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Have Geese Flown to the Inland?

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The "flying geese" hypothesis predicts as labor cost surges in one economy, firms tend to move their investment to the less developed neighboring countries or regions to take advantage of lower wage rates. Using provincial savings and investment data, this paper investigates whether capital has flowed to the interior regions from the coast when massive domestic labor migrations to a large extent offset the pressure of labor cost in the coast. Evidence shows that "geese"(capital) have begun to fly to the inland since the late 1990s.

Keywords: China, Capital, Regional Inequality, and Flying Geese.

Introduction

In 1962, Kaname Akamatsu, a Japanese scholar, put forward a hypothesis that as shift in comparative advantage due to increasing wage rate, firms in more developed countries will move their manufacture production bases to the less developed countries nearby where capital is scarcer and labor is more abundant. He coined a term "flying geese" for this phenomena. In the recent East Asian economic history, the phase of flying geese lasts less than two decades. The New Industrializing Economies (South Korea, The Taiwan, Singapore and Hong Kong) absorbed most of the Japanese investment in the 1960s and 1970s when the production cost in Japan rocketed up (Kasahara, 2004; Ozawa, 2005). In less than two decades, the geese started to fly to the coastal China.

Since opening up in the late 1970s, China has attracted tremendous foreign direct investment (FDI) and production technologies from developed countries, in particular from the neighboring East Asian economies, including Japan, Hong Kong, Korea, and Taiwan. China has become the largest receipt of FDI in the world. Most of this ends up in companies in the coastal regions. Not only has the coastal area attracted most FDI, but also domestic investment from the interior regions (Zhang and Zhang, 2003). One key assumption of the "flying geese" hypothesis is that labor mobility is restricted across economies. Although there are still some barriers on labor migrations, China's labor market has become much more integrated over the past several decades (de Brauw et al., 2002; Zhang and Tan, 2007). To a large extent, the massive migration from the interior regions to the coastal area would help lower labor cost, therefore weakening the key

assumption of the "flying geese" hypothesis and delaying the timing of or preempting capital inflow to interior regions.

A few studies indicate that China's capital market has become more fragmented from the 1980s to the 1990s. Boyreau-Debray and Wei (2003) use two methods to test the degree of capital market fragmentation based on provincial data for 1978–2000. The first approach is to examine the correlation of local savings and investment. In an integrated capital market the correlation should be low. The second approach, drawing from the risk-sharing literature, is to check the degree of consumption smoothing across time and space, which is an important indicator of capital mobility and asset market completeness. Both approaches show that the capital has not flown to places with higher returns. Zhang and Tan (2007) estimate a production function using provincial and sectoral data, showing that China's labor market has become more integrated while capital market has become fragmented. In other words, the inland regions were underinvested as marked by the higher marginal returns to capital in inland than in coastal regions. These two studies suggest that flying geese (capital inflow) had not happened up to 2000.

However, in the past several years, there are numerous media reports of labor shortage in the coastal areas. The surging labor cost may force firms to move some of their production to interior regions as predicted by the "flying geese" hypothesis. In this paper, we aim to use more recent data to empirically investigate whether "flying geese" have occurred or not within an economy ---- China.

In this paper, we first provide some descriptive evidence on the evolving patterns of capital flows between the coastal and inland regions. Then we use more rigorous

econometric analysis to test whether the direction of capital flow has reversed from the coast to the inland as a favorable destination.

The Evolving Spatial Patterns of Capital Flow: Descriptive Evidence

China's regional inequality has widened tremendously since the 1980s. As shown in Table 1, although both regions grow fast, the annual growth rate in per capita GDP and consumption from 1985 to 2005 in the coastal areas is over one percentage higher than that in inland areas. Considering the increasing integration in the product and labor markets, the flow of capital from the inland to the coastal has been regarded as one key explanatory factor to the observed widening regional inequality (Zhang and Tan, 2007). Therefore, understanding the patterns of capital flow is helpful for discerning the trend of China's regional inequality.

Table 2 presents the coastal-inland ratios in several key variables: GDP, population, foreign direct investment (FDI), fixed capital formation, savings, capital/population, capital/GDP, and capital/savings.[1] Although the coast has a small proportion of population than the inland, its GDP share has been larger and on a rise. For every dollar of FDI in interior regions, at least six dollars have gone to the coast. It is apparent that foreign investment has favored the coastal region. The ratio has slightly come down from 7.57 in 1986 to 6.31 in 2004. Given that the total amount of FDI has increased significantly in the study period, the FDI in the inland has gone up despite with a smaller share. Are FDI portfolio rebalanced toward the inland?

[1] See Appendix for data sources.

The fifth and sixth columns present the coastal-inland ratios in fixed capital formation and savings. The coastal regions have enjoyed a larger share of both investment in fixed assets and savings. The above two ratios has widened from 1.26 to 1.56 and 1.58 over the period of 1985-2004, respectively. It is worthy noting that the gaps have leveled off since the late 1990s.

It is well known that the booming economy in the coast has attracted massive migrant workers from the inland since the start of economy reforms. Migration helps lower the capital/labor ratio in the coastal areas, reducing the pressure of capital outflow. The next column compares per capita fixed capital formation between the two regions. On average each person in the coast possesses about twice amount of investment in fixed asset comparing to that in the inland. Apparently, the coastal economy is more capital intensive. From 1985 to 2005, per capita capital has increased by 20% while total capital formation has gone up by 31%. The difference in the growth rate is largely due to large scale of coastal-bound migration. Once again, per capita fixed capital formation seems to be leveling off since the late 1990s.

Next, we compare the coastal-inland difference in fixed capital formation by controlling for GDP size and savings. The last two columns present the ratio of share of fixed capital formation in GDP and in savings between the coastal and inland regions. As graphed in Figure 1, most of the capital/GDP ratio and capital/saving ratio are greater than one, meaning that for most of period the coast has attracted a larger share of capital relative to its GDP size and savings. In other words, for most of the period of 1985-2005, capital has been moved outward from interior regions to coastal regions. Since 1999, the ratios have dropped over time. By 2005, the capital/saving ratio has declined to 0.95,

meaning that the share of investment in the inland has outgrown its corresponding share of savings. In other words, in 2005, it is the inland region which had a net capital inflow. If the trend continues, we will notice more "flying geese" (capital) to the interior regions.

In summary, the descriptive evidence indicates a trend of capital flow to coastal areas since the 1980s but it has leveled off since the late 1990s, if not reversed.

Empirical Test on the Directions of Capital Flow

Having presented illustrative evidence on the possible reversal trend of capital flow between coastal and inland regions, in this section we conduct a more rigorous econometric test on the possible switch in the direction of capital flow. Conceptually, capital flow can be defined as:

Capital inflow if $S_i<K_i$;

Capital outflow if $S_i>K_i$.

Where S_i and K_i are savings and fixed capital formation in province i. In reality, total savings may not equal to total capital at the national level every year probably due to difference in aggregate fiscal transfers and foreign direct investment from year to year. We use the following econometric strategy to test whether the coastal region has experienced a regime switch from capital inflow to outflow:

$$\frac{K_{it}}{S_{it}} = \boldsymbol{\alpha}\mathbf{Y}_t + \beta_{-T} * D + \beta_{+T} * D + \varepsilon_{it},$$

Where the left hand side is capital/saving ratio in year t and at province i; $\mathbf{Y_t}$ is a vector of year dummies to capture the time-specific policies such as the aggregate fiscal transfers and debt, while $\boldsymbol{\alpha}$ is the corresponding vector of coefficients; D is a dummy variable for the coastal region; T is defined as the year of regime switch; β_{-T} and β_{+T} are the coefficient for the dummy variable when $t<T$ and $t\geq T$, respectively.

Table 3 present the estimated varying coefficients for β_{-T} and β_{+T} in regressions with T from 1995 to 2001. In addition, the p-value for testing the difference between β_{-T} and β_{+T} is presented in the second to the last column. The last column lists the Akaike's information criterion (AIC) values. The smaller the value, the better is the fit of the regression. As the switch point T increases from 1996 to 2001, the coefficient for the coastal dummy variable (β_{-T}) prior to T declines from significant 0.043 in 1996 to insignificant 0.033. In contrast, the coefficient (β_{+T}) for the period after the turning point T is negative and has changed from -0.011 to -0.060 by 2001, which is marginally significant with a p-value of 0.105.

The p-value for testing the difference in the varying coefficient for the coastal variable between two time periods is insignificant in 1995 and 1996 but turns into significant since 1998. It reaches the smallest value when T is set to 1998. So it is the AIC value. This suggests that by 1998 the trend of net capital inflow to the coastal region might have stopped. Since 2000, the trend may have reserved in favor of inland regions, as indicated by the marginally significant negative coefficient (β_{+T}) when T is set to 2000 and 2001.

Overall, the econometric tests provide further support on the descriptive evidence regarding the patterns of capital flow between coastal and inland regions in the last section. In the first two decades of economic reform since the late 1970s, coastal areas attracted most investment, the so called “flying geese to the east”. Since the late 1990s, the inland region has become a more popular destination of capital flow. “Geese” fly not only across countries but also within an economy. If the increasing investment in interior regions mainly target productivity-generating sectors instead of rent-seeking sectors, then it is good news for China’s regional inequality which may start to fall as well.

Appendix Data

Fixed capital formation and GDP data at the provincial level come from *The Gross Domestic Product of China* 1978-1995 (CNBS, 1997) and *Data of Gross Domestic Product of China* 1996-2002 (CNBS, 2004) and *China Statistical Yearbooks* (CNBS, 2003-2005).

Foreign direct investment is from various issues of *China Statistics Yearbooks*.

The provincial data on savings from 1986 to 1996 are taken from various issues of *China Financial Statistical Yearbooks*. The data from 1997 to 2000 are from provincial statistical yearbooks and *Comprehensive Statistical Data and Materials on 50 Years of New China* (CNBS, 1999). The data from 2001 to 2004 are from *China Statistical Yearbook* (CNBS).

The data on total population prior to 1999 come from *Comprehensive Statistical Data and Materials on 50 Years of New China* (CNBS, 1999), and those for 1999 onwards come from *China Statistical Yearbook*.

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Table 1 Economic Growth in Inland and Coastal Regions from 1985 to 2005

Region	Year	Per capita GDP	Per capita consumption
Inland	1985	625	310
	2005	3,497	1,046
	Annual growth rate (%)	9.0	6.3
Coast	1985	1,069	396
	2005	7,857	1,766
	Annual growth rate (%)	10.5	7.8

Note: The units of per capita GDP and consumption are in 1985 yuan. The data are from various issues of *China Statistical Yearbooks*.

Table 2 Coastal-inland Ratios in Key Variables

Year	GDP	population	fdi	capital	savings	capital/pop	capital/GDP	capital/saving
1978	1.16	0.70		0.93		1.34	0.80	
1979	1.13	0.70		0.93		1.33	0.82	
1980	1.16	0.70		1.07		1.54	0.93	
1981	1.15	0.70		1.07		1.53	0.93	
1982	1.17	0.70		1.08		1.54	0.92	
1983	1.15	0.70		1.01		1.43	0.88	
1984	1.18	0.70		1.11		1.57	0.94	
1985	1.20	0.70	13.24	1.19		1.69	0.99	
1986	1.20	0.70	7.35	1.26	1.26	1.79	1.05	1.00
1987	1.22	0.70	8.69	1.29	1.26	1.84	1.06	1.02
1988	1.26	0.70	7.42	1.31	1.27	1.87	1.04	1.03
1989	1.27	0.70	11.83	1.35	1.31	1.92	1.06	1.03
1990	1.23	0.70	16.04	1.29	1.34	1.84	1.05	0.97
1991	1.29	0.70	16.38	1.38	1.36	1.96	1.07	1.01
1992	1.36	0.70	9.35	1.53	1.41	2.18	1.12	1.09
1993	1.46	0.70	6.81	1.66	1.45	2.36	1.14	1.14
1994	1.49	0.70	7.15	1.67	1.50	2.38	1.12	1.11
1995	1.48	0.70	7.03	1.69	1.53	2.41	1.14	1.10
1996	1.38	0.70	7.36	1.62	1.52	2.32	1.18	1.07
1997	1.38	0.70	6.21	1.56	1.61	2.24	1.13	0.97
1998	1.45	0.70	6.82	1.52	1.59	2.17	1.05	0.95
1999	1.43	0.70	7.17	1.57	1.56	2.24	1.10	1.01
2000	1.47	0.74	7.19	1.60	1.49	2.15	1.09	1.07
2001	1.48	0.71	7.22	1.56	1.54	2.18	1.05	1.01
2002	1.51	0.72	6.95	1.55	1.57	2.17	1.03	0.99
2003	1.54	0.72	6.42	1.58	1.59	2.21	1.03	1.00
2004	1.53	0.72	6.11	1.56	1.58	2.17	1.02	0.99
2005	1.65	0.77		1.56		2.03	0.95	

Note: See the appendix for data sources. FDI and savings for 2005 will not be available until the publication of the *China Statistical Yearbook 2007*. Tibet is excluded due to lack of saving data in some years.

Table 3 Testing the Switch in Directions of Capital Flow

	1995	1996	1997	1998	1999	2000	2001
Coefficient for the coastal dummy variable							
Before time T (β_{-T})	0.036	0.043*	0.043*	0.041*	0.036*	0.033	0.030
	(0.025)	(0.024)	(0.024)	(0.022)	(0.021)	(0.020)	(0.019)
Since time T (β_{+T})	-0.011	-0.024	-0.024	-0.039	-0.043	-0.049	-0.060
	(0.024)	(0.025)	(0.025)	(0.028)	(0.030)	(0.033)	(0.037)
p-value for the difference in two periods	0.331	0.128	0.066	0.066	0.078	0.091	0.097
AIC	-132.6	-134.5	-135.8	-135.9	-135.6	-135.4	-135.8

Note: The symbol * stands for a significance level at 10%. For AIC, the smaller the value, the better is the fit of the regression.

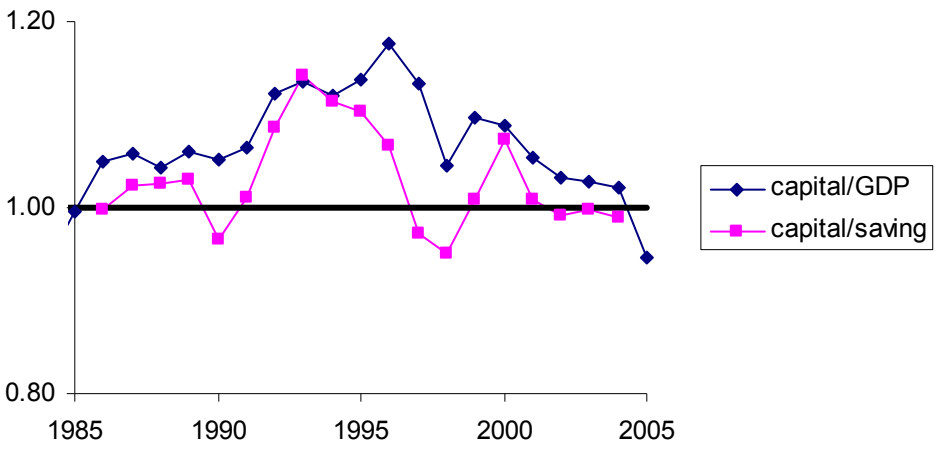

Figure 1 Ratio of Fixed Capital Formulation in GDP and in Savings between Coastal and Inland Regions

Source: Author's calculation.