Journal of COMPARATIVE ECONOMICS

Journal of Comparative Economics 32 (2004) 148–164

www.elsevier.com/locate/jce

Limited linkages from growth engines and regional disparities in China

Xiaolan Fu

Centre for Business Research, Judge Institute of Management, University of Cambridge, Cambridge CB2 1AG, UK

Received 12 August 2002; revised 15 October 2003

Fu, Xiaolan—Limited linkages from growth engines and regional disparities in China

Pronounced disparities in income and economic opportunities exist between the coastal and the inland regions of China. This paper explores the proposition that regional disparities in China are relatively ultimately to the structure of exports and foreign direct investment, which results in limited linkages from the growth engines. The spillover and migration effects of exports and FDI on regional inequalities are investigated. The emphasis on FDI-driven, labor-intensive, processing-type exports in the coastal regions has attracted relatively mobile and efficient resources from the inland regions but it has offered only limited growth linkages to those regions. This reallocation of resources has exacerbated the backwardness of the inland regions.

Journal of Comparative Economics **32** (1) (2004) 148–164. Centre for Business Research, Judge Institute of Management, University of Cambridge, Cambridge CB2 1AG, UK.

JEL classification: F43; J31; O15; O18; R11

1. Introduction

Pronounced disparities in income and economic opportunities between the coastal and inland regions of China are well documented in the literature. Factors responsible for these regional inequalities include preferential government policies, favorable geographical location, and superior infrastructure facilities in the coastal regions. Another factor contributing to the observed increase in regional disparities in China is insufficient linkages from important growth engines. This paper explores the proposition that regional

E-mail address: xf205@cam.ac.uk.

0147-5967/$ – see front matter
doi:10.1016/j.jce.2003.10.004

disparities in China are related intimately to the structure of exports and foreign direct investment (FDI), which results in limited linkages from these growth engines to inland regions. After embarking upon economic reforms in 1978, the Chinese government has been opening up the economy gradually to foreign trade and investment. In 1988, the government introduced a coastal regions' development strategy and the two-ends outside policy,[1] both of which encourage processing trade in order to exploit China's comparative advantage in abundant cheap labor. Export-oriented FDI was encouraged by fiscal and financial incentives, e.g., tax holidays and tax-rebates for exports. As a result, exports of foreign-invested enterprises (FIEs) and exports due to processing trade have increased rapidly in the coastal regions.

Accompanying the rapid growth of exports and FDI concurrent with domestic reforms, the Chinese economy has experienced impressive growth. Real GDP per capita increased from RMB792 to RMB3631 in 1990 constant prices during the period 1978 to 1999. However, this growth has not been balanced across regions; disparities developed during the 1990s as Table 1 indicates. On average, the coastal regions registered relatively higher growth than the inland provinces following the reforms and into the 1990s.[2] Although the inland regions experienced growth similar to that of the coastal regions during the 1980s, these regions fell considerably behind their coastal counterparts during the 1990s when real GDP per capita increased by only 95 percent in the inland regions but by 144 percent in the coastal regions. In fact, GDP per capita in purchasing power terms in the coastal regions began to catch up with that of the Southeast Asian emerging economies, e.g., Malaysia, Philippines, Indonesia and Thailand, in the early 1990s and even surpassed that of these countries in 1996.[3] Regional income inequality in China, measured in terms of real GDP per capita, grew at a rate of 3 percent per year in the 1990s. In 1999, the average GDP per capita in the coastal regions, measured using 1990 constant prices, was RMB5204, while the same figure in the inland regions was only RMB2497. GINI indices for the 29 provinces, municipalities and autonomous regions indicate similar results.[4]

[1] "Two-ends outside" refers to both the sources of production material and the markets of final products being outside the domestic market.

[2] The coastal regions refer to the three municipalities, Beijing, Tianjin and Shanghai, and the provinces located by the coast, namely Hebei, Liaoning, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Guangxi provinces. Hainan province is excluded because of incomplete data. The remaining non-coastal provinces are referred to as inland regions. The names of all included provinces in the coastal and inland regions appear in Table 1.

[3] The coastal regions of China and the four Southeast Asian economies, i.e., Indonesia, Malaysia, Philippines and Thailand, converged over the 1990s at an annual rate of 0.002 percent. The rate of convergence is estimated from the equation $(1/T)\log(y_{i,t+T}/y_{i,t}) = \alpha - \beta\log(y_{i,t}) + \varepsilon_{i,t}$, where $y_{i,t}$ is the per capita income in region i at the beginning of the interval, T is the length of the interval, $Y_{i,t+T}$ is the per capita income in country i at the end of the period, and β is the annual rate of convergence. If $\beta > 0$, the data exhibits absolute β convergence.

[4] The GINI index by regions is estimated as

$$G = \frac{1}{2n^2\mu}\sum_{j=1}^{m}\sum_{k=1}^{m} n_j n_k |y_j - y_k|,$$

where n is the total number of people, μ is the average income equal to total income divided by total population, m is the number of regions, n_j is the number of individuals in region j, and y_j is the income per capita in region j. The estimated GINI indices are 0.218, 0.252, 0.225 and 0.276 for 1952, 1978, 1990 and 1999, respectively.

Table 1
Real GDP per capita of coastal and inland regions

Regions	Real GDPPC (yuan at 1990 constant prices)				% Change			
	1952	1978	1990	1999	1952–78	1978–99	1978–90	1990–99
Coastal								
Beijing	462	2807	4881	9960	507	255	74	104
Tianjin	813	2524	3621	8017	210	218	43	121
Shanghai	1186	5436	5910	15,459	358	184	9	162
Liaoning	593	1480	2698	5062	150	242	82	88
Hebei	340	792	1465	3479	133	339	85	137
Jiangsu	356	936	2016	5352	163	472	115	165
Zhejiang	305	720	2122	6041	136	739	195	185
Fujian	277	594	1767	5418	114	812	197	207
Shandong	248	688	1815	4353	178	533	164	140
Guangdong	275	799	2395	5886	191	637	200	146
Guangxi	182	490	1066	2082	169	325	118	95
Average	347	1018	2132	5204	193	411	109	144
Inland								
Shanxi	316	794	1493	2372	152	199	88	59
Inner Mongo	471	690	1478	2685	47	289	114	82
Jilin	416	829	1746	3182	99	284	111	82
Heilongjiang	636	1227	2028	3844	93	213	65	90
Anhui	212	531	1182	2362	150	345	123	100
Jiangxi	310	601	1110	2339	94	289	85	111
Henan	226	505	1091	2456	124	387	116	125
Hubei	245	722	1556	3269	195	353	115	110
Hunan	234	622	1228	2562	166	312	97	109
Sichuan	182	551	1105	2234	202	306	101	102
Guizhou	158	381	810	1242	141	226	113	53
Yunnan	190	492	1224	2234	158	354	149	83
Shaanxi	231	640	1241	2058	177	222	94	66
Gansu	340	757	1099	1851	123	144	45	68
Qinghai	275	931	1558	2340	239	151	67	50
Ningxia	343	805	1393	2245	135	179	73	61
Xinjiang	452	681	1799	3247	51	377	164	80
Average	255	637	1280	2497	149	292	101	95
National average	294	792	1630	3631	169	358	106	123

Note. Growth that is higher than the national average appears as a shaded entry.
Source. SSB, 1999a, 2000.

The literature on regional disparities in China takes exports and FDI into consideration, e.g., Yao and Liu (1998), Yao and Zhang (2001a, 2001b), Sachs and Woo (1997), Zhang (2001), Sun and Parikh (2001), Demurger (2001) and Demurger et al. (2002). These studies find that both exports and FDI have a significant and positive impact on growth in coastal regions but not in inland regions. However, none of these papers accounts for the structure and the nature of exports and FDI or their impact on regional development. Yao and Zhang (2001b) attribute the income divergence between the Chinese regions to the slow process of economic spillovers from the growth center to the remote provinces. In our paper,

we investigate the factors that are responsible for this slow spillover process and place particular emphasis on exports and FDI, which are often regarded to be the engines of growth for the Chinese economy over the post-reform period. In addition, we examine the spillover and migration effects of these two engines.

The paper is organized as follows. Section 2 presents the theoretical framework for understanding the relationships between exports, linkages and regional income inequalities. Section 3 discusses the linkage and migration effects of China's exports and FDI. Section 4 provides empirical evidence. Section 5 concludes with policy implications.

2. Linkage and migration effects: a theoretical framework

The trade literature identifies several possible channels through which exports promote growth. These include vent-for-surplus effects, resource reallocation, increased specialization, market augmentation, capital accumulation, technology transfer and knowledge spillovers, *X*-efficiency effects, and financing of imports; see Myint (1955), Corden (1985), Grossman and Helpman (1991) and Baldwin and Caves (1997). Exports are regarded as the engine of growth for the recently settled regions in the 19th century by Nurkse (1961) and for the newly industrialized countries (NICs) by Krueger (1995). However, backward linkages are essential for successful export-led growth to insure that the export sector does not remain a separate enclave. Meier (1995) argues that an integrated process should be established to diffuse stimuli from the export sector to the rest of the economy. The strength of the spillover effects depends both on the extent of the linkages between the economy and the export sector and on the availability of the basic ingredients of development in the domestic economy, e.g., infrastructure facilities, ambitious entrepreneurs, and a threshold level of human capital (Greenaway and Sapsford, 1994). Furthermore, a high proportion of manufactures in total exports and an advanced production technology in the export sector are essential for generating strong spillover effects to the rest economy from technology transfer (Fosu, 1990). If these prerequisites are not met, exports may lead to economic growth in several regions only with weak spillover effects for the rest of the economy.

If export sector growth attracts a substantial number of immigrants from other regions, the impact of exports on regional income inequalities depends on the costs and benefits of migration for both the home and the host regions. For the home regions, emigrants may benefit their economy through two major channels. First, emigrants' remittances can help home regions to overcome capital constraints and support economic development.

The net welfare effect of immigration on the host region equals the immigration surplus net of the fiscal burden imposed by immigrants on native taxpayers (Borjas, 1995). The fiscal costs of immigration are likely to be low in developing countries having low welfare entitlements, while the positive impact of immigration on these host regions tends to be large due to the immigrants' contribution to sustainable growth. In a two-region model with a fixed supply of labor, wages will increase and returns to capital will decrease in the faster-growing region. However, immigration from the slower-growing region will relax the labor supply constraint in the faster-growing region and attenuate the decrease in the marginal productivity of capital so that faster growth is sustainable (Faini, 1996). Moreover, labor mobility across regions may interact with increasing returns to scale to create a tendency for firms and workers to cluster together, which intensifies agglomeration effects (Krugman, 1991 and Puga, 1999). Therefore, richer regions will experience faster growth due to increasing returns to scale and agglomeration effects. However, relatively

Table 2
Exports and FDI by regions, 1999

Regions	GDP	FDI, by 1999	Exports, 1999				
	% of total	% of total	% of total	EX/GDP (%)	Primary (%)	Processing % of total	Exports of FIEs % of total
Coastal							
Beijing	2.7	4.13	3.2	23.9	7.6		45
Tianjin	1.8	3.94	3.3	36.4	9.3	67	72
Shanghai	4.9	8.19	9.4	37.5	4.0	46	54
Hebei	5.1	4.16	4.2	16.1	26.16	19	
Liaoning	5.6	1.99	1.4	4.8	26.3		
Jiangsu	9.4	12.13	9.5	20.0	3.3	54	51
Zhejiang	6.5	3.11	7.0	21.1	11.4	24	25
Fujian	4.3	9.78	5.4	24.8	12.1	53	57
Shandong	9.4	5.9	6.3	13.2	22.8	53	
Guangdong	10.3	28.25	40.4	77.0	3.9	78	49
Guangxi	2.4	2.09	0.6	5.2	17.6	15	18
Coastal sum	62.4	83.7	90.7				
Coastal average				25.5	13.1		
Inland							
Shanxi	1.8	0.42	0.8	8.2	49.8		
Inner Mongolia	1.5	0.17	0.4	4.5	33.3		
Jilin	2.0	0.84	0.6	6.0	43		
Heilongjian	3.5	1.09	0.8	4.4	30.4		
Anhui	3.6	0.88	0.8	4.7	15.5		
Jiangxi	2.4	0.81	0.5	3.9	18		
Henan	5.6	1.22	0.6	2.2	17.-21		.

located in other regions are not produced by local firms but by firms in these six coastal provinces, which have been the growth engines of China since the reforms began.

Technology and knowledge spillovers are another channel through which exports and FDI may contribute to growth. The extent and quality of technology embodied in export-oriented FDI influence the strength of technology spillovers. On average, the level of technology embodied in FDI has been only two years ahead of the technology in place in China, according to survey results reported in Huang (2001). Although the technology level of FDI has increased since the mid-1990s when large multinational enterprises began investing in China, case studies in Beijing and Shenzhen by Wang (2000) report that technology advancement levels of foreign-invested firms are significantly correlated to the equity structures of these firms. High technology levels are usually found in wholly foreign-owned enterprises or joint ventures in which foreign partners hold majority equity shares. Advanced core technologies are often controlled by foreign investors in these firms. Therefore, technology spillovers from foreign investment to indigenous firms are limited. In a case study of China's largest car assembly joint venture, the Shanghai–Volkswagen Automotive Company Ltd, Nolan (2002) argues that, after more than a decade as a joint venture partner to Volkswagen, Shanghai Auto has no capability at all to compete as an independent carmaker. In the Chinese electronics industry, Hu and Jefferson (2002) find significant productivity depression rather than positive spillover effects of FDI on domestic firms.

The rapid growth of exports and FDI in the coastal regions has attracted substantial volumes of labor to migrate from inland regions to the coastal regions. Recent population census data indicate that there were about 22 million net migrants working in the twelve coastal provinces in 2000 (SSB, 2001).[5] Emigrants usually remit 20 to 50 percent of their income back home (World Bank, 1997), which raises rural household incomes. According to Li (2001), remittances accounted for about 4 percent of the total income of all households in the home regions in 1995. Out-migration has also increased the labor productivity of members remaining in their households because of resource reallocation. Therefore, some benefits accrue to home regions from emigration.

Most migrants are young and educated; the majority are aged between 15 and 35. The education level of migrants is higher than the average in the home regions, but nevertheless lower than that in the host regions. In 2000, about 60 percent of all migrants had 9 years of schooling or more, while the figure for the average rural population was only 43 percent (Hu, 2001). Therefore, the inland regions have lost relatively young and educated labor to emigration. Although China has abundant supplies of unskilled labor, this young and educated labor is not in surplus in the poor regions. In the poorer inland regions, the average education level of rural residents has actually decreased due at least partly to emigration. Hence, a shortage of educated working-aged labor has developed in some inland regions.

In addition, the wage earnings of emigrants prior to emigration are less than their private marginal product. In 1999, the average income of rural migrant households was 17 percent higher than that of rural non-migrant households (Hu, 2001). Hence, this surplus of output over average earnings, which accrued to home regions, is lost with emigration. Moreover,

[5] Migrants are defined as residents who left their *hukou* (household registration) places for more than half a year. This figure includes immigrants who come from within the province and from other provinces.

emigration increases income inequalities in backward regions, e.g., Sichuan, mainly due to the lack of mobility of workers in very low-income households (Li, 2001). The growth in inequalities in these poor regions may well, in turn, hamper economic growth. Therefore, emigration from the inland regions is not necessarily favorable to their development in the long-term. In fact, the costs may outweigh the benefits of emigration for the home regions.

In the host regions, immigrants do jobs that non-migrants will not or cannot do so that they are complements to non-migrant workers. As Knight and Song (1999) argue, the immigrants constitute an increasingly important group that meets the growth in demand for low-skilled labor in the coastal regions and, hence, enabled the coastal regions to sustain their rapid growth. In addition, the marginal product of migrants is more than three times their wage rate (Knight and Song, 1999). Therefore, the immigrants generate a significant surplus over their earnings; this surplus contributes to the welfare of the coastal host regions.

When and if the migrants return to their home regions depends on the attitudes of the migrants, the enterprises and the government (Knight et al., 1999). From the migrants' perspective, their social and cultural environment does not change fundamentally in the case of inter-regional migration. Hence, migrants find it easier to integrate into the society of the host region than into a foreign land. If access to health and education services for migrants and their children are similar to those for local residents in the host regions, and if wage and opportunity differentials between the two regions persist, migrants are unlikely to return. Therefore, widening income and opportunity inequalities between the two regional groups in China, together with the lack of infrastructure for returnees' career or business development in the inland regions, may lead to very little return migration. In addition, the unmarried status of most migrants in the coastal regions reduces the probability of return migration.

From the firms' perspective, employers of immigrants will try to stabilize migrant labor in order to recover their investment in training. Temporary migration will become economically inefficient as the migrant workers move up the job ladder. Therefore, more and more migrants will be induced to stay in the host regions and become urbanized. Finally, whether and when the migrants return also depends on the government's policy on migration. If government policy is designed only to encourage labor to migrate from the poorer inland regions to the richer coastal regions rather than to encourage a two-way movement of capital and labor, fewer migrants will return.

In summary, two significant propositions may be drawn from this analysis. First, exports in China have led to economic growth in the coastal regions, but not in the inland regions. FDI-funded processing-type exports generate only limited linkages and weak spillovers to the inland regions. As a corollary, these exports have aggravated regional income inequalities in China in the 1990s. Second, export-oriented FDI in labor-intensive industries in the coastal regions has induced labor in the inland regions to migrate to capital-rich coastal regions, which has enabled the coastal regions to sustain their growth. The effects of this migration on the growth in inland regions have been unfavorable on balance, although the contribution of remittances to the home regions cannot be ignored. As a corollary, this migration may have contributed to the increase in the income gap between the coastal and inland regions in the 1990s.

4. Empirical evidence

4.1. Econometric evidence of spillover effects

The first proposition and its corollary on exports, spillover effects and regional income inequalities can be tested statistically. Following Salvatore and Hatcher (1991) and Greenaway and Sapsford (1994), we specify a log-linear dynamic panel model as

$$y_{it} = \alpha + \varphi x_{it} + \beta l_{it} + \gamma k_{it} + \lambda y_{i,t-1} + \nu_{it}, \tag{1}$$

where i and t denote regions and time, respectively. The disturbance term, ν_{it}, varies across regions and time and has the usual properties. The dependent variable, y_{it}, is the real growth rate of GDP; the explanatory variables are the real growth rate of exports, x_{it}, the growth rate of labor, l_{it}, the growth rate of the capital stock, k_{it}, and $y_{i,t-1}$, which is the one year lag of y_{it}. We introduce exports into the production function explicitly for three reasons. First, the incentives associated with export orientation are likely to lead to higher total factor productivity because of economies of scale and competition effects. Second, exports are likely to alleviate serious foreign exchange constraints and thereby enable the country to import more advanced machinery and materials. Third, exports are likely to result in a higher rate of technological innovation and dynamic learning from abroad (Balasubramanyam et al., 1996). We include a lagged dependent variable, i.e., $y_{i,t-1}$, as an explanatory variable not only to take account of the dynamic process of growth, but also because the lagged dependent variable provides a proxy for many omitted variables (Nair-Reichert and Weinhold, 2001).

The spillover effects of coastal-region export growth on the growth of the inland regions is assessed by including a spillover effect variable, s, in the growth equation for inland regions. Demurger (2000) specifies the indicator of diffusion as the weighted average of neighboring provinces' values for the variable under consideration. Hence, we measure the spillover effects variable, s_{it}, for an inland province i as the weighted average of the export growth rates of coastal provinces adjusted by the geographical distances between these coastal provinces and that inland province. The following equation provides the calculation:

$$s_{it} = \sum w_{jt} \frac{x_{jt}}{d_{ij}}, \tag{2}$$

where w_{jt} is the share of exports of coastal province j in total exports of all the coastal provinces, x_{jt} is the export growth rate of coastal province j, and d_{ij} is the geographical distance between inland province i and coastal province j measured by the distance between their capital cities. Therefore, the modified growth equation for inland regions takes the form

$$y_{it} = \alpha + \varphi x_{it} + \beta l_{it} + \gamma k_{it} + \delta s_{it} + \lambda y_{i,t-1} + \nu_{it}. \tag{3}$$

We use a panel data set for the coastal and inland regions in China; the data are collected from the China Statistical Yearbook (SSB, 2000, 2001) and the Comprehensive Statistical Data and Materials on 50 Years of New China (SSB, 1999a). The growth rate in the number of employees is used to measure labor growth. Because of the difficulties associated with

measuring the capital stock in developing countries, we follow the practice common in empirical studies of approximating the rate of growth of capital stock by the share of

Table 4
Exports and growth: panel data estimation results

Independent variables	Inland regions						Coastal regions		
	Static	Static	Dynamic	Static	Static	Dynamic	Static	Static	Dynamic
x_{it}	0.021	0.000***	−0.002	0.003	0.028	0.007	0.106***	0.129***	0.032**
	(1.188)	(5.838)	(−0.117)	(0.141)	(0.934)	(0.380)	(2.895)	(2.771)	(2.165)
l_{it}	0.035	0.040	0.005	−0.011	0.010	0.038	0.130	0.089	−0.001
	(0.231)	(0.298)	(0.033)	(−0.074)	(0.095)	(0.272)	(0.764)	(0.533)	(−0.021)
k_{it}	0.082***	0.070***	0.037	0.082***	0.083***	0.052**	0.064***	0.067***	0.028
	(5.524)	(5.282)	(1.694)	(5.578)	(5.611)	(2.174)	(3.842)	(4.164)	(0.844)
s_{it}				0.076	0.032	0.023			
				(1.066)	(0.702)	(0.651)			
$y_{i,t-1}$			−0.089			−0.176			0.000
			(−1.759)			(−1.509)			(0.554)
Number of observations	144	144	128	144	144	128	99	99	88
Estimation method	FE	IV-FE	GMM	FE	IV-FE	GMM	FE	IV-FE	GMM
Adj. R-square	0.210	0.380	0.250	0.230	0.57	0.264	0.284	0.584	0.190
Hausman statistic									
(H_0: random effects)	25.7***			23.34***			8.98**		
Wu–Hausman (p-value)									
(H_0: exogeneity of x)	0.010		0.330	0.009		0.310	0.000		0.120

Notes. 1. The dependent variable is y_{it}. 2. The t-statistics are in parentheses.
** Significance at the 5% level.
*** Idem., 1%.

and the value of exports and inward FDI in these provinces. The estimated rank correlation coefficients are as high as 0.93 for the number of immigrants and the value of exports and 0.77 for the number of immigrants and the value of realized FDI. This result suggests that exports and FDI in labor-intensive industries have attracted labor to the capital-rich coastal regions. In Guangdong, the region that has attracted about 30 percent of total inward FDI in China, net migrants numbered around 12 million in 2000 (SSB, 2001).

Second, we test the proposition that migration and regional income inequalities are related in a log-linear panel data specification of the form

$$gap_{it} = \alpha + \beta mig_{it} + \chi str_{it} + \phi fdi_{it} + \mu_{it}, \tag{4}$$

where i and t denote regions and time respectively. The disturbance term, μ_{it}, varies across regions and time and has the usual properties. The dependent variable is the ratio of average GDP per capita of coastal provinces to that of inland province i, denoted gap_{it}. The explanatory variables are the ratio of the number of rural emigrants to total population in province i, denoted mig_{it}, a structural variable measured by the ratio of the number of urban employees to total employees in province i, denoted str_{it}, and the ratio of the average FDI in coastal provinces to that in inland province i, denoted fdi_{it}.

When people decide to leave their homeland and move to another region, this emigration depends on several economic and political factors. The income difference between the home region and the destination region is a major factor; hence, reverse causality from the income gap to the emigration ratio may be present. Therefore, we use a Wu–Hausman test to test for such endogeneity. One-year lagged values of gap_{it}, mig_{it} and other exogenous variables are used as instrumental variables. If endogeneity between the income gap and the emigration ratio is present, we use a two-stage fixed-effects model for estimation; otherwise, we use normal fixed-effects or random-effects models depending on the estimated Hausman statistics. The analysis is based on a panel of data for 16 of 19 inland regions of China during the period 1995 to 1998. Tibet and Qinghai are omitted due to lack of reliable data and data for Congqing are combined with those for Sichuan. The data are taken from various issues of the China Labor Statistical Yearbook (SSB, 1996–1999) and the Statistical Yearbook of China (SSB, 1996–1999).

Because the Wu–Hausman test indicates significant endogeneity between the income gap and the emigration ratio, the two-stage fixed-effects specification in Table 5 is preferred to the others. In addition, this specification controls for regional-specific effects. This is important because urbanization may reflect the level of economic development in the inland areas, while the inland provinces are themselves heterogeneous in terms of development level. However, we include the other estimation results to check for robustness. As Table 5 indicates, emigration exhibits a significant positive impact on the income gap between the coastal and the inland regions. A one percent increase in the share of emigrants in the total population will increase the per capita income gap by about 0.07 percent. This result suggests that migration of young and educated labor from the inland regions to the coastal regions contributes to the increasing income gap. However, the significant endogeneity between the income gap and the emigration ratio indicated by the Wu–Hausman statistics suggests a two-way causal relationship. Although migration has contributed to income inequality, income inequality has also induced more migration.

Table 5
The impact of emigration on the income gap between coastal and inland regions

Independent variables	Fixed effects		Random effects		2S-fixed effects	
	Coefficient	*t*-ratio	Coefficient	*t*-ratio	Coefficient	*t*-ratio
mig	0.018***	4.176	0.022***	3.039	0.071**	2.204
str	−0.181***	−4.971	−0.274***	−5.177	−0.189***	−7.563
fdi	0.025***	7.219	0.027***	3.297	0.017**	2.696
R-square	0.996		0.991		0.999	
Adj. *R*-square	0.994		0.990		0.999	
Lagrange multiplier		75.68***				
Hausman statistics (H_0: random effects)		14.6***				
Wu–Hausman (*p*-value) (H_0: exogeneity)		0.000				

Note. Dependent variable: *gap*.
** Significance at the 5% level.
*** Idem., 1%.

The relative FDI ratio also exhibits a significant positive impact on the income gap; it indicates that a one percent increase in the average FDI in coastal provinces relative to that in inland regions increases the income gap by about 0.02 percent. This result suggests that an increase in FDI in the coastal regions relative to the inland regions leads to a larger income gap between the regions. The estimated coefficient of the structural variable is negative and statistically significant; it indicates that a one percent increase in the ratio of the number of urban employees to the number of total employees reduces the income gap by 0.19 percent. This result suggests that urbanization in the inland regions reduces the income gap between coastal and inland regions. Finally, the movement of domestic capital may increase regional income inequalities because capital has been flowing from the poor inland regions to the fast-growing coastal regions since the reforms began. However, because we lack reliable data on the scale of inter-regional capital flows, we could not include this effect in our empirical model.

5. Conclusions

This paper investigates the spillover and migration effects of exports and FDI and estimates their impact on regional income inequalities in China. Exports are found to exert a significant positive impact on growth in the coastal regions, while the inland regions have not experienced similar growth-inducing effects from exports and FDI. The FDI-based labor-intensive processing-type exports in the coastal regions have attracted the relatively mobile and efficient resources from the inland regions, but have offered only limited growth linkages to these regions. Contrary to previous studies, e.g., Kanbur and Zhang (1999), we find evidence that emigration from the inland regions enlarges the income gap between the coastal and the inland regions. However, although the difference in FDI between the coastal and the inland regions widens the income gap, urbanization of the inland regions

serves to reduce regional income inequalities. On balance, exports and FDI have played an important role in increasing regional disparities in China.

Since FDI-based labor-intensive processing trade has grown rapidly in recent decades due to the globalization of production and the increasing liberalization of trade and FDI, our results suggest that any linkages between inland and coastal economic activity that

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