland-favoring land policy on land prices, we utilize land transaction data from 2002 to 2018, collected from the China Land Market Website (`http://www.landchina.com/`). The dataset includes unique land IDs, parcel locations, land usage (industrial land, commercial/service sector land, housing land, and others), land area, and leasing prices. Table A9 shows the summary statistics of land prices by their selling categories. There are three categories based on the function of the land, including land parcels for housing construction, commercial business construction, and manufacturing factory construction. We detect a price disparity such that land prices for commercial constriction are more expensive.

Table A9: Summary Statistics of Land Prices

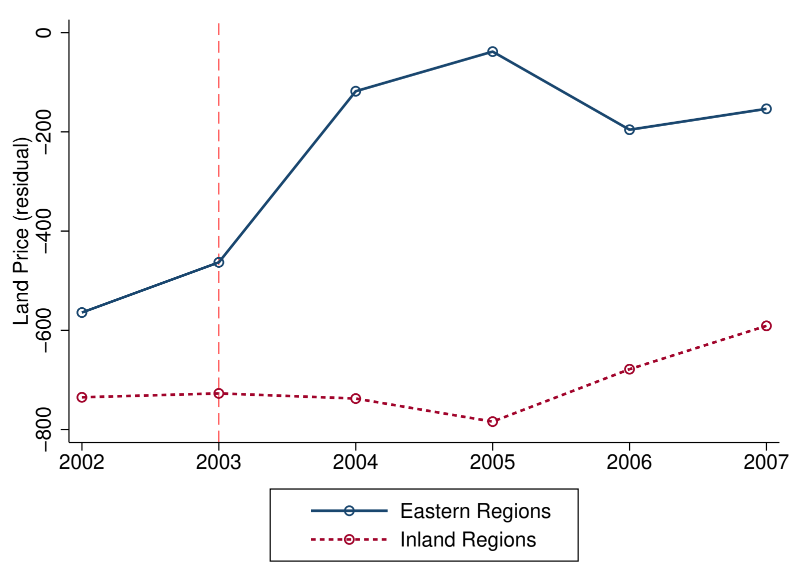
Variable	Observations	Mean	Std. dev.	Min	Median	Max
Panel A. Land Prices in (2002-2007)						
Ln(landprice)	192317	4.69	1.45	0.62	4.68	9.92
Ln(landprice Housing)	84553	4.63	1.67	0.62	4.61	9.62
Ln(landprice Commercial)	29080	5.74	1.44	2.48	5.73	9.92
Ln(landprice Manufacturing)	78684	4.37	0.94	1.94	4.49	7.03
Panel B. Land Prices (2002-2018)						
Ln(landprice)	1549444	5.79	1.47	0.61	5.70	9.93
Ln(landprice Housing)	749495	5.95	1.70	0.61	6.05	9.62
Ln(landprice Commercial)	275739	6.56	1.31	2.48	6.58	9.93
Ln(landprice Manufacturing)	524210	5.14	0.78	1.94	5.19	7.03

Notes: We summarize land transaction data from 2002 to 2018, collected from the China Land Market Website. Panel A uses data from 2002 to 2007. Panel B uses data from 2002 to 2018.

A.7.2 Policy Effect on Land Prices

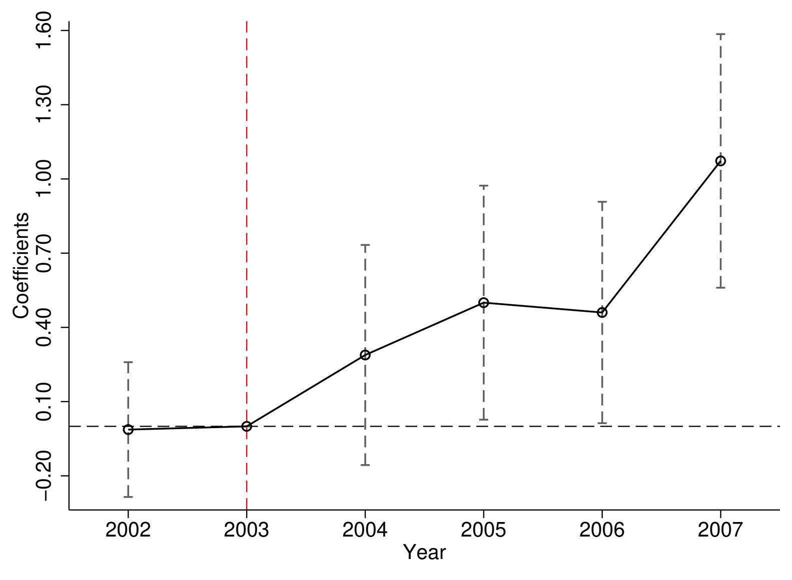
Our empirical strategy for analyzing land prices is a simple DID regression at the land parcel level, similar to the main regression. Additionally, we control for land selling categories. Local land administration departments were required to publish information on the transfer of state-owned land-use rights only after the passage of *The Regulations on the Disposition of State-Owned Land Use Rights for Auctions and Biddings* in 2007. Consequently, the transaction data before 2007 is not comprehensive. The sample size becomes reasonable only after 2002; therefore, we ran the regression using data from 2002 to 2018. Figure A6 and A7 display the time trends and the event study regression results for land prices. The coefficient before 2003 is insignificant (although we have only one data point). Furthermore, we observe a notable increase in the land price gap between eastern and inland regions after 2003. Table A10 presents the DID regression results. Column (1) showcases the results when using the same sample years as in the productivity regression (before 2007), while column (2) includes the results when incorporating all available sample years. Our findings suggest that the inland-favoring land policy expanded the land price gap between eastern and inland regions by 50 percentage points.

Figure A6: **Time Trends of Land Price**



Notes: This figure shows land parcel price time trends. The black line is the average outcome value in the developed eastern region, and the grey line is the average outcome value in the inland region. The dashed vertical line indicates the implementation of the inland-favoring land policy.

Figure A7: **Event Study - Land Price**



Notes: The dependent variable is the land price. The corresponding confidence interval is 95%.

Table A10: **DID Results on Land Prices**

	(1) Sample 02-07	(2) Sample 02-18
Post2003×East	0.513**	0.654**
	(0.220)	(0.261)
Province × Time Trend	Y	Y
GDP Per Capita × Time Trend	Y	Y
Industry Share × Time Trend	Y	Y
Year FE	Y	Y
Prefecture FE	Y	Y
Observations	189,619	1,421,487
R-squared	0.502	0.469

Notes: The dependent variable is land parcel prices. We also control for land parcel level selling categories. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

A.7.3 Policy Effect on Wages and Housing Prices

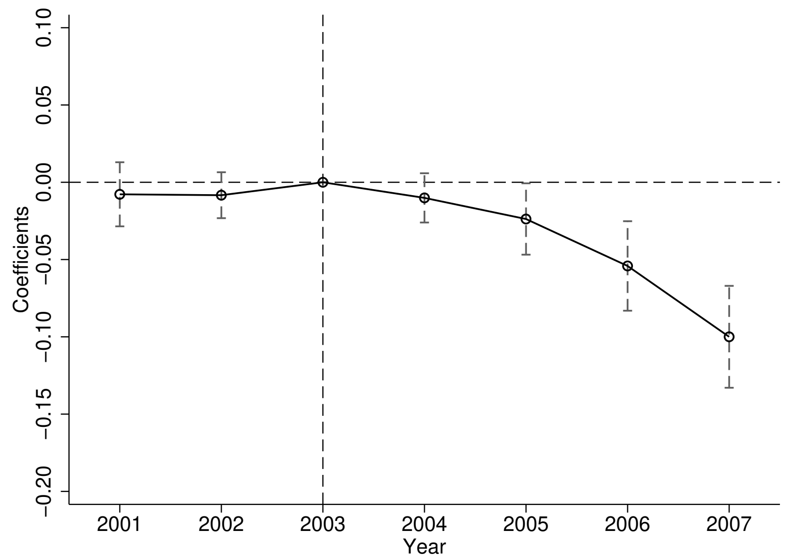
Furthermore, we examine the impact of the inland-favoring policy on wages and housing prices between eastern and inland regions. We employ prefecture-level data from City Statistical Yearbooks and conduct two simple DID regressions for wages and housing prices. The outcomes are presented in Table A11. Our findings show that the inland-favoring land policy reduced relative wages by two percentage points and increased relative housing prices by seven percentage points in eastern regions compared with inland regions. Figures A8 and A9 further illustrate the event study regression results for wages and housing prices. We find that there is no evident divergent pre-trend in wages or housing prices before the policy in 2003. After the policy was implemented, in eastern regions, relative wages fell and relative housing prices increased gradually and significantly.

Table A11: **DID Results on Wages and Housing Prices**

	(1) Wages	(2) Housing Prices
Post2003×East	-0.0210*	0.0673**
	(0.0122)	(0.0269)
Province × Time Trend	Y	Y
GDP per capita × Time Trend	Y	Y
Industry Share × Time Trend	Y	Y
Year FE	Y	Y
Prefecture FE	Y	Y
Observations	1,792	1,789
R-squared	0.9385	0.7421

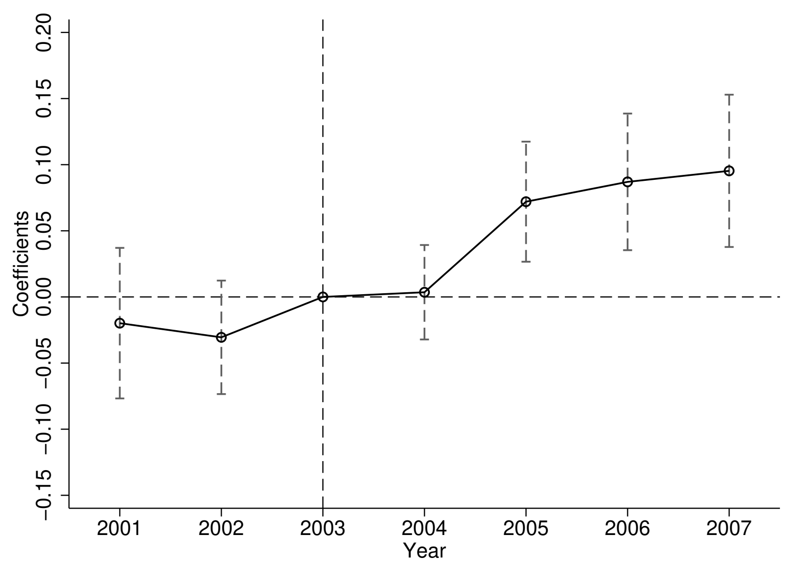
Notes: Prefecture-level average wages and housing prices are dependent variables. Standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Figure A8: **Event Study - Wage**



Notes: The dependent variable is the prefecture-level wages. The corresponding confidence interval is 95%.

Figure A9: **Event Study - Housing Price**



Notes: The dependent variable is the prefecture-level housing prices. The corresponding confidence interval is 95%.

A.7.4 Policy Effect on Migration

We finally conduct a simple DID regression to investigate the policy effect on prefecture-level labor migration. We employ Census 2005 and 2010 to infer the scale of migration in each province from 2001 to 2010. Migration connects directly to our mechanism by investigating the location choices of workers. In the first column, we evaluate the effects on net migration. In the second column, we evaluate the effects on migration inflows. In the third column, we evaluate the effects on migration outflows. The units of the dependent variables are one thousand people. Table A12 shows that the 2003 policy reduced the eastern migration inflow and the net migration gap between eastern and inland regions.

Table A12: **DID Results on Migration**

	(1) Net Migration	(2) Migration Inflow	(3) Migration Outflow
Post2003×East	-7.81**	-6.94**	0.87
	(3.09)	(2.84)	(0.99)
Province × Time Trend	Y	Y	Y
GDP per capita × Time Trend	Y	Y	Y
Industry Share × Time Trend	Y	Y	Y
Year FE	Y	Y	Y
Prefecture FE	Y	Y	Y
Observations	2,181	2,181	2,181
R-squared	0.10	0.17	0.45

Notes: In the first column, we evaluate the effects on net migrations. In the second column, we evaluate the effects on migration inflows. In the third column, we evaluate the effects on migration outflows. The units of the dependent variables are 1 thousand people. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

B Supplements to the Equilibrium Analysis

B.1 List of Cities by Productivity and Land Tightness

Table B1: List of Cities

City Name	GDP Per Capita (RMB)	Group	productivity 05	productivity 10	Land Abundance 2005	Land Abundance 2010
Beijing	38315	East, High	38.96	40.85	0.13	0.11
Tianjin	34170	East, Middle	38.95	41.63	0.03	0.14
Shijiazhuang	31850	East, Middle	36.53	39.25	0.12	0.04
Tangshan	27995	East, Middle	38.40	40.81	0.18	0.07
Qinhuangdao	39214	East, High	35.29	39.82	0.25	0.09
Handan	19687	East, Middle	36.95	40.24	0.14	0.05
Xingtai	18043	East, Middle	37.72	40.16	0.11	0.04
Baoding	23312	East, Middle	37.06	39.76	0.07	0.04
Zhangjiakou	24225	East, Middle	36.59	40.02	0.18	0.06
Chengde	20145	East, Middle	37.23	38.90	0.14	0.19
Taiyuan	20622	Non-east, Middle	37.54	40.04	0.10	0.12
Datong	16655	Non-east, Middle	37.03	40.82	0.08	0.12
Yangquan	16700	Non-east, Middle	38.45	40.95	0.06	0.10
Changzhi	20807	Non-east, Middle	37.74	40.84	0.04	0.07
Jincheng	20974	Non-east, Middle	38.14	40.37	0.03	0.06
Shuozhou	13665	Non-east, Low	36.58	40.20	0.07	0.08
Jinzhong	9873	Non-east, Low	36.57	39.42	0.02	0.04
Yuncheng	7584	Non-east, Low	36.67	38.36	0.03	0.06
Xinzhou	4795	Non-east, Low	36.13	37.49	0.02	0.05
Linfen	10588	Non-east, Low	37.72	39.22	0.03	0.03
Hohhot	31585	Non-east, Middle	35.87	38.45	0.27	0.17
Baotou	39561	Non-east, High	38.23	40.04	0.20	0.17
Wuhai	20081	Non-east, Middle	37.16	40.21	0.11	0.24
Chifeng	7547	Non-east, Low	36.56	39.00	0.19	0.09
Tongliao	13789	Non-east, Low	35.66	38.95	0.15	0.13
Ordos	35380	Non-east, Middle	38.46	42.13	0.05	0.13
Hulunbeir	13785	Non-east, Low	37.38	39.64	0.06	0.05
Shenyang	34345	East, Middle	37.80	39.89	0.18	0.12
Dalian	54183	East, High	38.29	41.01	0.18	0.15
Anshan	43816	East, High	38.41	39.73	0.21	0.13
Fushun	19635	East, Middle	37.73	39.89	0.24	0.18
Dandong	15440	East, Low	36.49	38.92	0.11	0.07
Fuxin	11242	East, Low	35.80	38.30	0.19	0.18
Tieling	11041	East, Low	36.14	39.66	0.12	0.08
Chaoyang	10781	East, Low	36.98	39.56	0.07	0.08
Changchun	37003	East, Middle	36.92	39.22	0.14	0.21
Jilin	23046	East, Middle	37.01	39.94	0.15	0.16
Siping	14560	East, Low	35.11	39.04	0.08	0.10
Liaoyuan	12097	East, Low	36.96	39.00	0.17	0.21
Tonghua	14717	East, Low	37.28	39.48	0.06	0.07
White City	9091	East, Low	33.83	37.96	0.06	0.11
Harbin	30534	East, Middle	37.11	39.33	0.19	0.13
Qiqihar	13431	East, Low	36.40	36.94	0.15	0.15
Jixi	8480	East, Low	36.59	37.15	0.18	0.16
Hegang	8432	East, Low	37.03	39.52	0.16	0.13
Shuangyashan	12678	East, Low	37.52	38.34	0.32	0.18
Yichun	8546	East, Low	35.63	39.11	0.66	0.53
Jiamusi	14080	East, Low	35.08	39.27	0.14	0.18
Shanghai	57423	East, High	40.22	41.11	0.04	0.06
Nanjing	35464	East, Middle	39.36	40.89	0.32	0.16
Wuxi	58976	East, High	39.07	41.34	0.12	0.06
Xuzhou	31592	East, Middle	37.94	40.37	0.13	0.10
Changzhou	36335	East, Middle	39.05	40.78	0.08	0.06

Table B2: List of Cities (Continued)

City Name	GDP Per Capita (RMB)	Group	productivity 05	productivity 10	Land Abundance 2005	Land Abundance 2010
Suzhou	60326	East, High	39.99	41.71	0.08	0.04
Nantong	35059	East, Middle	38.01	41.08	0.04	0.04
Lianyungang	29298	East, Middle	36.46	39.71	0.20	0.09
Huaian	11557	East, Low	36.99	41.05	0.17	0.08
Yancheng	15929	East, Middle	36.56	40.16	0.08	0.04
Zhenjiang	34988	East, Middle	39.62	40.62	0.13	0.08
Hangzhou	49055	East, High	39.86	41.30	0.16	0.07
Ningbo	60381	East, High	39.70	41.42	0.06	0.05
Wenzhou	45795	East, High	38.72	40.79	0.07	0.03
Jiaxing	30988	East, Middle	39.34	41.00	0.08	0.03
Huzhou	26260	East, Middle	39.55	40.52	0.14	0.05
Shaoxing	35753	East, Middle	39.24	40.82	0.08	0.04
Jinhua	19113	East, Middle	39.02	40.57	0.06	0.02
Zhoushan	21215	East, Middle	38.80	41.26	0.17	0.10
Taizhou	30647	East, Middle	39.47	40.88	0.09	0.04
Lishui	17653	East, Middle	37.03	40.59	0.07	0.05
Hefei	29058	Non-east, Middle	39.50	41.73	0.29	0.15
Wuhu	33544	Non-east, Middle	38.00	40.41	0.22	0.17
Bengbu	15456	Non-east, Low	35.64	39.48	0.29	0.20
Huainan	9784	Non-east, Low	37.74	40.82	0.23	0.18
Ma'anshan	29536	Non-east, Middle	38.84	41.11	0.24	0.17
Huaibei	15007	Non-east, Low	36.00	40.43	0.23	0.15
Anqing	19917	Non-east, Middle	35.27	39.24	0.11	0.08
Chuzhou	17353	Non-east, Middle	36.06	39.78	0.07	0.08
Fuyang	4229	Non-east, Low	35.92	38.71	0.26	0.07
Suzhou	4900	Non-east, Low	35.21	38.58	0.10	0.09
Lu'an	3039	Non-east, Low	36.15	39.55	0.18	0.08
Bozhou	6314	Non-east, Low	35.66	39.55	0.14	0.10
Chizhou	7290	Non-east, Low	37.11	39.74	0.10	0.12
Xuancheng	8989	Non-east, Low	37.80	40.78	0.11	0.07
Fuzhou	43600	East, High	38.27	40.70	0.12	0.07
Xiamen	40146	East, High	38.74	43.06	0.15	0.10
Sanming	25396	East, Middle	37.59	40.23	0.05	0.04
Quanzhou	28010	East, Middle	38.79	40.83	0.02	0.04
Zhangzhou	29056	East, Middle	38.24	40.88	0.05	0.04
Nanping	16169	East, Middle	37.09	39.83	0.04	0.03
Longyan	24690	East, Middle	38.21	40.37	0.07	0.04
Ningde	12408	East, Low	37.51	39.92	0.03	0.03
Nanchang	28388	Non-east, Middle	37.39	39.96	0.15	0.11
Jingdezhen	19486	Non-east, Middle	35.95	37.91	0.23	0.17
Pingxiang	13828	Non-east, Low	36.99	40.47	0.21	0.07
Jiujiang	29840	Non-east, Middle	35.78	39.43	0.07	0.07
Xinyu City	12046	Non-east, Low	36.69	39.94	0.24	0.15
Yingtan	11379	Non-east, Low	36.98	39.81	0.14	0.12
Ganzhou	12262	Non-east, Low	36.66	39.61	0.05	0.04
Ji'an	14198	Non-east, Low	35.89	38.41	0.06	0.04
Yichun	4600	Non-east, Low	36.68	39.29	0.05	0.04
Shangrao	12052	Non-east, Low	36.20	39.64	0.04	0.03
Jinan	36697	East, Middle	38.28	39.39	0.18	0.14
Qingdao	43327	East, High	39.24	41.10	0.10	0.07
Zibo	37104	East, Middle	38.15	39.66	0.19	0.14
Zaozhuang	13923	East, Low	36.38	38.87	0.18	0.12
Dongying	86523	East, High	39.20	41.20	0.26	0.15
Yantai	35583	East, Middle	38.74	40.47	0.13	0.13
Weifang	24267	East, Middle	37.26	40.44	0.09	0.06
Jining	18548	East, Middle	37.25	40.17	0.05	0.06
Tai'an	16938	East, Middle	37.15	39.71	0.14	0.08
Weihai	48100	East, High	38.20	39.94	0.15	0.14
Rizhao	16930	East, Middle	36.40	40.02	0.16	0.15
Laiwu	18042	East, Middle	37.55	40.45	0.32	0.14

Table B3: List of Cities (Continued)

City Name	GDP Per Capita (RMB)	Group	productivity 05	productivity 10	Land Abundance 2005	Land Abundance 2010
Linyi	17479	East, Middle	36.98	40.25	0.13	0.08
Dezhou	24777	East, Middle	36.27	39.71	0.09	0.08
Liaocheng	8844	East, Low	36.58	39.03	0.13	0.08
Binzhou	19158	East, Middle	37.30	40.27	0.11	0.12
Zhengzhou	27261	Non-east, Middle	36.71	39.77	0.26	0.10
Kaifeng	11976	Non-east, Low	35.44	38.85	0.39	0.17
Luoyang	26555	Non-east, Middle	36.73	39.93	0.22	0.12
Pingdingshan	18337	Non-east, Middle	37.15	39.82	0.17	0.08
Anyang	19362	Non-east, Middle	36.74	39.54	0.18	0.07
Hebi	14703	Non-east, Low	34.47	39.15	0.39	0.16
Xuchang	14306	Non-east, Low	36.63	39.65	0.16	0.11
Luohe	23156	Non-east, Middle	35.12	38.29	0.53	0.14
Sanmenxia	15414	Non-east, Low	36.35	39.21	0.17	0.08
Nanyang	25615	Non-east, Middle	35.64	38.19	0.23	0.08
Shangqiu	14764	Non-east, Low	35.49	38.86	0.16	0.07
Zhoukou	13144	Non-east, Low	33.75	38.60	0.15	0.39
Wuhan	24963	Non-east, Middle	37.38	40.19	0.12	0.11
Shiyan	35874	Non-east, Middle	36.70	38.93	0.14	0.08
Yichang	26548	Non-east, Middle	36.03	38.15	0.09	0.10
Xiangfan	12493	Non-east, Low	36.02	38.84	0.15	0.10
Ezhou	13519	Non-east, Low	35.45	41.07	0.23	0.18
Jingmen	19907	Non-east, Middle	35.62	38.24	0.12	0.08
Xiaogan	6977	Non-east, Low	35.99	38.80	0.08	0.03
Jingzhou	10007	Non-east, Low	35.58	39.36	0.09	0.06
Huanggang	10270	Non-east, Low	34.97	38.78	0.05	0.06
Xianning	8278	Non-east, Low	35.60	38.93	0.08	0.12
Suizhou	8350	Non-east, Low	35.30	38.61	0.54	0.11
Changsha	34131	Non-east, Middle	37.89	40.15	0.10	0.10
Zhuzhou	24835	Non-east, Middle	38.31	40.75	0.12	0.09
Xiangtan	26112	Non-east, Middle	37.51	40.77	0.12	0.10
Hengyang	15457	Non-east, Low	37.17	40.47	0.15	0.08
Shaoyang	8988	Non-east, Low	36.07	39.96	0.07	0.05
Yueyang	28512	Non-east, Middle	37.32	39.85	0.12	0.08
Changde	18270	Non-east, Middle	37.19	39.62	0.10	0.08
Zhangjiajie	6514	Non-east, Low	38.52	39.86	0.19	0.13
Yiyang	8840	Non-east, Low	37.23	39.30	0.11	0.08
Chenzhou	14959	Non-east, Low	37.54	40.34	0.06	0.07
Yongzhou	8503	Non-east, Low	37.52	40.30	0.13	0.09
Huaihua	15795	Non-east, Middle	37.24	40.29	0.09	0.07
Guangzhou	63819	East, High	40.36	42.60	0.08	0.10
Shaoguan	19590	East, Middle	37.25	40.38	0.03	0.12
Shenzhen	59271	East, High	40.35	42.69	0.08	0.07
Zhuhai	64960	East, High	39.74	40.72	0.06	0.10
Shantou	12456	East, Low	36.43	39.54	0.06	0.11
Foshan	47500	East, High	38.99	40.83	0.03	0.03
Jiangmen	30791	East, Middle	37.57	40.37	0.04	0.08
Zhanjiang	24248	East, Middle	37.68	39.15	0.04	0.09
Maoming	20541	East, Middle	38.26	40.15	0.03	0.10
Zhaoqing	25943	East, Middle	38.09	40.02	0.03	0.11
Huizhou	37681	East, Middle	38.73	40.72	0.04	0.11
Meizhou	10984	East, Low	37.54	40.23	0.02	0.07
Shanwei	10193	East, Low	36.76	39.91	0.01	0.03
Heyuan	11453	East, Low	37.76	39.24	0.01	0.07
Yangjiang	18778	East, Middle	37.01	38.88	0.04	0.09
Qingyuan	12004	East, Low	38.13	40.27	0.03	0.10
Dongguan	71997	East, High	40.34	42.03	0.01	0.01
Zhongshan	44005	East, High	39.29	41.76	0.02	0.02
Yunfu	12543	East, Low	36.84	39.14	0.02	0.06

Table B4: List of Cities (Continued)

City Name	GDP Per Capita (RMB)	Group	productivity 05	productivity 10	Land Abundance 2005	Land Abundance 2010
Nanning	24296	Non-east, Middle	35.60	39.23	0.19	0.11
Liuzhou	23042	Non-east, Middle	37.31	40.60	0.21	0.12
Guilin	22192	Non-east, Middle	37.60	39.84	0.10	0.06
Beihai	18530	Non-east, Middle	36.92	39.25	0.23	0.16
Yulin	8573	Non-east, Low	37.22	39.63	0.10	0.07
Baise	12227	Non-east, Low	36.71	39.63	0.08	0.07
Hechi	9114	Non-east, Low	35.60	38.46	0.07	0.04
Laibin	5947	Non-east, Low	36.90	39.37	0.15	0.11
Chongzuo	6633	Non-east, Low	35.84	39.38	0.04	0.09
Haikou	17928	East, Middle	36.89	38.89	0.08	0.14
Sanya	9538	East, Low	37.76	39.96	0.10	0.12
Chongqing	13342	Non-east, Low	37.80	40.73	0.10	0.12
Chengdu	29463	Non-east, Middle	37.89	39.83	0.24	0.07
Zigong	14452	Non-east, Low	35.83	39.34	0.22	0.18
Panzhihua	20725	Non-east, Middle	36.92	40.26	0.42	0.15
Luzhou	10166	Non-east, Low	37.04	38.94	0.25	0.13
Deyang	15421	Non-east, Low	38.23	40.87	0.07	0.06
Mianyang	18200	Non-east, Middle	36.08	39.87	0.16	0.10
Guangyuan	6323	Non-east, Low	35.79	39.71	0.34	0.08
Suining	5207	Non-east, Low	36.71	39.23	0.25	0.08
Leshan	9887	Non-east, Low	36.45	38.76	0.19	0.07
Nanchong	6373	Non-east, Low	35.98	39.17	0.19	0.07
Meishan	8575	Non-east, Low	37.34	39.89	0.20	0.09
Yibin	16042	Non-east, Middle	36.45	39.78	0.09	0.08
Guang'an	4584	Non-east, Low	36.55	38.33	0.24	0.07
Ziyang	7540	Non-east, Low	36.70	39.07	0.10	0.09
Guiyang	18874	Non-east, Middle	36.68	39.57	0.16	0.11
Liupanshui	13504	Non-east, Low	38.03	40.34	0.16	0.08
Zunyi City	15180	Non-east, Low	37.43	39.81	0.08	0.05
Anshun	4921	Non-east, Low	36.04	39.52	0.14	0.11
Kunming	31780	Non-east, Middle	38.12	40.26	0.11	0.09
Qujing	17659	Non-east, Middle	37.59	39.80	0.23	0.06
Yuxi	52230	Non-east, High	37.71	39.08	0.03	0.05
Baoshan	4656	Non-east, Low	36.94	39.18	0.05	0.07
Zhaotong	6819	Non-east, Low	37.94	40.12	0.04	0.05
Lijiang	11223	Non-east, Low	35.71	39.13	0.12	0.10
Xi'an	17528	Non-east, Middle	37.07	39.49	0.09	0.08
Tongchuan	8160	Non-east, Low	35.13	39.29	0.12	0.18
Baoji	24210	Non-east, Middle	36.38	40.01	0.06	0.13
Xianyang	18391	Non-east, Middle	36.25	38.96	0.42	0.07
Weinan	5411	Non-east, Low	36.16	39.83	0.05	0.06
Yan'an	10092	Non-east, Low	36.47	40.21	0.03	0.06
Yulin	5932	Non-east, Low	36.01	40.99	0.12	0.06
Lan'Zhou	22470	Non-east, Middle	36.60	39.09	0.14	0.13
Jiayuguan	25206	Non-east, Middle	38.51	40.05	0.31	0.44
Jinchang	31236	Non-east, Middle	36.19	40.31	0.12	0.28
Baiyin	17406	Non-east, Middle	36.26	38.96	0.13	0.22
Tianshui	6311	Non-east, Low	35.16	38.21	0.10	0.11
Wuwei	7307	Non-east, Low	34.78	37.24	0.10	0.14
Zhangye	8654	Non-east, Low	35.62	37.02	0.05	0.17
Pingliang	7591	Non-east, Low	36.20	38.99	0.11	0.08
Xining	11160	Non-east, Low	37.04	38.95	0.05	0.08
Yinchuan	13956	Non-east, Low	36.32	39.50	0.10	0.12
Shizuishan	15503	Non-east, Low	36.39	40.43	0.16	0.31

Notes: This table displays the complete list of cities used in the quantitative model. The second column shows GDP per capita in 2005. The third column shows the city's category according to its location and GDP per capita. We divide cities into three levels of development by their GDP per capita. The fourth and fifth columns show productivity in 2005 and 2010, as calculated in the quantitative model. The sixth and the seventh columns show the land tightness in 2005 and 2010, as calculated in the quantitative model.

B.2 Computational Method of Solving the Model

Given the exogenous variables and parameters, we need to calculate the responses of endogenous variables resulting from model policy changes. As mentioned, we select the equilibrium that is the closest to the one observed in the real world. Thus, the initial values of the variables are set equal to the data in 2005 and 2010. Since we have a within-city land market between residential and production uses, we adopt a double-loop variation of the method in Fang and Huang (2022).

We first specify the exogenous variables and the model equation system. The exogenous variables are $\{H_i^s, \epsilon_j^s, \tau_{ij}^s, L_j, \phi_j, \eta_j\}$ where i indexes Hukou city, j indexes destination city, and s indexes skill. The equation system consists of three blocks: 1). Migration Block: worker income and gravity equations; 2). Production Block: production, wage, and floor space price equations; 3). Housing Block: construction equations and market clearing equations.

To calculate the counterfactuals following policy changes, we start with the block where the changes happen and then iterate block by block to update the endogenous variables until all endogenous variables converge within certain small thresholds. We present the process of calculating a counterfactual following an increase in land supply as an example below.

Suppose a land reallocation policy is $\hat{L_j} = \Delta_j \times L_j$ for every city j. We have the following process of updating variables $\{\hat{x_{jk}}\}^{OI}$, which indicates the OI^{th} iteration of variable x. Start with the housing block to initiate the process (there is no need to update $\{\hat{S_j}\}^*$ again):

Outer Loop: In the outer loop, we update the floor space distribution between residential and production uses according to the inner loop equilibrium unit prices of residential and production floor space. The outer loop converges when the prices satisfy the equilibrium price equation between both markets.

Step 1: Initiation (ensuring non-zero floor space supply)

$$\{\hat{S_{ju}}\}^* = \phi_j \hat{L_j} \tag{2}$$

$$\{\hat{S_{ju}^R}\}^1 = S_{ju}^R \times (\{\hat{S_{ju}}\}^* / S_{ju}) \tag{3}$$

$$\{\hat{S_{ju}^M}\}^1 = S_{ju}^M \times (\{\hat{S_{ju}}\}^* / S_{ju}) \tag{4}$$

Step 2: **Inner Loop** (feedback prices to Outer Loop, x^{1*} means Inner Loop for x converges)

$$\{\hat{Q_{ju}}\}^{\mathbf{1}^*} = \frac{1-\beta}{\beta} \frac{\{w_{ju}^l H_{ju}^l + w_{ju}^h H_{ju}^h\}^{\mathbf{1}^*}}{\{\hat{S_{ju}^R}\}^1} \tag{5}$$

$$\{\hat{q}_{ju}\}^{\mathbf{1}^*} = (1-\alpha)\Big(\frac{\alpha}{\{\hat{W_{ju}}\}^{\mathbf{1}^*}}\Big)^{\frac{\alpha}{1-\alpha}} \tag{6}$$

Step 3: Compare floor space prices and generate excess demand for residential space. The core idea is that if $\{\hat{Q_{ju}}\}^{\mathbf{1}^*} > \frac{\{\hat{q_{ju}}\}^{\mathbf{1}^*}}{\eta_j}$, residential floor space is smaller than equilibrium and production floor space is larger than equilibrium, so we need to redistribute more residential floor space to production floor space, until $\{\hat{Q_{ju}}\}^{\mathbf{1}^*} = \frac{\{\hat{q_{ju}}\}^{\mathbf{1}^*}}{\eta_j}$. We update partially with step size γ.

$$\{ED_j^R\}^1 = \gamma \left(\frac{\{\hat{Q_{ju}}\}^{\mathbf{1}^*} - \frac{\{\hat{q_{ju}}\}^{\mathbf{1}^*}}{\eta_j}}{\{\hat{Q_{ju}}\}^{\mathbf{1}^*} + \frac{\{\hat{q_{ju}}\}^{\mathbf{1}^*}}{\eta_j}} \right) \times \{\hat{S_{ju}^R}\}^1 \tag{7}$$

Step 4: Update floor space

$$\{\hat{S_{ju}^R}\}^2 = \{\hat{S_{ju}^R}\}^1 + \{ED_j^R\}^1 \tag{8}$$

$$\{\hat{S_{ju}^M}\}^2 = \{\hat{S_{ju}^M}\}^1 - \{ED_j^R\}^1 \tag{9}$$

Finally, we repeat Step 2 to Step 4 until the market clearing condition holds: $\{\hat{Q_{ju}}\}^{**} = \frac{\{\hat{q_{ju}}\}^{**}}{\eta_j}$.

Inner Loop: In the inner loop, we update the migration and production decisions given the residential and production floor space. This Inner Loop is almost identical to Fang and Huang (2022)'s method. Notation: for variable x^{OI}, O denotes the step in the Outer Loop, and I denotes the step in the Inner Loop. Here, we demonstrate with $O = 1$.

Step 2-1: Update the housing block

$$\{\hat{Q_{ju}}\}^{11} = \frac{1-\beta}{\beta} \frac{w_{ju}^l H_{ju}^l + w_{ju}^h H_{ju}^h}{\{\hat{S_{ju}^R}\}^1} \tag{10}$$

$$\{\hat{Q_{jr}}\}^{11} = \tau \{\hat{Q_{ju}}\}^{11} \tag{11}$$

$$\{S_{jr}^R\}^{11} = \frac{1-\beta}{\beta} \frac{w_{jr} H_{jr}}{\{\hat{Q_{jr}}\}^{11}} \tag{12}$$

Step 2-2: Update the migration block

$$\{\hat{v_{in,jk}^s}\}^{11} = w_{jk}^s + \frac{\{\hat{Q_{in}}\}^{11} \{\hat{S_{in}^R}\}^{11}}{H_{in}^R} \quad \text{from eq.(4)} \tag{13}$$

$$\{\hat{\pi_{in,jk}^s}\}^{11} = \frac{(\tau_{in,jk}^s \{\hat{Q_{jk}}\}^{11^{1-\beta}})^{-\epsilon} (\{\hat{v_{in,jk}^s}\}^{11})^{\epsilon}}{\sum_{j'k'=11}^{JK} (\tau_{in,jk}^s \{\hat{Q_{j'k'}}\}^{11^{1-\beta}})^{-\epsilon} (\{\hat{v_{in,j'k'}^s}\}^{11})^{\epsilon}} \text{ from eq.(6)} \tag{14}$$

Then, combining $\{\hat{\pi_{in,jk}^s}\}^{11}$ with $\{H_{in}^s\}$, we are able to calculate $\{\hat{H_{jk}^s}\}^{11}$.

Step 2-3: Update the production block

$$\{\hat{X_{ju}}\}^{11} = [(\{A_{ju}^h\}^{11} \{\hat{H_{ju}^h}\}^{11})^{\frac{\sigma-1}{\sigma}} + (\{A_{ju}^l\}^{11} \{\hat{H_{ju}^l}\}^{11})^{\frac{\sigma-1}{\sigma}}]^{\frac{\sigma}{\sigma-1}} \text{ from eq.(7)} \tag{15}$$

$$\{\hat{w^l_{ju}}\}^{11} = \alpha(\{\hat{X_{ju}}\}^{11})^{\alpha-1}(\{\hat{S^M_{ju}}\}^1)^{1-\alpha}(\{A^l_{ju}\}^{11})^{\frac{\sigma-1}{\sigma}}(\{\hat{X_{ju}}\}^{11})^{\frac{1}{\sigma}}(\{\hat{H^l_{ju}}\}^{11})^{-\frac{1}{\sigma}} \text{ from eq.(8)} \tag{16}$$

$$\{\hat{w^h_{ju}}\}^{11} = \alpha(\{\hat{X_{ju}}\}^{11})^{\alpha-1}(\{\hat{S^M_{ju}}\}^1)^{1-\alpha}(\{A^h_{ju}\}^{11})^{\frac{\sigma-1}{\sigma}}(\{\hat{X_{ju}}\}^{11})^{\frac{1}{\sigma}}(\{\hat{H^h_{ju}}\}^{11})^{-\frac{1}{\sigma}} \text{ from eq.(9)} \tag{17}$$

Step 2-4: Update prices

$$\{\hat{Q_{ju}}\}^{12} = \frac{1-\beta}{\beta}\frac{\{w^l_{ju}H^l_{ju} + w^h_{ju}H^h_{ju}\}^{11}}{\{\hat{S^R_{ju}}\}^1} \tag{18}$$

We repeat Step 2-1 to Step 2-4 until residential floor space prices $\{\hat{Q_{ju}}\}^{1t}$ converge to $\{\hat{Q_{ju}}\}^{1*}$. We then output $\{\hat{Q_{ju}}\}^{1*}$ and $\{\hat{q}_{ju}\}^{1*}$ for the use in outer loop.

$$\{\hat{Q_{ju}}\}^{1*} = \frac{1-\beta}{\beta}\frac{\{w^l_{ju}H^l_{ju} + w^h_{ju}H^h_{ju}\}^{1*}}{\{\hat{S^R_{ju}}\}^1} \tag{19}$$

$$\{\hat{W_{ju}}\}^{11} = \frac{\{\hat{w^h_{ju}}\}^{11}\{\hat{H^h_{ju}}\}^{11} + \{\hat{w^l_{ju}}\}^{11}\{\hat{H^l_{ju}}\}^{11}}{\{\hat{X_{ju}}\}^{11}} \tag{20}$$

$$\{\hat{q}_{ju}\}^{1*} = (1-\alpha)\left(\frac{\alpha}{\{\hat{W_{ju}}\}^{1*}}\right)^{\frac{\alpha}{1-\alpha}} \tag{21}$$

Optimal Policy: To find the optimal policy, we first need to repeat the **Outer Loop** with modification in Step 3 to enforce $\eta_j = 1$ for any j and then add an additional Step 5 for updating the land distribution according to the price gap. The procedure of solving **Optimal Policy** is:

Step 1 to Step 4 from the **Outer Loop** with Step 3 modified as $\eta_j = 1$ for any j.

Step 5: Update land distribution according to the updated prices $\{\hat{Q_{ju}}\}^{\mathbf{1^*}}$.

$$\hat{L_j}^{\mathbf{1^*}} = \hat{L_j} \times (1 + \gamma_o \times \frac{\{\hat{Q_{ju}}\}^{\mathbf{1^*}} - \overline{\{\hat{Q_{ju}}\}^{\mathbf{1^*}}}}{\overline{\{\hat{Q_{ju}}\}^{\mathbf{1^*}}}}) \tag{22}$$

$$\{\hat{L_j}\}^{\mathbf{1^*}} = \frac{\hat{L_j}^{\mathbf{1^*}}}{\sum \hat{L_j}^{\mathbf{1^*}}} \times \sum L_j \tag{23}$$

where γ_o is the tuning parameter for the spread of updating and $\overline{\{\hat{Q_{ju}}\}^{\mathbf{1^*}}}$ is the national average floor space price. The updating of construction land distribution in equation (22) is to distribute more construction land quota to the prefecture with a higher price. We then scale to satisfy the equation's total land constraint (23).

Finally, we repeat Step 1 to Step 5 until all prices are equal: $\{Q_{ju}\}^{**} = \overline{\{Q_{ju}\}^{**}}$.

B.3 Estimating the Agglomeration Parameters

Estimating the agglomeration parameters is not an easy task. A simple but naive way to identify these parameters is to log-linearize the agglomeration equation (12) and run a regression:

$$log(A^s_{ju}) = \gamma log(D_{ju}) + log(a^s_{ju})$$

However, the above regression suffers from a severe endogeneity issue. Fundamental productivity a^s_{ju} is absolutely correlated with D_{ju} since locations with higher fundamental productivity will naturally attract more workers. Usually, people choose instruments such as long population lags or soil fertility to estimate this regression (Ciccone and Hall, 1996; Rosenthal and Strange, 2008; Combes et al., 2010). Nevertheless, due to data limitations, there has been almost no successful attempt to estimate the prefecture-level agglomeration effect in China.

Fortunately, we can pin down the parameter with indirect inference. The basic idea is to find the parameter value that can reproduce the observed effect of the inland-favoring land policy within the model. We first execute a prefecture-level DID regression to obtain the real-world impact of the inland-favoring policy, which has been done in our empirical part. Next, we simulate the model to examine prefecture-level productivity if we eliminate the land supply policy. By employing these simulated data, we conduct the same regression and match the simulated regression coefficients with their corresponding ones in the empirical regression.

Measured Productivity We need a consistent comparison between productivity in the model and the empirical analysis. This requires us to calculate measured productivity in the model for two reasons. First, the labor productivities A^s_{ju} are inconsistent with the productivity used in our empirical analysis. Our measurements of productivity in the empirical analysis follow Olley and Pakes (1992), Levinsohn and Petrin (2003), and Ackerberg, Caves, and Frazer (2015), which do not consider land as one of the production inputs. Second, data on land input costs at the firm level is not available, nor are the fundamental skill-augmented labor productivities A^h_{ju} and A^l_{ju} distinguishable in the data. Thus, we calculate measured productivity in the model as output net of measured labor inputs:

$$ln(\widetilde{Prod}_{ju}) = ln\left(\frac{Y_{ju}}{(H^h_{ju} + H^l_{ju})^\alpha}\right) \tag{24}$$

With the measured productivity for each prefecture, we can estimate the production fundamentals (a^h_{ju} and a^l_{ju}) and the agglomeration elasticity (γ) jointly.

Method We now delve into the details in three steps. In the first step, we run a traditional DID regression for productivity using equation (5) to get $\hat{\delta}_1^*$.

In the second step, we construct a counterfactual 2005 equilibrium by guessing the agglomeration parameter γ^0 (and correspondingly, $a_j^{s,0}$) and derive simulated productivity. Given all the variables and parameters we have derived, we can solve for the 2005 equilibrium, except γ and a_j^s. For an initial guess of γ^0, we simulate the counterfactual case with no inland-favoring policy. We get this counterfactual equilibrium using the algorithm described in Appendix B.2 with the counterfactual labor productivity $A_j^{s,0}$. Then, given the counterfactual labor productivity $A_j^{s,0}$, we calculate the counterfactual measured productivity $\widetilde{Prod}_{ju}^0$ using equation (24).

In the third step, we run the same regression (5) using the simulated data from both the original equilibrium and the counterfactual equilibrium as $ln(\widetilde{Prod}_{ju}^0) = \alpha + \delta_1 Post2003 \times East_j + \phi_j + \gamma_t + \epsilon_{jut}$, where $Post2003 = 1$ indicates the original equilibrium and $Post2003 = 0$ indicates the counterfactual equilibrium without the inland-favoring land policy. This yields the estimate of $\hat{\delta}_1^0$. Finally, we calculate the absolute distance between $\hat{\delta}_1^0$ and the real-world estimate $\hat{\delta}_1^*$. We then repeat this process, say n times, until we find the γ^* that minimizes this distance between the simulated regression coefficient $\hat{\delta}_1^n$ and the real regression coefficient $\hat{\delta}_1^*$.

Results Table B5 shows the empirical prefecture-level regression estimate from data. We use two methods to measure firm productivity (OP and LP) and then calculate the average firm productivity in each prefecture, weighted by total firm employment. The 2003 inland-favoring policy led to a 5-7% decrease in eastern prefecture average productivity relative to the inland. This yields an estimate of $\hat{\delta}_1^*$ between -0.075 and -0.05. Figure B1 shows the relationship between the value of the agglomeration parameter γ and the regression estimate of $\hat{\delta}_1$ from the simulated data. We find a monotonic negative relationship: the stronger the agglomeration effect is, the larger the loss generated by the inland-favoring land policy in the model. Matching $\hat{\delta}_1^* \in [-0.075, -0.05]$ gives us a range of estimates $\gamma \in [0.13, 0.21]$.

Data Estimation of $\hat{\delta}_1$		
	(1) OP	(2) LP
Post2003×East	-0.0749***	-0.0516*
	(0.0241)	(0.0268)
Trend Variables	Y	Y
Year FE	Y	Y
Prefecture FE	Y	Y
Observations	1,788	1,788
R-squared	0.7537	0.6351

Table B5: Empirical DID Results

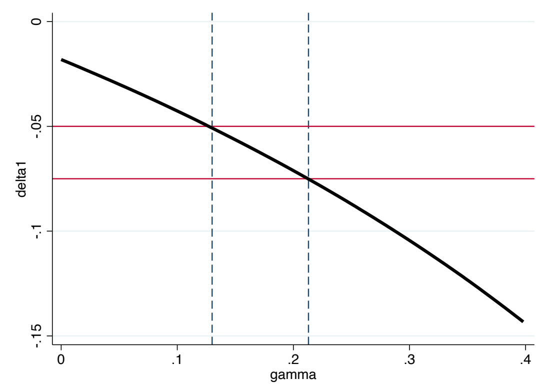


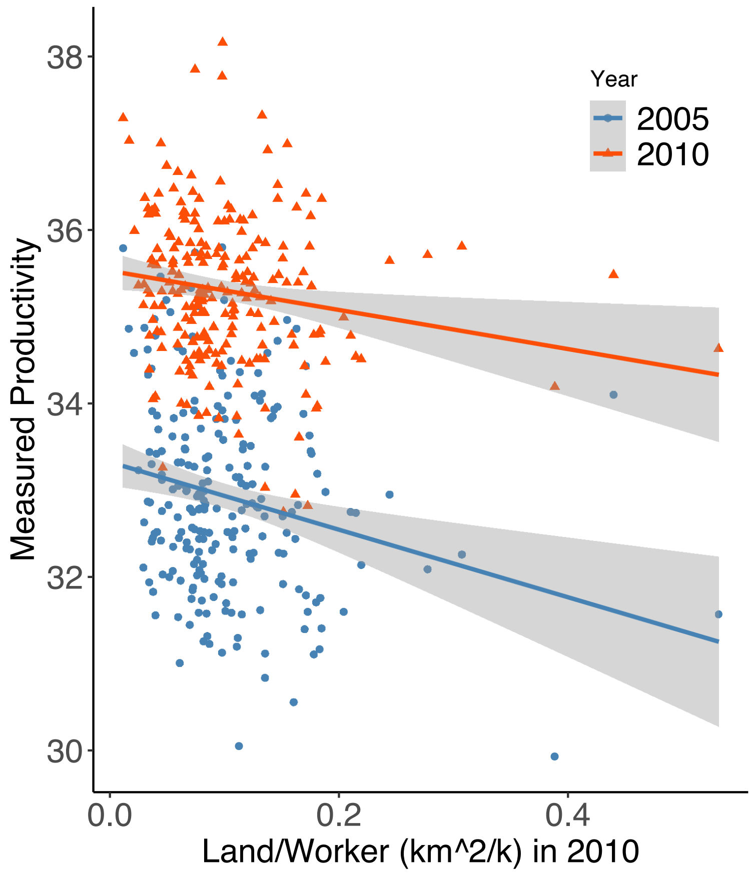
Figure B1: Relationship between γ and $\hat{\delta}_1$

Notes: In Table B5, the dependent variable is the prefecture average firm-level productivity measured by the OP and LP methods. The trend variables include province linear time trends, prefecture-level GDP per capita linear time trends, and prefecture-level industry share linear time trends. The standard errors are clustered at the prefecture level. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$. The regression results also hold from a firm-level regression; see Fang et al. (2024). Figure B1 plots how γ affects the estimation of $\hat{\delta}_1$ from the model simulated data. The regression result uses the data simulated by the model from both the original equilibrium and the counterfactual equilibrium from estimating $ln(\widetilde{Prod}_j^0) = \alpha + \delta_1 Post2003 \times East_j + \phi_j + \gamma_t + \epsilon_{jt}$, where $Post2003 = 1$ indicates the original equilibrium and $Post2003 = 0$ indicates the counterfactual equilibrium without the inland-favoring land policy. This yields an estimated coefficient $\hat{\delta}_1$ for a choice of the agglomeration elasticity γ. The range of the estimation in Table B5 $\hat{\delta}_1^* \in [-0.075, -0.05]$ (the red solid horizontal lines) gives us a range of estimates $\gamma \in [0.13, 0.21]$ (the blue dotted vertical lines).

B.4 Correlation between Productivity and Land Tightness

Figure B2 plots the correlation between productivity and land tightness in the model at the prefecture level, including the extreme values omitted in the main paper. We find a strong negative correlation between productivity and land tightness with the extreme values included.

Figure B2: Correlation between Productivity and Land Tightness By Individual Prefecture (Including Extreme Values)



Notes: This figure plots the correlation between productivity and land abundance in the model at the prefecture level, including the extreme values omitted in the main paper.

B.5 Additional Results of the Equilibrium Analysis

In this section, we show additional results of the quantitative analysis of the spatial distribution of economic development, income, and welfare that is left out of the main context.

Economic Development Table B6 shows the spatial distributions of total output, urban output, rural output, and urban population in 2005. Table B7 shows the spatial distributions of urban and rural workers by skill and floor space price in 2005. Table B8 and B9 show the above contents in 2010. Across these four tables, we have two observations consistent with our findings in the main context of the paper. First, more developed eastern cities have much higher output, especially urban output. Second, these cities are much more populated with higher floor space prices. These results supplement our main findings on the spatial misallocation created by the place-based land policy.

Table B6: 2005 Spatial Distribution of Economic Development Part I

Regions (loc., dev.)	No. of Cities	Total Output	Urban Output	Rural Output	Urban Pop.
		Units are Chinese Yuan and Person			
National	225	7.28E+12	5.07E+12	2.21E+12	2.38E+08
(east, high)	21	2.37E+12	2.22E+12	1.52E+11	7.56E+07
(east, mid)	51	1.95E+12	1.38E+12	5.67E+11	6.97E+07
(east, low)	25	4.62E+11	2.51E+11	2.11E+11	1.76E+07
(inland, high)	2	6.01E+10	2.67E+10	3.34E+10	1.33E+06
(inland, mid)	50	1.13E+12	6.55E+11	4.72E+11	3.68E+07
(inland, low)	76	1.31E+12	5.38E+11	7.70E+11	3.70E+07

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table B7: 2005 Spatial Distribution of Economic Development Part II

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill	Floor Space Price
National	225	4.24E+07	1.96E+08	5.82E+05	2.20E+08	6.28E+01
(east, high)	21	1.42E+07	6.14E+07	6.31E+04	8.84E+06	1.24E+02
(east, mid)	51	1.07E+07	5.90E+07	1.34E+05	5.33E+07	4.81E+01
(east, low)	25	2.53E+06	1.51E+07	8.74E+04	2.40E+07	4.39E+01
(inland, high)	2	2.56E+05	1.07E+06	6.21E+03	1.96E+06	5.22E+01
(inland, mid)	50	8.05E+06	2.87E+07	1.25E+05	4.66E+07	4.71E+01
(inland, low)	76	6.70E+06	3.03E+07	1.67E+05	8.50E+07	3.83E+01

Notes: This table displays a summary of economic development variables by group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table B8: 2010 Spatial Distribution of Economic Development Part I

Regions (loc., dev.)	No. of Cities	Total Output	Urban Output	Rural Output	Urban Pop.
		Units are Chinese Yuan and Person			
National	225	1.65E+13	1.28E+13	3.62E+12	3.40E+08
(east, high)	21	5.36E+12	5.12E+12	2.46E+11	1.08E+08
(east, mid)	51	4.50E+12	3.41E+12	1.09E+12	9.53E+07
(east, low)	25	6.43E+11	4.13E+11	2.30E+11	1.55E+07
(inland, high)	2	8.26E+10	5.87E+10	2.39E+10	1.59E+06
(inland, mid)	50	2.99E+12	2.21E+12	7.81E+11	6.52E+07
(inland, low)	76	2.88E+12	1.63E+12	1.25E+12	5.52E+07

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2010. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, as in 5.

Table B9: 2010 Spatial Distribution of Economic Development Part II

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill	Floor Space Price
National	225	6.20E+07	2.78E+08	1.45E+06	1.83E+08	1.15E+02
(east, high)	21	1.97E+07	8.80E+07	1.31E+05	8.02E+06	1.76E+02
(east, mid)	51	1.62E+07	7.91E+07	4.44E+05	5.26E+07	9.64E+01
(east, low)	25	2.29E+06	1.32E+07	1.01E+05	1.36E+07	7.35E+01
(inland, high)	2	3.60E+05	1.23E+06	9.26E+03	9.23E+05	1.03E+02
(inland, mid)	50	1.42E+07	5.10E+07	3.46E+05	3.91E+07	1.08E+02
(inland, low)	76	9.28E+06	4.59E+07	4.18E+05	6.86E+07	7.84E+01

Notes: This table displays a summary of economic development variables by group (weighted by population) in 2010. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Income Table B10 shows the spatial distribution of total income, wage income, and non-wage income for Hukou workers in 2005 and 2010. Workers in more developed cities earn higher incomes (higher wages for all workers and higher non-wage incomes for Hukou workers). It supplements our main findings on the spatial misallocation created by the place-based land policy.

Table B10: Spatial Distribution of Hukou-based Income

Regions (loc., dev.)	No. of Cities	Total Income 2005	Total Income 2010	Wage Income 2005	Wage Income 2010	Non-Wage Income 2005	Non-Wage Income 2010
National	225	1.90E+04	3.70E+04	1.46E+04	2.85E+04	4.35E+03	8.49E+03
(east, high)	21	3.74E+04	7.03E+04	2.47E+04	4.12E+04	1.27E+04	2.92E+04
(east, mid)	51	1.94E+04	3.72E+04	1.51E+04	2.89E+04	4.30E+03	8.26E+03
(east, low)	25	1.47E+04	2.93E+04	1.18E+04	2.43E+04	2.86E+03	5.06E+03
(inland, high)	2	2.26E+04	4.02E+04	1.74E+04	3.04E+04	5.21E+03	9.73E+03
(inland, mid)	50	1.71E+04	3.50E+04	1.37E+04	2.76E+04	3.45E+03	7.35E+03
(inland, low)	76	1.47E+04	3.05E+04	1.22E+04	2.61E+04	2.55E+03	4.45E+03

Notes: This table displays a summary of income variables by group (weighted by population) in 2005 and 2010. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

C Supplements to the Counterfactual Analysis

C.1 Constructing the Counterfactual Policy

Table C1 and C2 provide additional summary statistics of the counterfactual land allocation policy when we redistribute the land supply according to equation (18). In general, if we maintain the pre-2003 land policy instead of adopting the inland-favoring policy, we would distribute more urban land to more developed cities and increase their land per worker, compared with the data. This increases the land tightness in more developed cities.

Table C1: Removing the Inland-favoring Policy: Spatial Distribution of Land Tightness

Regions (loc., dev.)	No. of Cities	Reality 2005	Reality 2010	Counterfactual $\widehat{2005}$	Counterfactual $\widehat{2010}$
National	225	0.093	0.083	0.092	0.082
(east, high)	21	0.077	0.068	0.082	0.090
(east, mid)	51	0.084	0.082	0.083	0.071
(east, low)	25	0.080	0.108	0.084	0.106
(inland, high)	2	0.127	0.130	0.127	0.107
(inland, mid)	50	0.140	0.101	0.126	0.079
(inland, low)	76	0.104	0.086	0.103	0.080

Notes: This table displays a summary of urban land supply relative to workers by city group (weighted by urban population) as well as the counterfactual migration-based land supply in 2005 and 2010 (unit: km^2/k). Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table C2: Removing the Inland-favoring Policy: Changes in Total Land Supply

Regions (loc., dev.)	No. of Cities	Changes 2005	Changes 2010
National	225	0%	0%
(east, high)	21	13%	51%
(east, mid)	51	-2%	-16%
(east, low)	25	4%	-5%
(inland, high)	2	0%	-18%
(inland, mid)	50	-12%	-27%
(inland, low)	76	-2%	-11%

Notes: This table displays changes in counterfactual total urban land supply by group (summations within the group) in 2005 and 2010. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

C.2 A Sophisticated Rule of Regional Transfer

Without loss of generality, we design a direct regional transfer rule instead of the place-based land allocation policy. We need first to figure out who gains and who loses from removing the inland-favoring land policy and then design a direct regional transfer rule to reduce the income gap between workers from developed and underdeveloped regions.

Who Gains and Who Losses We first discuss workers in four subgroups without considering cross-city migration. Firstly, developed regions experience direct gains. Urban workers in developed cities benefit from higher local wages, lower local housing prices, and increased land income. Rural workers in developed cities benefit from higher wages and lower housing prices in the nearby urban sector. Secondly, underdeveloped regions face direct losses. Urban workers in underdeveloped cities suffer from lower local wages, higher local housing prices, and decreased land income. Rural workers in underdeveloped cities suffer from two components: lower wages and higher housing prices in the nearby urban sector.

We then discuss workers in four subgroups, taking into account cross-city migration. All workers in underdeveloped cities enjoy more indirect gains from higher wages and lower housing prices in developed cities, especially rural workers in underdeveloped cities. Meanwhile, rural workers in developed cities also experience indirect gains, although they may not be as significant as those for workers in underdeveloped cities. Urban workers in developed cities have minimal indirect gains. Lastly, the government directly benefits from higher production floor space returns.

The Regional Transfer Rule Based on the above qualitative analysis, we could design a regional transfer rule to replace the place-based land policy. The rule does not targeting on optimal policy design but demonstrates that there could be a better policy design. The rule could directly aim at transferring the direct gains. First, define the national gains in land income as follows:

$$\Delta\Pi_L^R = \sum_i \left(\hat{Q}_{iu}\hat{S}_{iu}^R - Q_{iu}S_{iu}^R\right) \tag{25}$$

$$\Delta\Pi_L^M = \sum_i \left(\hat{q}_{iu}\hat{S}_{iu}^M - q_{iu}S_{iu}^M\right) \tag{26}$$

where $\hat{Q}_{iu}\hat{S}_{iu}^R$ and $\hat{q}_{iu}\hat{S}_{iu}^M$ are regional land income in the counterfactual and $Q_{iu}S_{iu}^R$ and $q_{iu}S_{iu}^M$ are regional land income in the original equilibrium. The regional transfers $\{\widehat{DT_{iu}}, \widehat{DT_{ir}}\}$ must satisfy the following balance of budgets:

$$\sum_i \left(\widehat{DT_{iu}} + \widehat{DT_{ir}}\right) = \Delta\Pi_L^R + \Delta\Pi_L^M \tag{27}$$

We assume the following rule for each city i:

$$\widehat{DT_{iu}} = \underbrace{-\left(\hat{Q}_{iu}\hat{S}_{iu}^{R} - Q_{iu}S_{iu}^{R}\right)}_{\text{restore urban land income}} + \underbrace{\frac{\frac{\hat{Q}_{iu}-Q_{iu}}{Q_{iu}}Q_{iu}S_{iu}^{R}}{\sum_i \frac{|\hat{Q}_{iu}-Q_{iu}|}{Q_{iu}}Q_{iu}S_{iu}^{R}} \times \gamma_u^1 \times \Delta\Pi_L^R \Bigg|_{\hat{Q}_{iu}-Q_{iu}>0}}_{\text{adjust for housing price} \uparrow} + \underbrace{\frac{\frac{\hat{Q}_{iu}-Q_{iu}}{Q_{iu}}Q_{iu}S_{iu}^{R}}{\sum_i \frac{|\hat{Q}_{iu}-Q_{iu}|}{Q_{iu}}Q_{iu}S_{iu}^{R}} \times \gamma_u^2 \times \Delta\Pi_L^R \Bigg|_{\hat{Q}_{iu}-Q_{iu}<0}}_{\text{adjust for housing price} \downarrow} \tag{28}$$

$$\widehat{DT_{ir}} = \underbrace{\frac{\Delta\Pi_L^M H_{ir}}{\sum_i H_{ir}}}_{\text{urban-rural transfer}} + \underbrace{\frac{\frac{\hat{Q}_{ir}-Q_{ir}}{Q_{ir}}Q_{ir}S_{ir}^{R}}{\sum_i \frac{|\hat{Q}_{ir}-Q_{ir}|}{Q_{ir}}Q_{ir}S_{ir}^{R}} \times \gamma_r^1 \times \Delta\Pi_L^R \Bigg|_{\hat{Q}_{ir}-Q_{ir}>0}}_{\text{adjust for housing price} \uparrow} + \underbrace{\frac{\frac{\hat{Q}_{ir}-Q_{ir}}{Q_{ir}}Q_{ir}S_{ir}^{R}}{\sum_i \frac{|\hat{Q}_{ir}-Q_{ir}|}{Q_{ir}}Q_{ir}S_{ir}^{R}} \times \gamma_r^2 \times \Delta\Pi_L^R \Bigg|_{\hat{Q}_{ir}-Q_{ir}<0}}_{\text{adjust for housing price} \downarrow} \tag{29}$$

where $\{\gamma_u^1, \gamma_u^2, \gamma_r^1, \gamma_r^2\}$ are tunning parameters for housing price transfer adjustments. The weights reflect the importance of the local housing market in the country in terms of housing prices. To satisfy the balanced budget condition (27), the following equation $\gamma_u^1 + \gamma_r^1 = \gamma_u^2 + \gamma_r^2 + 2$ must hold. The first part of $\widehat{DT_{iu}}$ is to restore gains and losses in direct land income, and the second and third parts adjust for gains and losses in floor space prices. The first part of $\widehat{DT_{ir}}$ is to redistribute additional urban production land income to rural households, and the second and third parts adjust for gains and losses in floor space prices.

This counterfactual is feasible to implement and still fulfills the central government's goal of balancing regional development. This mechanism mimics a "land quota market" policy recommended by previous literature such as Lu and Xiang (2016). The basic idea is that the central government can balance the development of different regions by transferring revenues from developed cities to underdeveloped cities rather than allocating the land supply directly. Since land and wage incomes in land-gaining cities are higher than in land-losing cities, and the total land supply is unchanged, this redistribution is feasible, and the central government generates an additional financial surplus.

Turning the Redistribution Parameters Since the distribution of gains is mainly between housing price drops in developed urban regions and housing price increases in underdeveloped rural regions because it is more costly to move to nearby urban regions. We could mainly focus on γ_r^1 and γ_u^2. Currently, we choose $\gamma_r^1 = 20$ and $\gamma_u^2 = 18$ to satisfy significant redistribution. We choose $\gamma_u^1 = 0.2$ and $\gamma_r^2 = 0.2$ to make non-zero adjustments in the other directions.

C.3 A Simple Rule of Regional Transfer

We could also design a very simple direct regional transfer rule without considering the changes from the new equilibrium to the original equilibrium. There are certainly more efficient regional transfer rules. The simple rule is as follows for each city *i*:

$$\widehat{DT_{iu}} = \underbrace{\hat{Q}_{iu}\hat{S}^R_{iu} \times \gamma^l_u \times \frac{-\Delta L_i}{L_i}}_{\text{urban land income transfer}} + \underbrace{(\hat{w}^l_{iu}H^l_{iu} + \hat{w}^h_{iu}H^h_{iu}) \times \gamma^w_u \times \frac{-\Delta L_j}{L_j}}_{\text{urban wage income transfer}}$$

$$\widehat{DT}_{ir} = \underbrace{(\hat{w}_{ir}H_{ir}) \times \gamma_r \times \frac{-\Delta L_j}{L_j}}_{\text{rural wage income transfer}}$$

where $\widehat{DT}_{iu}$ stands for direct transfer to urban workers and $\widehat{DT}_{ir}$ stands for direct transfer to rural workers. For a city losing $\frac{\Delta L_i}{L_i}$ (<0) of its land, urban workers will be compensated with a fraction γ^l_u of their floor space income $\hat{Q}_{iu}\hat{S}^R_{iu}$, and a fraction γ^w_u of their wage income $(\hat{w}^l_{iu}H^l_{iu} + \hat{w}^h_{iu}H^h_{iu})$. Since rural workers also face losses in their wage for losing access to their closest urban sector (the urban sector in their own city), they will be compensated with a fraction γ_r of their indirect wage income $\hat{w}_{ir}H_{ir}$. These direct transfers are feasible to implement because land-gaining cities ($\frac{\Delta L_i}{L_i} > 0$) have much higher floor space prices and wages.

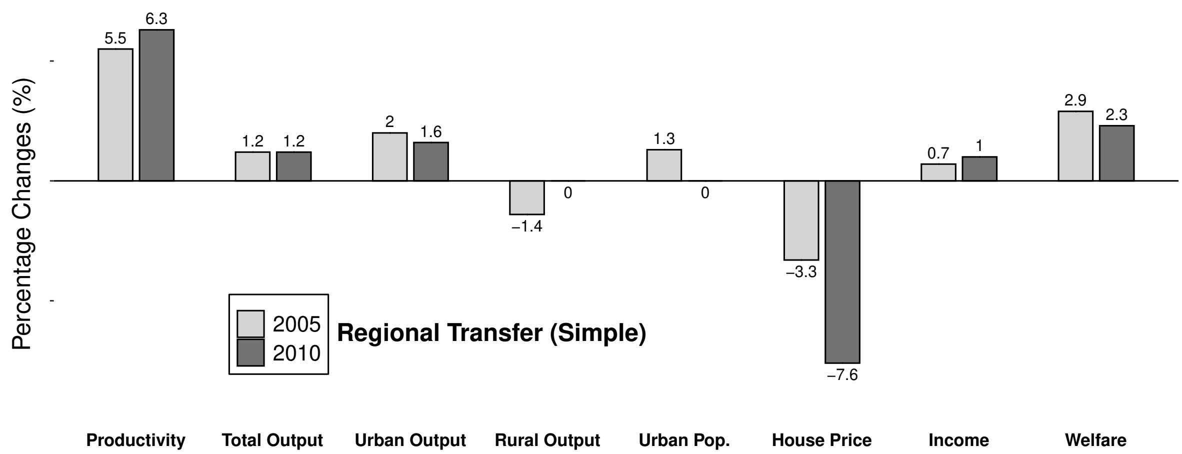
The transfer scale depends on the tuning parameters $\{\gamma^l_u, \gamma^w_u, \gamma_r\}$. As we mentioned, we cannot discuss the design of optimal redistribution policy in this paper. We show the results from one set of tuning parameters $\{\gamma^l_u, \gamma^w_u, \gamma_r\} = \{0.5, 0.1, 0.5\}$ for 2010 and $\{\gamma^l_u, \gamma^w_u, \gamma_r\} = \{0.75, 0.1, 0.5\}$ for 2005 which are sufficient to generate substantial redistribution and clarify the key mechanisms of the transfer results. We tested other sets of parameters, and the results were similar.

One thing to note is that the simple rule does not utilize the additional income from the more productive production land, and the government keeps the surplus.

C.4 Aggregate Effects with the Simple Rule of Regional Transfer

We show the aggregate effects of replacing the inland-favoring land policy with the simple rule of regional transfer on national productivity, urban output, rural output, urban population, and national average income and welfare. The results are plotted in Figure C1. Removing the place-based land policy significantly increased productivity, urban output, income, and welfare in 2005 and 2010. It also helps to increase the urban population due to lower residential floor space prices in more developed cities. Rural output falls due to worker emigration.

Figure C1: Aggregate Effects with the Simple Rule of Regional Transfer



Notes: This figure shows the aggregate effects of replacing the inland-favoring policy with the regional transfer on the Chinese economy in 2005 and 2010. We find substantial national gains in TFP, total output, urban output, urban population, income, and welfare.

One thing to note is that the simple rule does not utilize the additional income from the more productive production land, and the government keeps the surplus. Therefore, the aggregate incomes in both years are much lower than the sophisticated rule of regional transfer.

C.5 Aggregate Effects Decomposition

Construction To show the decomposition of the aggregate effects into three channels, we need to construct two intermediate equilibrium counterfactuals to separate the direct, the indirect, and the agglomeration effects. The idea is to follow the transmission path sequentially: (1) the direct effect from production floor space changes, (2) the indirect effect from induced labor demand and supply changes, and (3) the agglomeration effect from induced population density changes.

Suppose the initial equilibrium is a collection of variables X_{ini} and the final counterfactual equilibrium with the policy change is a collection of variables X_{fin}. We must construct two equilibrium collections of variables X_{de} and X_{die}.

In the direct effect equilibrium X_{de}, we would only consider how the policy change affects each prefecture's production floor space. We start with the production land supply equation (13) and then end with the production function (7). We assume workers do not move during the process, agglomeration effects do not change, and residential floor space and corresponding prices are unchanged. As a result, measured productivity, urban output, income, and welfare would change, but other variables would remain the same as in X_{ini}.

We would only shut down the agglomeration effects in the direct and indirect effects equilibrium X_{die}. The idea is that we allow the counterfactual policy change to move workers across prefectures and regions. Still, we assume the agglomeration component $(D_{ju})^{\gamma}$ in equation (12) to be the same as X_{ini}. Alternatively, we solve the counterfactual policy change with the agglomeration elasticity $\gamma = 0$ to generate the equilibrium X_{die}.

Finally, we could calculate the percentage changes of specific variable $x \in X$ in the direct, indirect, and agglomeration effects following the chain rule:

$$\underbrace{\frac{x_{fin} - x_{ini}}{x_{ini}}}_{total} = \underbrace{\frac{x_{de} - x_{ini}}{x_{ini}}}_{direct} + \underbrace{\frac{x_{die} - x_{de}}{x_{ini}}}_{indirect} + \underbrace{\frac{x_{fin} - x_{die}}{x_{ini}}}_{agglomeration} \tag{30}$$

Table C3: Aggregate Effects Decomposition

Decomp.	Δ Productivity		Δ Total Output		Δ Urban Output		Δ Rural Output		Δ Urban Pop.		Δ House Price		Δ Income		Δ Welfare	
	$\widehat{2005}$	$\widehat{2010}$	$\widehat{2005}$	$\widehat{2010}$	$\widehat{2005}$	$\widehat{2010}$	$\widehat{2005}$	$\widehat{2010}$	$\widehat{2005}$	$\widehat{2010}$	$\widehat{2005}$	$\widehat{2010}$	$\widehat{2005}$	$\widehat{2010}$	$\widehat{2005}$	$\widehat{2010}$
(a) Without Transfer																
Total	5.9%	8.1%	1.5%	1.8%	3.0%	3.1%	-1.4%	-1.9%	1.3%	1.5%	-3.0%	-6.2%	1.5%	1.7%	3.8%	4.1%
Direct	0.3%	-0.8%	0.2%	-0.6%	0.3%	-0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	-0.4%	0.2%	-0.4%
Indirect	3.2%	5.8%	0.7%	1.2%	1.6%	3.2%	-1.4%	-1.7%	1.3%	1.2%	-3.8%	-7.3%	0.7%	1.3%	3.2%	3.9%
Agglomeration	2.4%	3.1%	0.5%	1.2%	1.0%	0.8%	0.0%	-0.3%	0.0%	0.3%	0.8%	1.1%	0.6%	0.8%	0.4%	0.6%
(b) Regional Transfer																
Total	5.1%	6.8%	1.2%	1.2%	2.0%	1.6%	-0.9%	-0.3%	0.4%	0.3%	-3.8%	-7.4%	3.2%	3.3%	4.8%	2.9%
Direct	0.3%	-0.8%	0.2%	-0.6%	0.3%	-0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	-0.3%	0.3%	-0.3%
Indirect	2.9%	5.3%	0.5%	1.2%	1.1%	2.4%	-0.9%	-0.6%	0.4%	0.3%	-4.4%	-8.0%	1.8%	1.7%	3.9%	2.1%
Agglomeration	1.9%	2.3%	0.5%	0.6%	0.6%	0.0%	0.0%	0.3%	0.0%	0.0%	0.6%	0.6%	1.1%	1.9%	0.6%	1.1%
(c) Regional Transfer (Simple Rule)																
Total	5.5%	6.3%	1.4%	0.6%	2.6%	1.6%	-1.4%	0.0%	1.3%	0.0%	-3.3%	-7.6%	0.7%	1.0%	2.9%	2.3%
Direct	0.3%	-0.8%	0.2%	-0.6%	0.3%	-0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	-0.3%	0.3%	-0.3%
Indirect	3.0%	4.9%	0.6%	1.2%	1.4%	3.2%	-0.9%	-1.7%	0.8%	1.2%	-4.1%	-7.3%	0.0%	1.2%	2.1%	2.1%
Agglomeration	2.2%	2.2%	0.5%	0.0%	0.8%	-0.8%	-0.5%	1.7%	0.4%	-1.2%	0.8%	-0.3%	0.4%	0.1%	0.5%	0.5%

Notes: This table summarizes the decomposition of the aggregate effects into three components in 2005 and 2010. All numbers are relative changes from the observed data to the counterfactual results without the inland-favoring policy. The three channels are (1) the direct effect from production floor space changes, (2) the indirect effect from induced labor demand and supply changes, and (3) the agglomeration effect from induced population density changes. All three channels of the inland-favoring land policy lead to spatial misallocation of production and labor towards less productive regions and cause national productivity to stay relatively low.

C.6 Spatial Effects on Measured Productivity

Table C4, C5, and C6 below provide additional summary statistics of the spatial effects on measured productivity when the inland-favoring land policy was removed. The effects on measured productivity are similar whether there are regional transfers.

The decomposition further reveals that most of the national productivity gains are driven by increased fundamental productivity. The reform encourages more workers to migrate to developed regions with higher productivity, raising the weighted national productivity. The influx of migrant workers also amplifies the agglomeration effect on local productivity in developed regions. The changes in productivity are uneven across regions. In 2005, productivity in eastern cities with high productivity increased, while there was almost no change in productivity in other cities. In 2010, although we observed a larger productivity increase in developed cities, there was also a significant productivity decrease in underdeveloped cities due to land losses. For instance, productivity in inland cities with medium and low productivity declines, respectively. This result demonstrates that although national productivity and output would be higher with the pre-2003 land allocation policy, regional productivity gaps would also increase.

Table C4: Spatial Effects on Measured Productivity (Without Transfer)

		Measured Productivity									
Regions	No. of	2005					2010				
(loc., dev.)	Cities	Total	LSP	SP	Fund	Agg	Total	LSP	SP	Fund	Agg
National	225	5.9%	0.9%	-0.8%	4.5%	1.2%	8.1%	0.5%	-0.6%	5.4%	2.6%
(east, high)	21	7.4%	2.9%	-3.0%	4.7%	2.7%	14.9%	4.8%	-2.6%	5.1%	7.2%
(east, mid)	51	-0.3%	-0.3%	0.1%	0.1%	-0.1%	-2.3%	-2.1%	0.4%	0.6%	-1.2%
(east, low)	25	-0.6%	0.4%	0.1%	-0.6%	-0.5%	-2.7%	-0.9%	-0.1%	-0.2%	-1.5%
(inland, high)	2	-0.1%	-0.2%	0.0%	0.1%	0.0%	-2.6%	-2.4%	0.0%	0.2%	-0.4%
(inland, mid)	50	-0.7%	-1.0%	0.0%	1.2%	-0.9%	-7.8%	-3.6%	-0.2%	-1.3%	-2.8%
(inland, low)	76	-0.4%	-0.3%	0.1%	0.3%	-0.6%	-4.9%	-2.1%	0.2%	-0.7%	-2.5%

Notes: This table displays a summary of the spatial effects on measured productivity $ln(\widetilde{Prod}_{ju})$ in the model by group (weighted by population) in 2005 and 2010, as well as the decomposition of measured productivity. *LSP* stands for land scale premium, *SP* stands for skill premium, *Fund* stands for fundamental, and *Agg* stands for agglomeration. Land tightness is measured by km^2/thousand workers. Regions are classified by the location of the prefecture (east or inland) and the level of development (GDP per capita) in 2005, as in the data. For the level of development, we divide all cities into three categories {high, mid, and low} to capture {10%, 45%, 45%} of the distribution of GDP per capita. Each region has the same cities in 2005 and 2010 for consistent comparisons.

Table C5: Spatial Effects on Measured Productivity (Regional Transfer)

		Measured Productivity									
Regions (loc., dev.)	No. of Cities	2005 Total	2005 LSP	2005 SP	2005 Fund	2005 Agg	2010 Total	2010 LSP	2010 SP	2010 Fund	2010 Agg
National	225	5.1%	0.8%	-0.7%	4.2%	0.8%	6.8%	0.4%	-0.6%	4.9%	1.9%
(east, high)	21	6.7%	2.9%	-2.7%	4.3%	2.2%	13.6%	4.7%	-2.5%	4.8%	6.2%
(east, mid)	51	-0.6%	-0.3%	0.1%	0.0%	-0.4%	-2.7%	-2.1%	0.3%	0.6%	-1.6%
(east, low)	25	-1.3%	0.3%	0.2%	-0.4%	-1.3%	-3.2%	-0.9%	-0.1%	-0.4%	-1.8%
(inland, high)	2	-0.2%	-0.2%	0.0%	0.0%	0.0%	-3.0%	-2.4%	0.0%	-0.1%	-0.5%
(inland, mid)	50	-1.2%	-1.0%	0.0%	1.0%	-1.1%	-8.3%	-3.6%	-0.3%	-1.4%	-3.3%
(inland, low)	76	-0.7%	-0.3%	0.1%	0.2%	-0.8%	-5.2%	-2.1%	0.2%	-1.0%	-2.4%

Notes: This table displays a summary of the spatial effects on measured productivity $ln(\widetilde{Prod}_{ju})$ in the model by group (weighted by population) in 2005 and 2010, as well as the decomposition of measured productivity. *LSP* stands for land scale premium, *SP* stands for skill premium, *Fund* stands for fundamental, and *Agg* stands for agglomeration. Land tightness is measured by km^2/thousand workers. Regions are classified by the location of the prefecture (east or inland) and the level of development (GDP per capita) in 2005, as in the data. For the level of development, we divide all cities into three categories {high, mid, and low} to capture {10%, 45%, 45%} of the distribution of GDP per capita. Each region has the same cities in 2005 and 2010 for consistent comparisons.

Table C6: Spatial Effects on Measured Productivity (Regional Transfer with Simple Rule)

		Measured Productivity									
Regions (loc., dev.)	No. of Cities	2005 Total	2005 LSP	2005 SP	2005 Fund	2005 Agg	2010 Total	2010 LSP	2010 SP	2010 Fund	2010 Agg
National	225	5.5%	0.8%	-0.7%	4.3%	1.0%	6.3%	0.4%	-0.5%	4.6%	1.7%
(east, high)	21	7.1%	2.9%	-2.8%	4.5%	2.5%	12.9%	4.7%	-2.2%	4.2%	5.8%
(east, mid)	51	-0.4%	-0.3%	0.1%	0.1%	-0.3%	-2.7%	-2.1%	0.4%	0.7%	-1.7%
(east, low)	25	-0.8%	0.3%	0.1%	-0.4%	-0.8%	-2.9%	-0.9%	-0.1%	-0.3%	-1.6%
(inland, high)	2	-0.2%	-0.2%	0.0%	0.0%	0.0%	-2.9%	-2.4%	0.0%	0.0%	-0.5%
(inland, mid)	50	-1.0%	-1.1%	-0.1%	1.0%	-0.9%	-8.4%	-3.6%	-0.3%	-1.4%	-3.4%
(inland, low)	76	-0.4%	-0.3%	0.1%	0.3%	-0.6%	-5.2%	-2.1%	0.2%	-1.0%	-2.4%

Notes: This table displays a summary of the spatial effects on measured productivity $ln(\widetilde{Prod}_{ju})$ in the model by group (weighted by population) in 2005 and 2010, as well as the decomposition of measured productivity. *LSP* stands for land scale premium, *SP* stands for skill premium, *Fund* stands for fundamental, and *Agg* stands for agglomeration. Land tightness is measured by km^2/thousand workers. Regions are classified by the location of the prefecture (east or inland) and the level of development (GDP per capita) in 2005, as in the data. For the level of development, we divide all cities into three categories {high, mid, and low} to capture {10%, 45%, 45%} of the distribution of GDP per capita. Each region has the same cities in 2005 and 2010 for consistent comparisons.

C.7 Spatial Effects on Migration

Table C7: Spatial Effects on Migration in 2005 (Without Transfer)

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill
National	225	0.0%	1.5%	-1.2%	-1.8%
(east, high)	21	1.4%	8.1%	-0.2%	-0.2%
(east, mid)	51	-0.9%	-0.7%	-1.4%	-0.8%
(east, low)	25	-0.5%	-0.7%	-2.3%	-1.3%
(inland, high)	2	-0.1%	0.1%	-0.2%	0.1%
(inland, mid)	50	-1.6%	-2.1%	-1.3%	-1.9%
(inland, low)	76	-1.1%	-2.0%	-0.7%	-2.1%

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table C8: Spatial Effects on Migration in 2010 (Without Transfer)

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill
National	225	0.0%	1.8%	-1.4%	-2.2%
(east, high)	21	8.6%	14.8%	5.1%	2.7%
(east, mid)	51	-2.5%	-3.0%	-1.8%	-0.8%
(east, low)	25	-3.8%	-3.0%	-0.8%	-2.2%
(inland, high)	2	-1.0%	-1.0%	3.5%	1.9%
(inland, mid)	50	-6.3%	-7.6%	-2.3%	-3.1%
(inland, low)	76	-3.2%	-5.2%	-2.6%	-3.8%

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table C9: Spatial Effects on Migration in 2005 (Regional Transfer)

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill
National	225	0.0%	0.5%	-3.7%	-0.9%
(east, high)	21	2.1%	6.5%	-5.9%	-1.1%
(east, mid)	51	-0.9%	-1.4%	-8.6%	-0.2%
(east, low)	25	-1.4%	-2.0%	-3.6%	-0.4%
(inland, high)	2	-0.2%	-0.1%	-0.2%	0.0%
(inland, mid)	50	-1.8%	-2.4%	-1.0%	-0.6%
(inland, low)	76	-1.8%	-2.3%	-1.0%	-0.9%

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table C10: Spatial Effects on Migration in 2010 (Regional Transfer)

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill
National	225	-0.2%	0.4%	3.3%	-0.5%
(east, high)	21	8.6%	12.6%	2.6%	1.3%
(east, mid)	51	-2.5%	-4.0%	3.9%	1.0%
(east, low)	25	-4.2%	-3.0%	4.6%	-0.7%
(inland, high)	2	-1.4%	-1.3%	6.4%	1.9%
(inland, mid)	50	-7.0%	-8.4%	2.8%	-0.5%
(inland, low)	76	-3.3%	-5.4%	2.9%	-1.5%

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table C11: Spatial Effects on Migration in 2005 (Regional Transfer with Simple Rule)

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill
National	225	0.0%	1.0%	-4.5%	-1.4%
(east, high)	21	2.1%	7.3%	-4.6%	-0.9%
(east, mid)	51	-0.9%	-1.0%	-7.1%	-0.8%
(east, low)	25	-1.1%	-1.3%	-7.4%	-1.3%
(inland, high)	2	-0.2%	0.0%	-2.0%	0.1%
(inland, mid)	50	-1.7%	-2.1%	-3.2%	-1.3%
(inland, low)	76	-1.6%	-1.7%	-2.1%	-1.6%

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table C12: Spatial Effects on Migration in 2010 (Regional Transfer with Simple Rule)

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill
National	225	0.0%	0.0%	1.3%	0.0%
(east, high)	21	9.1%	11.6%	1.9%	0.6%
(east, mid)	51	-3.1%	-4.0%	0.6%	1.5%
(east, low)	25	-4.5%	-3.0%	0.6%	-0.7%
(inland, high)	2	-1.3%	-1.3%	3.2%	2.0%
(inland, mid)	50	-7.0%	-8.6%	1.8%	0.5%
(inland, low)	76	-3.8%	-5.4%	1.6%	-0.9%

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

C.8 Spatial Effects on Economic Development

Table C13: Spatial Effects on Economic Development (Regional Transfer)

Regions (loc., dev.)	No. of prefectures	Δ Productivity 2005	Δ Productivity 2010	Δ Urban Output 2005	Δ Urban Output 2010	Δ Rural Output 2005	Δ Rural Output 2010	Δ Urban Pop. 2005	Δ Urban Pop. 2010	Δ House Price 2005	Δ House Price 2010
National	225	5.1%	6.8%	2.0%	1.6%	-0.9%	-0.3%	0.4%	0.3%	-3.8%	-7.4%
(east, high)	21	6.7%	13.6%	7.2%	15.4%	-1.3%	1.2%	5.7%	11.1%	-18.2%	-33.7%
(east, mid)	51	-0.6%	-2.7%	-1.4%	-5.3%	0.0%	0.9%	-1.3%	-3.8%	0.7%	10.9%
(east, low)	25	-1.3%	-3.2%	-1.6%	-5.1%	-0.9%	-2.2%	-1.7%	-3.2%	-4.3%	2.4%
(inland, high)	2	-0.2%	-3.0%	0.0%	-3.6%	0.0%	2.1%	-0.1%	-1.3%	1.5%	18.1%
(inland, mid)	50	-1.2%	-8.3%	-3.2%	-12.2%	-0.4%	-0.8%	-2.4%	-8.1%	1.0%	8.8%
(inland, low)	76	-0.7%	-5.2%	-2.2%	-7.4%	-0.9%	-1.6%	-2.2%	-5.1%	-4.3%	-1.9%

Notes: This table displays a summary of changes in core economic development variables by prefecture group (weighted by population) in 2005 and 2010. All numbers are relative changes from the observed data to the counterfactual results without the inland-favoring policy. For each variable, we show the changes in 2005 and 2010. Regions are classified by prefecture location (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table C14: Spatial Effects on Economic Development (Regional Transfer with Simple Rule)

Regions (loc., dev.)	No. of prefectures	Δ Productivity 2005	Δ Productivity 2010	Δ Urban Output 2005	Δ Urban Output 2010	Δ Rural Output 2005	Δ Rural Output 2010	Δ Urban Pop. 2005	Δ Urban Pop. 2010	Δ House Price 2005	Δ House Price 2010
National	225	5.5%	6.3%	3.1%	2.6%	-1.9%	-1.4%	1.5%	1.3%	-6.2%	-3.3%
(east, high)	21	7.1%	12.9%	17.8%	8.1%	3.3%	-0.7%	13.9%	6.3%	-32.4%	-17.7%
(east, mid)	51	-0.4%	-2.7%	-4.4%	-1.4%	0.0%	-0.4%	-3.0%	-1.0%	11.9%	1.1%
(east, low)	25	-0.8%	-2.9%	-4.6%	-1.2%	-3.5%	-1.4%	-3.2%	-1.1%	2.8%	-3.8%
(inland, high)	2	-0.2%	-2.9%	-3.2%	0.0%	1.7%	0.0%	-1.0%	0.0%	18.5%	1.5%
(inland, mid)	50	-1.0%	-8.4%	-11.8%	-2.7%	-2.9%	-0.8%	-7.5%	-2.2%	9.6%	1.3%
(inland, low)	76	-0.4%	-5.2%	-6.7%	-1.7%	-3.2%	-1.6%	-5.1%	-1.6%	-1.7%	-3.9%

Notes: This table displays a summary of changes in core economic development variables by prefecture group (weighted by population) in 2005 and 2010. All numbers are relative changes from the observed data to the counterfactual results without the inland-favoring policy. For each variable, we show the changes in 2005 and 2010. Regions are classified by prefecture location (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

C.9 Spatial Effects on Income and Welfare

Table C15: Spatial Effects on Income (Without Transfer)

Regions (loc., dev.)	No. of Cities	Δ Income 2005	Δ Income 2010	Δ Wage Income 2005	Δ Wage Income 2010	Δ Non-wage Income 2005	Δ Non-wage Income 2010
National	225	1.46%	1.74%	1.46%	1.74%	1.47%	1.76%
(east, high)	21	2.69%	7.43%	0.21%	0.60%	7.52%	17.08%
(east, mid)	51	0.28%	-0.08%	0.54%	0.82%	-0.64%	-3.22%
(east, low)	25	1.10%	1.92%	1.67%	3.21%	-1.24%	-4.28%
(inland, high)	2	0.01%	-1.61%	0.00%	-1.58%	0.03%	-1.68%
(inland, mid)	50	0.95%	-0.91%	1.71%	1.26%	-2.06%	-9.07%
(inland, low)	76	2.24%	1.92%	3.09%	3.15%	-1.80%	-5.31%

Notes: This table displays a summary of income by city group (summations within the group) in 2005 and 2010. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table C16: Spatial Effects on Income (Regional Transfer)

Regions (loc., dev.)	No. of Cities	Δ Income 2005	Δ Income 2010	Δ Wage Income 2005	Δ Wage Income 2010	Δ Non-wage Income 2005	Δ Non-wage Income 2010
National	225	3.18%	3.26%	1.09%	1.12%	10.20%	10.42%
(east, high)	21	-10.32%	-10.89%	0.29%	0.89%	-31.03%	-27.53%
(east, mid)	51	0.49%	5.03%	0.37%	0.15%	0.90%	22.10%
(east, low)	25	0.72%	6.49%	1.64%	2.72%	-3.10%	24.58%
(inland, high)	2	2.30%	5.63%	-0.01%	-1.77%	10.01%	28.79%
(inland, mid)	50	20.00%	6.94%	1.02%	0.36%	95.33%	31.66%
(inland, low)	76	6.49%	7.05%	2.34%	2.36%	26.27%	34.55%

Notes: This table displays a summary of income by city group (summations within the group) in 2005 and 2010. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table C17: Spatial Effects on Income (Regional Transfer with Simple Rule)

Regions (loc., dev.)	No. of Cities	Δ Income 2005	Δ Income 2010	Δ Wage Income 2005	Δ Wage Income 2010	Δ Non-wage Income 2005	Δ Non-wage Income 2010
National	225	0.72%	1.34%	1.30%	1.00%	-1.23%	2.46%
(east, high)	21	-6.97%	-14.48%	0.28%	0.61%	-21.13%	-35.80%
(east, mid)	51	-2.12%	1.34%	0.55%	0.11%	-11.45%	5.65%
(east, low)	25	-0.85%	5.90%	1.83%	2.75%	-11.89%	21.02%
(inland, high)	2	-1.34%	-2.30%	0.02%	-1.64%	-5.87%	-4.37%
(inland, mid)	50	11.43%	6.61%	1.29%	0.20%	51.67%	30.72%
(inland, low)	76	3.34%	6.68%	2.69%	2.23%	6.48%	32.72%

Notes: This table displays a summary of income by city group (summations within the group) in 2005 and 2010. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table C18: Spatial Effects on Welfare

Regions (loc., dev.)	No. of Cities	Without Transfer (Year 2005)				
		Welfare	(Urban, High)	(Urban, Low)	(Rural, High)	(Rural, Low)
National	225	3.8%	2.5%	1.7%	5.3%	1.0%
(east, high)	21	10.8%	7.3%	6.9%	16.0%	2.4%
(east, mid)	51	-0.2%	-0.5%	-0.6%	-0.1%	-0.5%
(east, low)	25	-1.5%	0.5%	0.8%	-2.7%	1.5%
(inland, high)	2	-0.6%	-0.3%	-0.2%	0.3%	-0.7%
(inland, mid)	50	-0.1%	-2.3%	-1.7%	0.5%	-2.2%
(inland, low)	76	2.7%	-0.1%	0.5%	3.4%	0.7%

Notes: This table displays a summary of welfare by city group (summations within the group) in 2005. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table C19: Spatial Effects on Welfare

Regions (loc., dev.)	No. of Cities	Without Transfer (Year 2010)				
		Welfare	(Urban, High)	(Urban, Low)	(Rural, High)	(Rural, Low)
National	225	4.1%	3.4%	0.2%	7.2%	3.8%
(east, high)	21	14.5%	19.4%	16.7%	15.9%	14.0%
(east, mid)	51	-4.0%	-4.6%	-5.7%	-3.2%	-3.6%
(east, low)	25	1.2%	-2.6%	-2.5%	7.2%	1.3%
(inland, high)	2	-5.3%	-5.7%	-6.8%	-5.1%	-4.7%
(inland, mid)	50	-5.1%	-10.3%	-9.0%	-4.4%	-3.2%
(inland, low)	76	-3.5%	-5.1%	-3.9%	-9.6%	-0.4%

Notes: This table displays a summary of welfare by city group (summations within the group) in 2010. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table C20: Spatial Effects on Welfare

Regions (loc., dev.)	No. of Cities	Regional Transfer (Year 2005)				
		Welfare	(Urban, High)	(Urban, Low)	(Rural, High)	(Rural, Low)
National	225	4.8%	-10.2%	-8.8%	6.3%	5.2%
(east, high)	21	7.7%	-18.0%	-16.2%	14.9%	0.3%
(east, mid)	51	1.2%	-4.4%	-4.3%	1.4%	3.1%
(east, low)	25	1.9%	-7.2%	-8.8%	2.0%	6.1%
(inland, high)	2	2.0%	-0.5%	-0.4%	2.0%	2.8%
(inland, mid)	50	5.8%	-4.9%	-5.5%	3.3%	23.7%
(inland, low)	76	5.0%	-7.1%	-8.3%	4.8%	8.8%

Notes: This table displays a summary of welfare by city group (summations within the group) in 2005. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table C21: Spatial Effects on Welfare

Regions (loc., dev.)	No. of Cities	Regional Transfer (Year 2010)				
		Welfare	(Urban, High)	(Urban, Low)	(Rural, High)	(Rural, Low)
National	225	2.9%	-14.3%	-11.4%	5.6%	4.6%
(east, high)	21	2.5%	-25.2%	-22.9%	8.0%	3.2%
(east, mid)	51	2.1%	-7.4%	-7.4%	1.1%	6.3%
(east, low)	25	6.3%	-6.0%	-6.8%	7.6%	10.9%
(inland, high)	2	3.1%	-4.6%	-5.3%	3.3%	8.1%
(inland, mid)	50	4.2%	-8.4%	-7.7%	5.1%	9.7%
(inland, low)	76	4.0%	-7.4%	-7.0%	0.7%	8.3%

Notes: This table displays a summary of welfare by city group (summations within the group) in 2010. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table C22: Spatial Effects on Welfare

Regions (loc., dev.)	No. of Cities	Regional Transfer with Simple Rule (Year 2005)				
		Welfare	(Urban, High)	(Urban, Low)	(Rural, High)	(Rural, Low)
National	225	2.9%	-8.5%	-8.9%	5.0%	0.9%
(east, high)	21	5.1%	-11.7%	-12.3%	11.8%	-3.1%
(east, mid)	51	0.6%	-7.8%	-8.9%	1.4%	1.7%
(east, low)	25	0.7%	-6.0%	-7.0%	1.4%	1.5%
(inland, high)	2	-1.3%	-7.4%	-7.9%	0.9%	0.7%
(inland, mid)	50	3.2%	-5.5%	-6.0%	2.3%	12.2%
(inland, low)	76	2.8%	-5.8%	-6.6%	3.2%	3.6%

Notes: This table displays a summary of welfare by city group (summations within the group) in 2005. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table C23: Spatial Effects on Welfare

Regions (loc., dev.)	No. of Cities	Regional Transfer with Simple Rule (Year 2010)				
		Welfare	(Urban, High)	(Urban, Low)	(Rural, High)	(Rural, Low)
National	225	2.3%	-20.9%	-20.8%	7.9%	4.5%
(east, high)	21	1.0%	-28.4%	-30.9%	6.6%	2.0%
(east, mid)	51	0.3%	-18.0%	-20.0%	2.6%	8.4%
(east, low)	25	6.9%	-12.1%	-14.1%	6.7%	14.7%
(inland, high)	2	-3.6%	-16.1%	-18.7%	1.5%	4.6%
(inland, mid)	50	5.1%	-15.6%	-16.2%	6.2%	14.8%
(inland, low)	76	7.8%	-14.6%	-15.0%	13.0%	10.7%

Notes: This table displays a summary of welfare by city group (summations within the group) in 2010. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

D Supplements to Eliminating All Land Frictions

D.1 Land Distribution Across Prefectures

Table D1: Counterfactual Total Land Supply (km^2)

Regions (loc., dev.)	No. of prefectures	Reality 2005	Reality 2010	Counterfactual $\widehat{2005}$	Counterfactual $\widehat{2010}$
National	225	22268	28336	22268	28336
(east, high)	21	5838	7272	15674	17002
(east, mid)	51	5875	7832	2648	4270
(east, low)	25	1418	1681	520	761
(inland, high)	2	169	206	115	85
(inland, mid)	50	5131	6578	2407	4565
(inland, low)	76	3837	4767	904	1655

Notes: This table displays a summary of total urban land supply data by prefecture group (summations within the group) in 2005 and 2010, as well as the counterfactual land supply in 2010 (unit: km. Regions are classified by prefecture location (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table D2: Spatial Distribution of Land Tightness

Regions (loc., dev.)	No. of Cities	Reality 2005	Reality 2010	Counterfactual $\widehat{2005}$	Counterfactual $\widehat{2010}$
National	225	0.093	0.083	0.090	0.082
(east, high)	21	0.077	0.068	0.137	0.114
(east, mid)	51	0.084	0.082	0.044	0.053
(east, low)	25	0.080	0.108	0.038	0.061
(inland, high)	2	0.127	0.130	0.094	0.062
(inland, mid)	50	0.140	0.101	0.078	0.074
(inland, low)	76	0.104	0.086	0.033	0.040

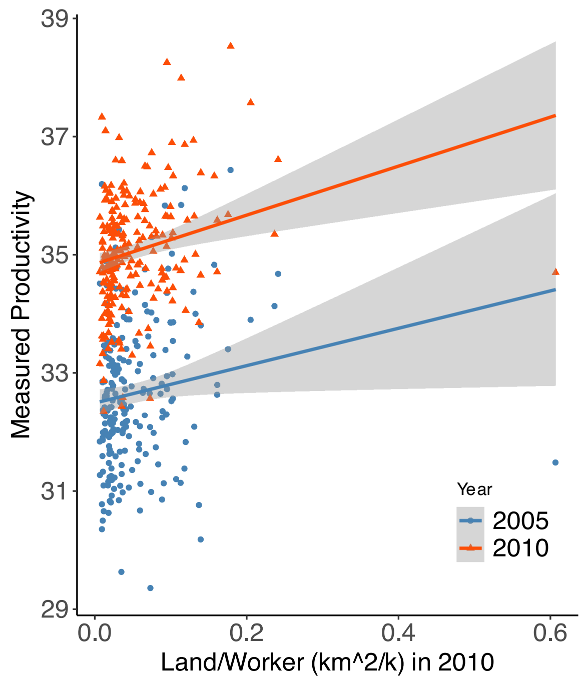
Notes: This table displays a summary of urban land supply relative to workers by city group (weighted by urban population) as well as the counterfactual migration-based land supply in 2005 and 2010 (unit: km^2/k). Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table D3: Changes in Total Land Supply

Regions (loc., dev.)	No. of Cities	Changes 2005	Changes 2010
National	225	0%	0%
(east, high)	21	168%	134%
(east, mid)	51	-55%	-45%
(east, low)	25	-63%	-55%
(inland, high)	2	-32%	-59%
(inland, mid)	50	-53%	-31%
(inland, low)	76	-76%	-65%

Notes: This table displays changes in counterfactual total urban land supply by group (summations within the group) in 2005 and 2010. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Figure D1: Correlation between Productivity and Land Tightness By Individual Prefecture (Including Extreme Values)



Notes: This figure plots the correlation between productivity and land abundance in the model at the prefecture level, including the extreme values omitted in the main paper.

D.2 Spatial Effects on Measured Productivity

Table D4: Spatial Distribution of Measured Productivity

		Measured Productivity									
Regions (loc., dev.)	No. of prefectures	2005 Total	LSP	SP	Fund	Agg	2010 Total	LSP	SP	Fund	Agg
National	225	34.27	2.19	0.62	31.33	0.13	36.09	2.21	0.66	33.04	0.19
(east, high)	21	35.68	2.40	0.68	32.13	0.48	37.15	2.39	0.71	33.55	0.51
(east, mid)	51	33.69	2.11	0.50	31.10	-0.01	35.57	2.12	0.60	32.75	0.10
(east, low)	25	32.29	1.93	0.52	30.01	-0.17	34.61	1.93	0.51	32.57	-0.40
(inland, high)	2	33.59	1.97	0.60	31.48	-0.45	35.04	2.00	0.77	32.66	-0.39
(inland, mid)	50	32.84	1.99	0.70	30.37	-0.22	35.32	2.11	0.71	32.41	0.09
(inland, low)	76	32.26	1.91	0.58	30.23	-0.47	34.90	1.98	0.53	32.82	-0.43

Notes: This table displays a summary of measured productivity $ln(\widetilde{Prod}_{ju})$ and land tightness in the model by group (weighted by population) in 2005 and 2010, as well as the decomposition of measured productivity. *LSP* stands for land scale premium, *SP* stands for skill premium, *Fund* stands for fundamental, and *Agg* stands for agglomeration. Land tightness is measured by km^2/thousand workers. Regions are classified by the location of the prefecture (east or inland) and the level of development (GDP per capita) in 2005, as in the data. For the level of development, we divide all prefectures into three categories {high, mid, and low} to capture {10%, 45%, 45%} of the distribution of GDP per capita. Each region has the same prefectures in 2005 and 2010 for consistent comparisons.

Table D5: Spatial Effects on Measured Productivity

		Measured Productivity									
Regions (loc., dev.)	No. of prefectures	2005 Total	LSP	SP	Fund	Agg	2010 Total	LSP	SP	Fund	Agg
National	225	54.7%	0.2%	2.8%	31.3%	14.5%	26.4%	-1.1%	4.0%	12.7%	9.0%
(east, high)	21	61.3%	16.4%	0.8%	5.8%	30.0%	41.0%	9.8%	3.2%	4.3%	19.3%
(east, mid)	51	-13.3%	-13.4%	0.4%	4.7%	-4.9%	-15.9%	-11.6%	2.8%	-0.9%	-6.6%
(east, low)	25	-27.8%	-18.0%	1.7%	0.7%	-14.0%	-20.1%	-12.6%	1.0%	-0.3%	-9.2%
(inland, high)	2	-8.9%	-8.7%	0.9%	4.0%	-5.0%	-17.4%	-12.9%	0.0%	0.9%	-6.0%
(inland, mid)	50	-12.0%	-11.5%	1.6%	3.3%	-5.3%	-3.0%	-5.6%	2.3%	0.5%	0.0%
(inland, low)	76	-20.8%	-16.7%	2.4%	2.1%	-9.1%	-18.4%	-15.3%	1.3%	8.3%	-12.2%

Notes: This table displays a summary of the spatial effects on measured productivity $ln(\widetilde{Prod}_{ju})$ in the model by group (weighted by population) in 2005 and 2010, as well as the decomposition of measured productivity. *LSP* stands for land scale premium, *SP* stands for skill premium, *Fund* stands for fundamental, and *Agg* stands for agglomeration. Land tightness is measured by km^2/thousand workers. Regions are classified by the location of the prefecture (east or inland) and the level of development (GDP per capita) in 2005, as in the data. For the level of development, we divide all cities into three categories {high, mid, and low} to capture {10%, 45%, 45%} of the distribution of GDP per capita. Each region has the same cities in 2005 and 2010 for consistent comparisons.

D.3 Spatial Effects on Migration

Table D6: Spatial Effects on Migration in 2005

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill
National	225	0.0%	5.1%	-12.6%	-4.5%
(east, high)	21	35.2%	55.7%	-0.7%	3.9%
(east, mid)	51	-14.5%	-13.4%	-9.7%	0.6%
(east, low)	25	-21.4%	-23.2%	-18.3%	-2.5%
(inland, high)	2	-4.4%	-9.4%	14.1%	3.5%
(inland, mid)	50	-17.1%	-15.7%	-22.4%	-5.2%
(inland, low)	76	-22.9%	-27.1%	-10.0%	-8.9%

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

Table D7: Spatial Effects on Migration in 2010

Regions (loc., dev.)	No. of Cities	Urban Pop. High-skill	Urban Pop. Low-skill	Rural Pop. High-skill	Rural Pop. Low-skill
National	225	0.2%	2.2%	-12.0%	-3.3%
(east, high)	21	31.5%	39.8%	12.4%	11.0%
(east, mid)	51	-14.2%	-15.2%	-9.8%	1.9%
(east, low)	25	-21.5%	-19.7%	-14.6%	-3.7%
(inland, high)	2	-16.0%	-13.7%	-3.2%	3.5%
(inland, mid)	50	-6.3%	-5.5%	-14.1%	-4.1%
(inland, low)	76	-24.4%	-26.1%	-19.7%	-8.0%

Notes: This table displays a summary of economic development variables by city group (weighted by population) in 2005. Regions are classified by the location of the city (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

D.4 Spatial Effects on Economic Development

Table D8: Spatial Effects on Economic Development in 2005

Regions (loc., dev.)	No. of prefectures	Δ Total Output	Δ Urban Output	Δ Rural Output	Δ Urban Pop.	Δ House Price
National	225	14.3%	21.7%	-2.7%	4.2%	60.7%
(east, high)	21	78.9%	83.8%	4.6%	52.1%	-18.5%
(east, mid)	51	-15.9%	-23.9%	2.6%	-13.5%	109.6%
(east, low)	25	-20.1%	-35.1%	-2.8%	-22.7%	129.7%
(inland, high)	2	-4.2%	-13.9%	3.6%	-8.4%	93.1%
(inland, mid)	50	-15.2%	-23.2%	-3.8%	-16.3%	113.9%
(inland, low)	76	-19.8%	-36.1%	-7.7%	-26.5%	163.1%

Notes: This table displays a summary of changes in core economic development variables by prefecture group (weighted by population). All numbers are relative changes from the observed data to the counterfactual results without the inland-favoring policy. Regions are classified by prefecture location (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table D9: Spatial Effects on Economic Development in 2010

Regions (loc., dev.)	No. of prefectures	Δ Total Output	Δ Urban Output	Δ Rural Output	Δ Urban Pop.	Δ House Price
National	225	7.9%	10.9%	-1.9%	1.8%	47.0%
(east, high)	21	57.6%	59.6%	11.4%	38.0%	-4.3%
(east, mid)	51	-16.2%	-22.3%	2.8%	-15.0%	74.8%
(east, low)	25	-20.2%	-29.1%	-4.8%	-20.0%	129.1%
(inland, high)	2	-16.9%	-25.2%	3.3%	-14.2%	63.7%
(inland, mid)	50	-7.4%	-8.6%	-3.6%	-5.8%	56.2%
(inland, low)	76	-22.9%	-35.0%	-7.2%	-25.9%	114.8%

Notes: This table displays a summary of changes in core economic development variables by prefecture group (weighted by population). All numbers are relative changes from the observed data to the counterfactual results without the inland-favoring policy. Regions are classified by prefecture location (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

D.5 Spatial Effects on Income and Welfare

Table D10: Spatial Effects on Income

Regions (loc., dev.)	No. of Cities	Δ Income $\widehat{2005}$	Δ Income $\widehat{2010}$	Δ Wage Income $\widehat{2005}$	Δ Wage Income $\widehat{2010}$	Δ Non-wage Income $\widehat{2005}$	Δ Non-wage Income $\widehat{2010}$
National	225	13.44%	7.72%	13.40%	7.69%	13.57%	7.81%
(east, high)	21	35.90%	28.62%	14.38%	8.36%	77.89%	57.25%
(east, mid)	51	-0.55%	-1.00%	3.62%	3.18%	-15.19%	-15.64%
(east, low)	25	8.78%	5.77%	15.56%	11.06%	-19.23%	-19.60%
(inland, high)	2	-1.98%	-5.45%	-1.49%	-2.03%	-3.63%	-16.14%
(inland, mid)	50	8.47%	4.38%	14.24%	7.46%	-14.42%	-7.22%
(inland, low)	76	15.17%	6.37%	22.24%	11.20%	-18.49%	-21.96%

Notes: This table displays a summary of income by city group (summations within the group) in 2005 and 2010. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, as in Table 5.

Table D11: Spatial Effects on Welfare

Regions (loc., dev.)	No. of Cities	Welfare	(Urban, High)	(Urban, Low)	(Rural, High)	(Rural, Low)
				Year 2005		
National	225	8.8%	14.2%	-6.5%	8.5%	12.8%
(east, high)	21	32.9%	67.4%	44.6%	23.0%	45.5%
(east, mid)	51	-7.4%	-20.9%	-27.1%	-3.7%	-16.6%
(east, low)	25	1.4%	-24.1%	-26.7%	10.0%	-16.4%
(inland, high)	2	-17.9%	-20.1%	-17.2%	-11.3%	-17.9%
(inland, mid)	50	-1.0%	-14.9%	-25.2%	3.4%	-14.1%
(inland, low)	76	2.3%	-25.2%	-29.7%	9.2%	-15.3%
				Year 2010		
National	225	7.5%	10.5%	-9.2%	14.3%	7.2%
(east, high)	21	17.1%	51.5%	29.0%	22.0%	14.8%
(east, mid)	51	-16.3%	-14.6%	-23.2%	-10.3%	-15.6%
(east, low)	25	-12.4%	-18.7%	-25.0%	5.2%	-12.5%
(inland, high)	2	-16.8%	-19.1%	-23.8%	-7.6%	-14.5%
(inland, mid)	50	-10.0%	-7.3%	-16.8%	5.4%	-11.5%
(inland, low)	76	-10.0%	-23.1%	-28.2%	3.5%	-12.7%

Notes: This table displays a summary of welfare by city group (summations within the group) in 2005. Regions are classified by the location of the prefecture/city (east or inland) and the level of development (GDP per capita) in 2005, consistently as in Table 5.

E Supplements to the Sensitivity Analysis

We have tested the model sensitivity in many checks. However, we intend not to dump redundant results. If particular sensitivity checks interest you, please get in touch with the authors to request them.

E.1 Parameter Sensitivity Check 1: Migration Elasticity

We show here (1) the correlation between productivity and land tightness and (2) the gains in removing the inland-favoring policy with a lower bound of migration elasticity $\epsilon = 1$.

Figure E1: Correlation between Productivity and Land Tightness ($\epsilon = 1$)

(a) By Prefecture Group (b) By Individual Prefecture

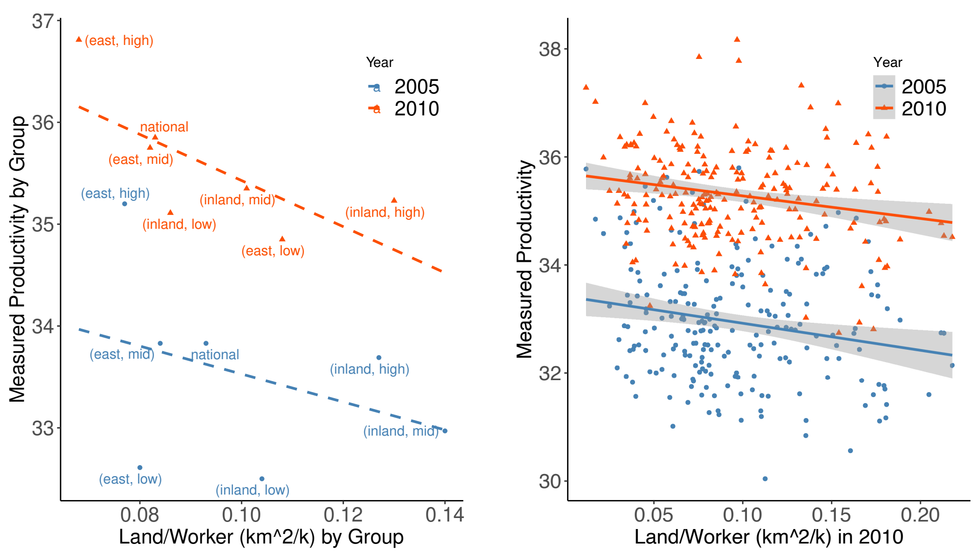
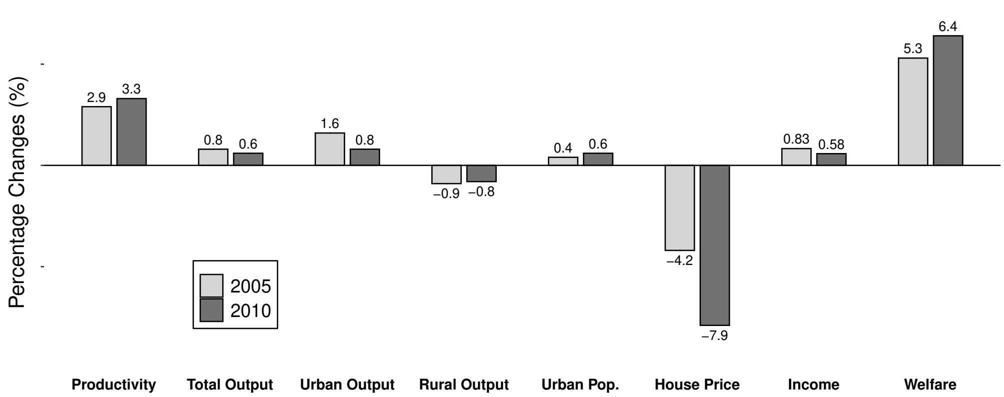


Figure E2: Aggregate Effects of Removing Inland-favoring Land Policy ($\epsilon = 1$)



E.2 Parameter Sensitivity Check 2: Skill Substitution Elasticity

We show here (1) the correlation between productivity and land tightness and (2) the gains in removing the inland-favoring policy with an upper bound of elasticity of substitution between H/L-skills $\sigma = 4$ as suggested by Bils, Kaymak, and Wu (2022).

Figure E3: Correlation between Productivity and Land Tightness ($\sigma = 4$)

(a) By Prefecture Group (b) By Individual Prefecture

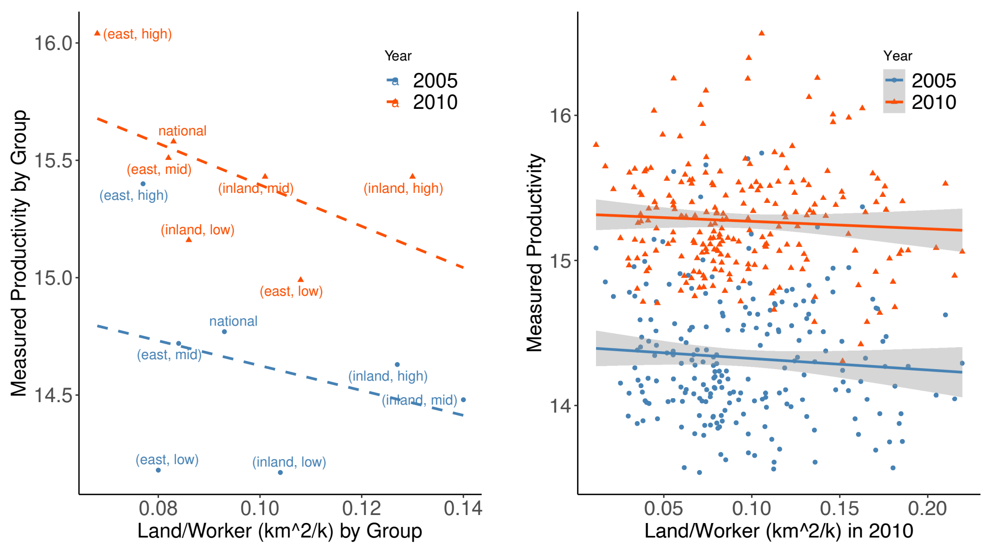
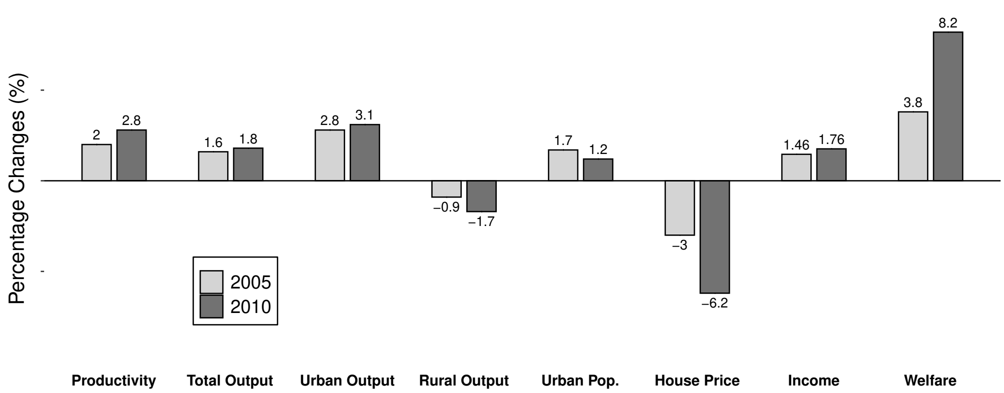


Figure E4: Aggregate Effects of Removing Inland-favoring Land Policy ($\sigma = 4$)



E.3 Parameter Sensitivity Check 3: Agglomeration Elasticity

We show here (1) the correlation between productivity and land tightness and (2) the gains in removing the inland-favoring policy with no agglomeration effect $\gamma = 0$.

Figure E5: Correlation between Productivity and Land Tightness ($\gamma = 0$)

(a) By Prefecture Group (b) By Individual Prefecture

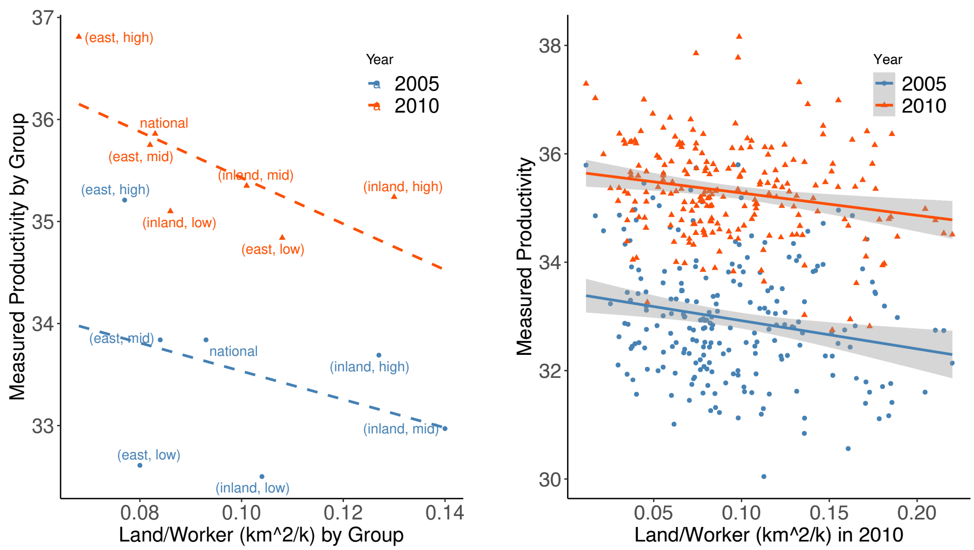
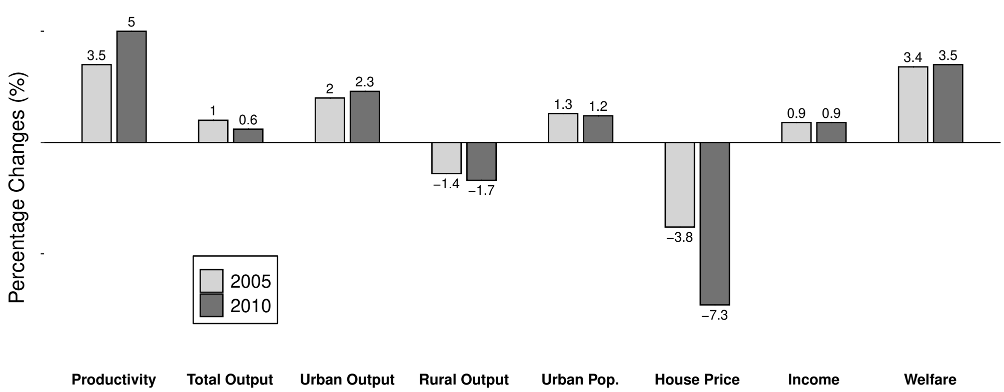


Figure E6: Aggregate Effects of Removing Inland-favoring Land Policy ($\gamma = 0$)



E.4 Data Inputs Sensitivity Check 1: Purged Wage Measures

We show here (1) the correlation between productivity and land tightness and (2) the gains in removing the inland-favoring policy with the purged wage following Fajgelbaum and Gaubert (2020) as our wage data inputs for both years.

Figure E7: Correlation between Productivity and Land Tightness (Purged Wage)

(a) By Prefecture Group (b) By Individual Prefecture

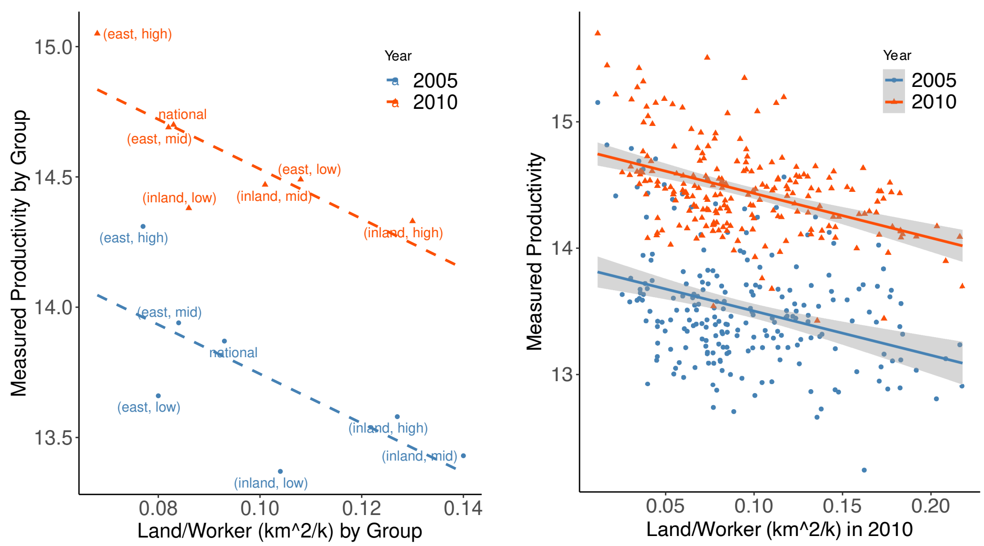
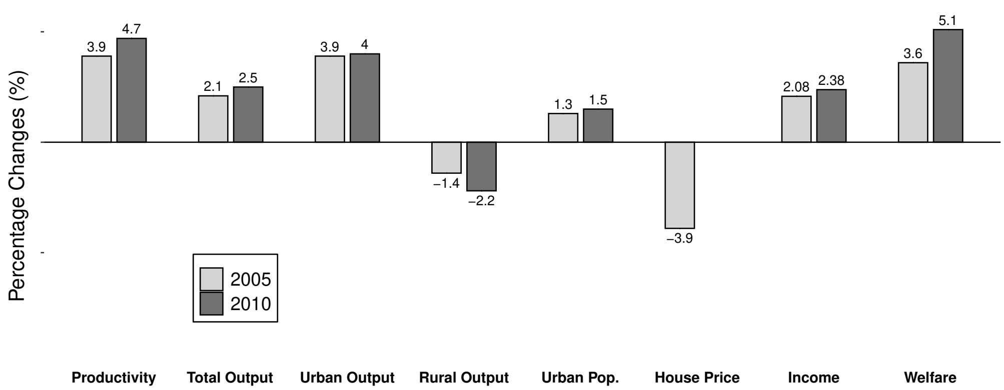


Figure E8: Aggregate Effects of Removing Inland-favoring Land Policy (Purged Wage)



E.5 Data Inputs Sensitivity Check 2: Imputed Land Quotas

We show here (1) the correlation between productivity and land tightness and (2) the gains in removing the inland-favoring policy with the prefecture-level land quotas (imputed from the province-level land quotas) as the construction land supply in the model.

The effects of removing inland-favoring land policy are huge if we use the imputed prefecture-level land quotas since these unused land quotas are now used as actual land usage in the more productive East. These findings are consistent with Figure 3.

Figure E9: Correlation between Productivity and Land Tightness (Imputed Land Quotas)

(a) By Prefecture Group (b) By Individual Prefecture

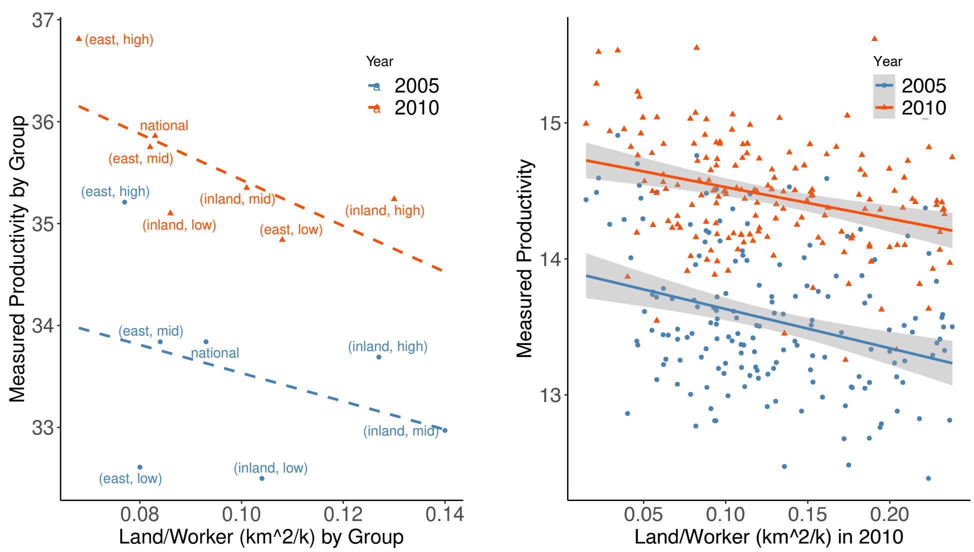
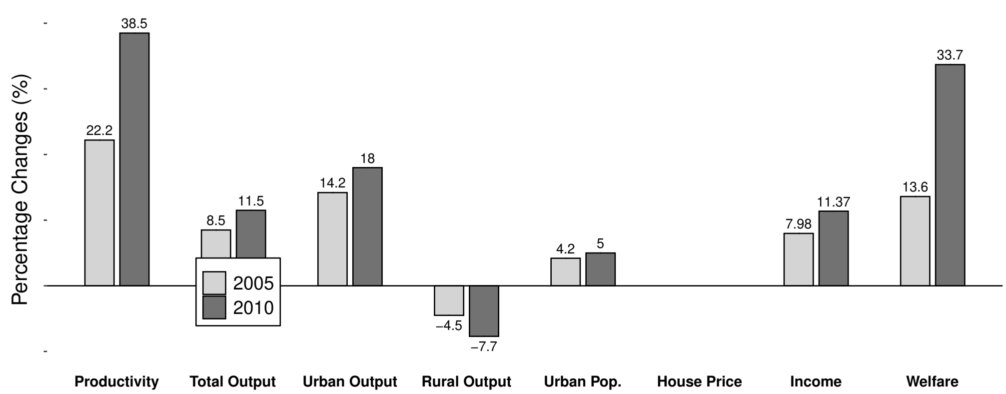


Figure E10: Aggregate Effects of Removing Inland-favoring Land Policy (Imputed Land Quotas)

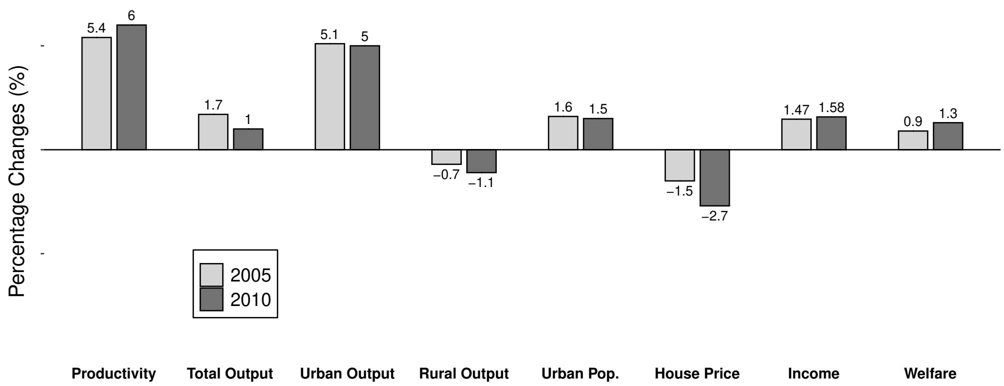


E.6 Counterfactual Sensitivity Check 1: Pre-2003 GDP Growth Trend

Here, we show the gains in removing the inland-favoring policy with the pre-2003 prefecture-level GDP growth (2003-2000) as g_{Lj} in the counterfactual land policy equation (18).

Figure E11: Aggregate Effects of Removing Inland-favoring Land Policy

(Pre-2003 GDP Growth Trend)

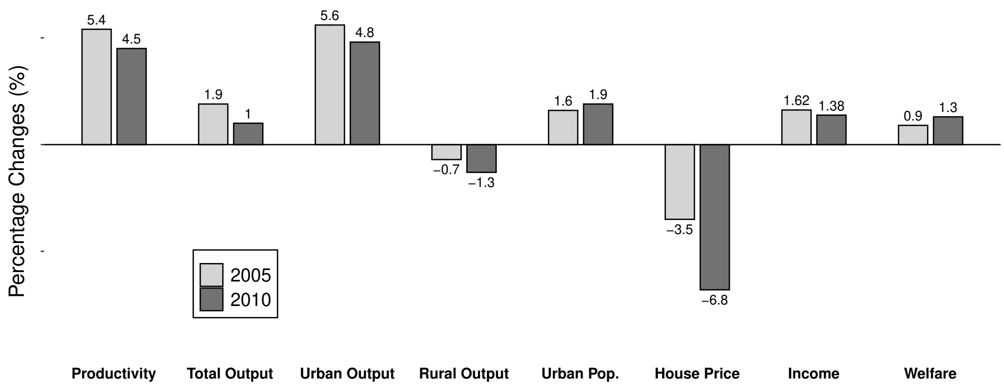


E.7 Counterfactual Sensitivity Check 2: Pre-2003 Migration Growth Trend

Here, we show the gains in removing the inland-favoring policy with pre-2003 prefecture-level migration inflow growth (2003-2000) as g_{Lj} in the counterfactual land policy equation (18).

Figure E12: Aggregate Effects of Removing Inland-favoring Land Policy

(Pre-2003 Migration Growth Trend)



E.8 Functional Sensitivity Check 1: Partially Elastic Floor Space Supply

Here, we show (1) the correlation between productivity and land tightness and (2) the gains in removing the inland-favoring policy when the construction intensity (plot ratio) is partially elastic to population density, which is

$$\phi_{ju} = \bar{\phi}_{ju} \times (D_{ju})^{\gamma_\phi} \tag{31}$$

where D_{ju} is the same urban density definition as in the agglomeration equation, and γ_ϕ is the elasticity. We try a range of γ_ϕ up to 0.10, and the effects of removing inland favoring policy get stronger with larger γ_ϕ.

Figure E13: Correlation between Productivity and Land Tightness ($\gamma_\phi = 0.10$)

(a) By Prefecture Group (b) By Individual Prefecture

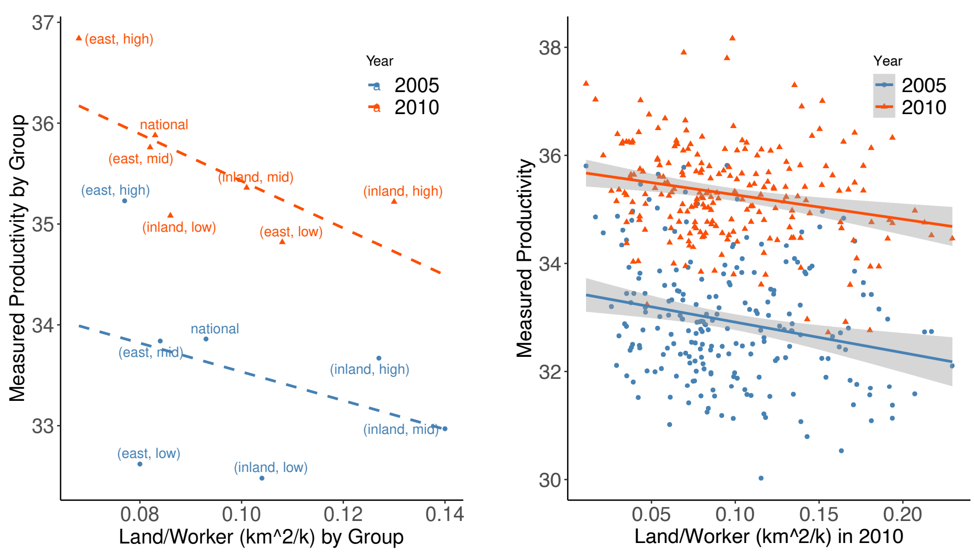
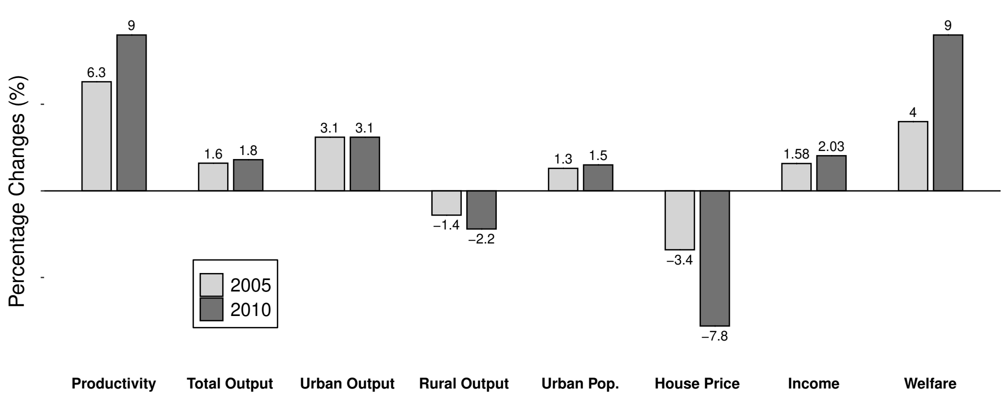


Figure E14: Aggregate Effects of Removing Inland-favoring Land Policy ($\gamma_\phi = 0.10$)



E.9 Functional Sensitivity Check 2: Additional Congestion Effects

Here, we show (1) the correlation between productivity and land tightness and (2) the gains in removing the inland-favoring policy when there are additional congestion effects in migration costs to population density, which is

$$\tau^s_{in,ju} = \bar{\tau}^s_{in,ju} \times (D_{ju})^{\gamma_\tau} \tag{32}$$

where D_{ju} is the same urban density definition as in the agglomeration equation, and γ_τ is the elasticity. We try a range of γ_τ up to 0.15 as in Allen and Donaldson (2020).

Figure E15: Correlation between Productivity and Land Tightness ($\gamma_\tau = 0.15$)

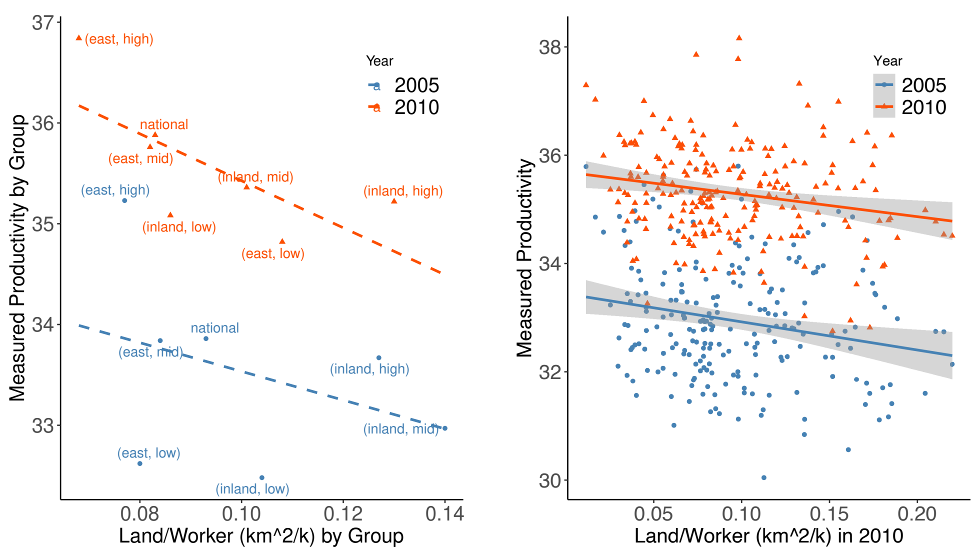
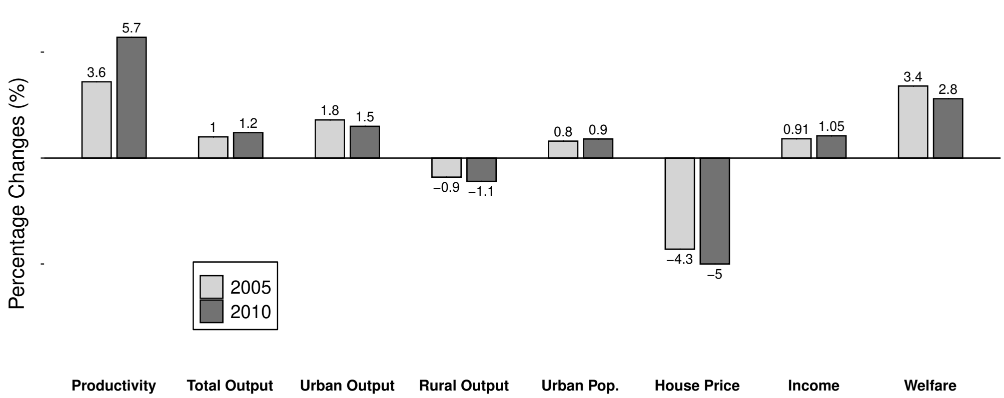


Figure E16: Aggregate Effects of Removing Inland-favoring Land Policy ($\gamma_\tau = 0.15$)



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