APPENDIX A: ADDITIONAL TABLES

Table A1. *List of industries and the corresponding industry classifications*

JSIC code	Industries based on Japan Standard Industrial Classification (JSIC)	Industries based on the classification of the input–output table of the Chubu region
E	Construction	Construction
F-12	Manufacture of food	Food
F-13	Manufacture of beverages, tobacco, and feed	
F-14	Manufacture of textile mill products	Textile
F-15	Manufacture of apparel and other finished products	
F-16	Manufacture of lumber and wood products	Lumber
F-17	Manufacture of furniture and fixtures	Furniture
F-18	Manufacture of pulp, paper, and paper products	Pulp and paper
F-19	Printing and allied industries	Printing
F-20	Manufacture of chemical and allied products	Chemical
F-21	Manufacture of petroleum and coal products	Petroleum and coal
F-22	Manufacture of plastic products	Plastic
F-23	Manufacture of rubber products	Rubber
F-24	Manufacture of leather tanning, leather products	Leather
F-25	Manufacture of ceramic, stone, and clay products	Ceramic
F-26	Manufacture of iron and steel	Iron and steel
F-27	Manufacture of non-ferrous metals and products	Non-ferrous metals
F-28	Manufacture of fabricated metal	Fabricated metal
F-29	Manufacture of general machinery	General machinery
F-30	Manufacture of electrical machinery	Electrical
F-31	Manufacture of transportation equipment	Transportation
F-32	Manufacture of precision instruments and	Precision
G	Electricity, gas, heat supply, and water	Utilities
H	Transport	Transport
I	Wholesale and retail trade	Wholesale and retail
J	Finance and insurance	Finance and insurance
K	Real estate	Real estate
L	Services	Information and communications
		Education and research
		Medical, health care and welfare
		Business services
		Personal services
		Public services

Note: The industry codes are based on the JSIC as of 1994.

Table A2. *Significant local Moran statistics for the centre of growth clusters*

Regional Industry	Local spatial statistics and associations based on the extensive spatial weights		Local spatial statistics and associations based on the geographical spatial weights	
The centre of the significant HH growth cluster:				
Toyota-shi in West Mikawa				
Food		n.s.	**0.024**	**HH**
Textile		n.s.	**0.156**	**HH**
Plastic	0.300	HH	**0.126**	**HH**
Rubber	**0.130**	**HH**	**0.021**	**HH**
Ceramic	0.015	HH	**0.010**	**HH**
Fabricated Metals	0.218	HH	**0.191**	**HH**
General Machinery	0.287	HH	**0.198**	**HH**
Electrical Machinery	−0.035	LH	**−0.017**	**LH**
Transportation	**1.739**	**HH**	**0.406**	**HH**
Construction	0.034	HH	**0.023**	**HH**
Wholesale and retail	**0.358**	**HH**	**0.163**	**HH**
Finance and insurance	0.059	HH	**0.076**	**HH**
Real Estate		n.s.	**0.009**	**HH**
Transport	0.211	HH	**0.213**	**HH**
Education and research	**−0.023**	**LH**	**−0.006**	**LH**
Medical	−0.186	LH	**−0.050**	**LH**
Public Services	0.021	HH	**0.021**	**HH**
Business Services	0.323	HH	**0.484**	**HH**
Personal Services		n.s.	**−0.023**	**LH**
Okazaki-shi in West Mikawa				
Food		n.s.	**0.076**	**HH**
Textile		n.s.	**−0.040**	**LH**
Furniture		n.s.	0.023	HH
Chemical	0.050	HH	**0.037**	**HH**
Plastic	0.027	HH	**0.011**	**HH**
Rubber	**−0.019**	**LH**	**−0.003**	**LH**
Ceramic	0.033	HH	**0.020**	**HH**
Fabricated Metals	0.092	HH	**0.070**	**HH**
General Machinery	0.182	HH	**0.142**	**HH**
Electrical Machinery	0.097	HH	**0.054**	**HH**
Transportation	**1.352**	**HH**	0.260	HH
Construction		n.s.	**0.118**	**HH**
Utilities	**0.008**	**HH**	**0.007**	**HH**
Wholesale and retail	−0.188	LH	**−0.113**	**LH**
Finance and insurance			**0.023**	**HH**
Real Estate		n.s.	**0.026**	**HH**
Transport	0.091	HH	**0.095**	**HH**
Education and research	**0.095**	**HH**	**0.022**	**HH**
Medical		n.s.	**0.017**	**HH**
Public Services			**0.024**	**HH**
Business Services	0.110	HH	**0.129**	**HH**
Personal Services		n.s.	**−0.010**	**LH**

Note: n.s. – Not significant. The significant values even at the 5% Bonferroni bound are shown in **bold**.

APPENDIX B: ESTIMATES OF OBSERVATIONS FOR ESDA

The error-component model employed is:

$$y(r,i,t) = comp(r) + comp(i) + comp(r,i) + comp(t) + comp(i,t) + comp(r,t) + \varepsilon\ (r,i,t)$$

where:

$y(r,i,t)$: the average annual growth rate of employment in industry i in region r at time period t,

$comp(r)$: time invariant regional trend component that is shared by industry,

$comp(i)$: time invariant sectoral trend component that is shared by all regions,

$comp(r,i)$: time invariant effect that is specific to industry i in region r,

$comp(t)$: a pure time effect,

$comp(i,t)$: the interaction between a fixed industry and time effect,

$comp(r,t)$: the interaction between a fixed region and time effect,

$\varepsilon(r,i,t)$: an idiosyncratic disturbance that is orthogonal to all other effects.

The given dummy structure associated with each component is composed of terms with perfect collinearity, and is unidentified unless a sufficient number of restrictions are imposed. Here the following restrictions are imposed, taking the respective sample means as a reference point (GREEN and SEAKS, 1991; MARIMON and ZILLIBOTTI, 1998):

$$\begin{cases} \sum_r comp(r) = 0, \\ \sum_t comp(t) = 0, \\ \sum_r comp(r,i) = 0,\ \forall i = 1, \cdots N_i\ , \\ \sum_i comp(r,i) = 0,\ \forall r = 1, \cdots N_r\ , \\ \sum_i comp(i,t) = 0,\ \forall t = 1, \cdots N_t\ , \\ \sum_t comp(i,t) = 0,\ \forall i = 1, \cdots N_i\ , \\ \sum_r comp(r,t) = 0,\ \forall t = 1, \cdots N_t\ , \\ \sum_t comp(r,t) = 0,\ \forall r = 1, \cdots N_r. \end{cases}$$

A set of $2N_r + 2N_i + 2N_t + 2$ restrictions, of which all but three restrictions are independent, guarantees the precise identification. Furthermore, imposing the above restrictions makes it possible to disentangle the dependence of $y(r,i,t)$ on the orthogonal components of each effect.

The absolute changes in growth rates of the small regional sectors tend to be considerably larger than those in the large sectors, and this results in an inherent heteroscedasticity problem in the ordinary least squares estimation. To address this issue, the estimation model is weighted by a factor given by the employment of each regional industry divided by aggregate employment in all industries at time period t. This weight also reflects their respective importance for aggregate employment (SUEDEKUM and BLIEN, 2005).

The (weighted) long-term growth across regional industries $y(r,i)$ is captured by the

following components, which are not affected by the industry-mix effect or any time- specific effects:

$$y(r,i) \;=\; comp(r) \;+\; comp(r,i)$$

The estimated values of $y(r,i)$ are used as the observations for ESDA.

APPENDIX C: GLOBAL AND LOCAL STATISTICS ON SPATIAL ASSOCIATIONS

The global spatial association for industry i's adjusted long-term growth in region r, y_{ri}, can be formally captured by using the following extended version of Moran's I:

$$I(d,f) = \frac{\sum_r \sum_i \sum_s \sum_j [\, w^*_{ri,sj}(d,f)](y_{ri} - \bar{y})(y_{sj} - \bar{y})}{\sum_r \sum_i (y_{ri} - \bar{y})^2}$$

where $w^*_{ri,sj}(d,f)$ denotes the element of the row-standardized extensive spatial weight matrix. Consequently, the expected Moran's I value can be given by $\mathrm{E}(I) = -1/(N_r N_i - 1)$.

The local spatial associations of the adjusted long-term industrial growth are measured with the following extended version of the local Moran statistic:

$$I_{ri}(d,f) = \frac{y_{ri} - \bar{y}}{m_1} \sum_s \sum_j [\, w^*_{ri,sj}(d,f)](y_{sj} - \bar{y})$$

where:

$$m_1 = \sum_r \sum_i \frac{(y_{ri} - \bar{y})^2}{N_r N_i}$$

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