

Political Economy of FDI and Economic Growth in China: A Longitudinal Test at Provincial Level

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This study asks two central questions: (1) how we can explain the dynamic relationships between economic growth and FDI distributions at national and regional levels; (2) what determines Chinese rapid economic growth and unprecedented volume of FDI at national and regional levels. Two empirical models are developed to test the two main hypotheses of FDI-led growth model and growth-driven FDI model based on time-series and cross-provincial data of 174 observations (29 provinces for 6 years, 1995-2000). The results confirm main findings of earlier studies on the links between FDI and economic growth in China, but disapprove the impact of human capital, historical, and geographical conditions on FDI distributions in the regions during the research period.

INTRODUCTION

For more than two decades since 1978, the Chinese economy has grown at a rate of nearly 10 percent annually, the highest in the world during that period. This “Chinese miracle” was achieved along with China’s market oriented transition and integration into the global economy through large foreign capital inflows. Since the mid 1980s when China further opened its coastal region and then the central and western regions to Foreign Direct Investment (FDI), the impact of FDI on the transitional economy has been a topic of debate among policymakers and students of developmental politics. A large volume of studies have attempted to explain the effects of FDI on domestic capital formation, productive efficiency, job creation, accumulation of social capital, social modernization, and economic growth.¹ These

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studies confirm the positive role played by FDI in Chinese economic and social development and in the transition from a centrally planned to a market economy.

Even during the 1997 Asian economic crisis, China attracted foreign investors and showed its capacity to grow and sustain the economy.² At US \$45.3 billion in 1997, China was the world's second-largest recipient of FDI after the United States.³ According to the World Bank estimate, China accounted for 40% of the US \$110 billion FDI flow into the less developed countries (LDCs), while Mexico ranked second accounted for only US \$6.4 billion in 1996. And also, with more than US \$145 billion in its treasury in December 1998, China ranked second to Japan in the world in terms of foreign exchange reserves. If US \$89.6 billion of foreign exchange reserves in Hong Kong is included, US \$234.6 billion of reserves in China are marginally higher than the US \$215.9 billion in Japan.⁴

There is, however, still a lack of systematic study on the impact of FDI on China's economic performance at sub-national level, especially (1) the relationship between FDI and GDP growth at the regional level, (2) the direction of causation of the relationship, (3) the determinants of FDI distributions in various provinces and regions, and (4) the similarity and differences of economic and social conditions for FDI at national and regional levels, although provinces and regions are frequently noted within the debate on the role of FDI. The key issue is: if FDI creates and/or encourages economic growth at the national level, how one can explain the variations of FDI distribution and economic growth at the regional level.

This paper aims to study the dynamic relationship between FDI flows and economic performance, and examine determinants of economic growth and FDI distributions not only at the national level but also at the regional level for the period 1995-2000, using time-series and cross-provincial level data.⁵ It analyzes the nature and extent of the regional economic impact of FDI and the determinants of regional economic growth. This enables researchers to explain how the inflows of FDI in China has been linked to regional economic growth, regions' integration into the global economy, and socioeconomic variations in regions. Hence, this study attempts to answer several specific questions. What explains the extent of uneven FDI distributions at the regional level? How is regional economic growth affected by external influences as well as internal factors? How is the regional differentiation of economic growth compared to the national trend of the "Chinese miracle?" What determines Chinese rapid economic growth and unprecedented volume of FDI at national and regional levels during the research period.

The remainder of the article is structured as follows. First, we will survey, in general, the relationships between FDI and economic growth in literature, and introduce some empirical findings, in particular, relating to developing countries in Asia and Latin America. Second, we will examine major factors determining the uneven regional distribution of FDI and regional development patterns in China. Third, based on the earlier research and findings, we will develop two empirical models (FDI-led growth model and Growth-driven FDI model) to analyze

determinants of economic growth and FDI distributions at the national and regional levels. Data, proposed hypotheses and econometric methodology are also discussed. Finally, we will analyze and interpret the empirical results and suggest some areas for further studies.

NEXUS OF FDI AND ECONOMIC GROWTH

The impact of FDI on economic growth is one of the most controversial topics in the literature of international political economy. According to the modernization hypothesis, FDI promotes economic growth by providing external capital and through growth, spreads the benefits throughout the economy. It is the presence, rather than the origin of investment, that is considered to be important, because FDI usually brings with it advanced technology, and better management and organization. Hence, in the modernization hypothesis, FDI is, in fact, the most critical engine for economic growth in developing countries.⁶

Contrary to this modernization hypothesis, the dependency hypothesis, while admitting a possible short-term positive impact of the flow of FDI on economic growth, contends that there is deleterious long-term impact of FDI on economic growth, as reflected in the negative correlation between the stock of FDI and growth rate. In the short run, an increase in FDI enables higher investment and consumption and thus contributes to economic growth. However, as FDI accumulates and foreign projects take hold, there will be adverse effects on the rest of the economy that reduce economic growth. This is due to the intervening mechanisms of dependency, in particular, "decapitalization" and "disarticulation."⁷

In addition, some have argued that political, social and cultural factors play crucial roles in determining the growth performance of LDCs.⁸ Others have argued that the impact of FDI on economic growth might vary across countries because of different stages of development.⁹

However, recent theories of economic growth emphasize the importance of knowledge and information as a determinant of economic growth. Empirical measures of knowledge generally focus on skill levels and R&D (Research and Development) activity. But since almost all of the R&D activity takes place in the advanced economies of the OECD (Organizations for Economic Co-operation and Development), the LDCs cannot catch up with more developed countries, unless LDCs can gain access to the new technology. The three most common channels of technology transfer include: (1) foreign direct investment; (2) international licensing agreements; and (3) international trade. A growing number of studies have found a statistical relationship between FDI inflows and economic growth in the host countries.¹⁰

The empirical studies on economic growth of LDCs generally seek to establish a statistical relationship between FDI inflows and a measure of output growth and/or domestic investment.¹¹ Such work is of interest because it attempts to capture the net effects of FDI in the economies as a whole. Negative effects may

stem from various distortions in an economy. For example, foreign investors may offer profit opportunities without improving efficiency of the host economies. These may occur, if protectionist trade policies encourage transnational corporations (TNCs) to enter a country purely to obtain market share and monopolistic power.¹² Or, governments may attract FDI to strategic industries by offering investment incentives that offset any benefit the TNC may generate. Even FDI that is not motivated by these objectives may create negative spillovers, which affect aggregate output. Some empirical studies have found a significant relation between FDI flows and economic growth in various samples of Asian and Latin American LDCs.

Applying a model of endogenous economic growth, Borensztein *et. al.* find that FDI stimulated the long-term expansion of per capita GDP.¹³ The contribution of FDI is likely to come from two effects. The more important one seems to be that the productivity of FDI is higher than that of domestic investment.¹⁴ This is because FDI promotes transmission of foreign advanced technology and management skills into the host economies, generates factors that can stimulate the host country's economic efficiency and competition, and provides the host economies with increased access to world markets. However, it appears that the higher productivity occurs only when the host country has a minimum threshold stock of human capital, because there is an essential interaction between FDI/advanced technology and human capital in the host economy. The second consequence explains that FDI has the effect of increasing total domestic investment by more than one-for-one. On the one hand, estimates of the "crowding in phenomenon" put the total increase in investment at between 1.5 and 2.3 times the increase in the flow of FDI.¹⁵ FDI may stimulate more domestic investment (crowding in) if there is complementarity in production between FDI and domestic industries. In this case, the foreign investors may develop backward and forward linkages, perhaps even assisting partners in the host country with technology and finance while holding out the prospects of a stable market for their output.¹⁶

On the other hand, FDI may "crowd out" equal amounts of investment by domestic entities through aggressive competition in local product of financial markets, especially in cases where domestic industries are already financially constrained. Reports by UNCTAD suggest that there are marked regional differences among the developing countries with FDI tending to crowd in investment in much of Asia and crowding it out in Latin America. There are also industrial differences. Mining and other raw material extraction projects, for example, generate a little foreign direct investment because the FDI creates few domestic linkages.¹⁷ The increase in total capital accumulation occurs in addition to the positive impact of FDI on technological progress. Overall, in developing countries with an average stock of human capital, 1 percent increase in the FDI-GDP ratio is associated with a 0.4-0.7 percent rise in long-term GDP per capita growth.¹⁸

In his comparative study of the impact of FDI on economic growth in 10 East Asian countries, Zhang finds that there are more diverse relationships between FDI flows and long-term growth. He starts with two problems in the previous approaches

of Borenztein *et.al.* (1998), Kamin and Wood (1997) and Lim (1983). First, all presume *a priori* that FDI responds to or causes economic growth and do not consider the possibility of feedback effects and a long-run equilibrium relationship between FDI and economic growth. Second, there is evidence of considerable parametric variation across countries in regard to estimates of growth equations and FDI. In effect the methodology involves the imposition of common structure, thus masking these differences. He concludes that FDI flows stimulated the long-run growth of China, Indonesia, Hong Kong, Japan and Taiwan, and the short-run growth of Singapore, while there is no relationship between FDI and economic growth in South Korea and the Philippines.¹⁹

There is another aspect of the impact of FDI on host countries' economy. Examining the impact of different types of capital flows in 18 Asian and Latin American countries, Gruben and McLeod argue that the most pronounced positive impact of FDI is on economic growth and domestic savings.²⁰ Their findings suggest that FDI has less influence in Asia than in Latin America presumably because domestic savings play a larger role in the Asian economies. However, they failed to explain why and how FDI led to increased domestic savings in sampling Asian countries. Indeed, developmental theorists have not provided a theoretical explanation for the impact of FDI on domestic savings, or vice versa.

However, earlier studies failed to clarify the causation of the relationships between economic growth and FDI inflows. Most studies assumed that FDI inflows stimulate economic growth (the FDI-led growth hypothesis). Such a relationship might be expected because FDI can enhance those factors which usually play an important role in promoting economic development: investment, technical progress, and, in the new growth theory, R&D, the accumulation of human capital and various positive externalities. However, the causation may go in the other direction: rapid economic growth attracts FDI (the growth-driven FDI hypothesis). This hypothesis suggests that economic growth is likely to improve the domestic investment environment and increase opportunity for boosting profits. Accordingly, the growth makes it possible for TNCs to exploit economies of scale. In the longer term, growth-associated improvements in human capital, labor productivity and infrastructure are likely to increase the marginal return of capital and, thus, the demand for domestic and foreign investment.²¹ Improved economic performance should also generate profits and encourage their reinvestment. The reinvested earnings can be a critical component of FDI. Evidence of a growth-driven FDI relationship has been found in Malaysia and Thailand.²² Another possibility is a two-way causal process, in which FDI and growth have a reciprocal causal relationship. Evidence of such a "virtuous circle" has been found in China and Indonesia.²³

However, there appear to be insufficient studies on the dynamic relationship between FDI and economic performance at regional levels, and such a relationship varies from region to region due to regional, social, economic and political dissimilarities. In the distinct regional contexts, the relationships between FDI

inflows and GDP growth are expected to be different. More specifically, in the case of China, three regions can be categorized: the coastal, the central and the western, and each region consists of a number of provinces.²⁴ They are distinguished not only by geographic features and distance from the coast, but also by social and economic characteristics such as the level of economic development, the degree of economic openness, industrial structure, factor endowments, and economic policies. Indeed, the demarcation of three regions has been a widely used framework for analysis of regional development in China as well as the policy framework of the Chinese government for regional development.²⁵

Although some earlier studies have considered the regions as a prime unit of analysis for their studies on the relationships between FDI and economic growth,²⁶ there is still a lack of study on the relationships at the regional and provincial levels. The formal analysis, developed in this study, is based on provincial rather than national data. An aggregate study of economic growth in China as a whole may not identify the dynamic relationships between FDI and economic growth at provincial level and may misinterpret the consequences of uneven FDI distributions across China's provinces and cities. Analysts of the Chinese economy generally concur with the view that provinces are an appropriate basis for Chinese macro studies. This study, therefore, attempts to fill the gap by investigating the relationships between regional FDI distributions and regional economic growth using the provincial-level data for the period of 1995 to 2000.²⁷

REGIONAL UNEVEN DISTRIBUTIONS OF FDI

An important characteristic of FDI in China is its uneven distribution in the three regions. Since 1979, FDI has been overwhelmingly located in the coastal region, with 91 percent and 87 percent flowing into the coastal region in the 1980s and the 1990s, respectively.²⁸ Although FDI gradually spread over the vast inland regions in the 1990s, its regional distribution pattern changed only slightly. Given its proximity to Hong Kong both geographically and culturally, Guangdong province is the single largest recipient of foreign investment.²⁹ It cumulatively received FDI of US \$63.2 billion from 1979 to 1997, accounting for nearly one-third of the total FDI in China.³⁰ Although the share in the total FDI of the central region doubled from 4 percent in the 1980s to 9 percent in the 1990s, the share of the western region displayed a declining trend, down from 4.9 to 3.3 percent over the same period.³¹ This indicates the slow progress in the regional spread of FDI from the coastal region to the inland regions.

There are three major factors underlying the uneven regional distribution of FDI and regional economic development in China. First, the open-door policy has been primarily oriented to the coastal region since 1979. The Chinese government initiated the open-door policy by establishing four SEZs in Guangdong and Fujian provinces where special policies favorable to foreign investors were implemented.³² For example, TNCs were entitled to preferential tax treatment including a two-year

tax holiday and a three-year tax deduction of 50 percent. In the middle 1980s, the government opened 14 coastal cities and granted them the right to implement policies similar to the SEZs. Since then, there was a significant shift in FDI from the SEZs to other open coastal areas. In the late 1980s and early 1990s, the Chinese government extended the “open region” to the “three deltas” - the Pearl River Delta (PRD), the Minnan Delta (MD) and the Yangzi River Delta (YRD), the Hainan province, and the Pudong New Area in Shanghai.

Second, the coastal region has advantages over the inland regions both in terms of the economic development conditions and the investment environment.³³ According to the theory of international production, location-specific factors affect the regional distribution of foreign investment. These location-specific factors include infrastructure, especially transportation and telecommunication facilities, the level of industrialization, industrial structure and networks, economic policies, labor skills, and the legal and institutional framework. Traditionally, the coastal region was well developed in comparison to the inland regions. Major economic centers, transport facilities, and universities were located in the coastal region. Social and economic infrastructure was better developed in the coastal region than in the inland regions. Such a regional divergence in development was a salient feature of, and a reason for, the dualistic structure of “old China” before the communists took power in 1949. Since 1979 the open policy and economic reforms have been pursued with a particular spatial dimension, with priority on the coastal region. In addition, the Chinese government committed a huge amount of capital in the region to improve the infrastructure and investment environment. Such coast-biased regional policies have further reinforced the existing regional disparity in economic growth conditions and the investment environment.³⁴

Third, the historical development of SEZs has shown a highly uneven pattern of FDI distributions. In the late 1970s and the early 1980s, the government established SEZs in Shenzhen, Zhuhai and Shantou in Guangdong Province and Xiamen in Fujian Province, and designated the entire province of Hainan as a SEZ. In 1984, China further opened 14 coastal cities to foreign investment: Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang and Beihai. In the 1990s, China's opening to the outside world was extended to its border areas, areas along the Yangtze River and inland areas, and the government decided to turn Hainan Island into China's biggest SEZ and to enlarge the other four SEZs.³⁵

The key feature of this expansion was to turn the coastal areas into the open economic zones, which includes YRD, PRD, Xiamen-Zhangzhou-Quanzhou Triangle (XZQT) in south Fujian, Shandong Peninsula, Liaodong Peninsula (Liaoning Province), Hebei and Guangxi. After south coastal China opened up and achieved remarkable success, China decided to focus on the YRD, which was the most developed area in China historically. In 1990, by building Pudong, a whole new section of Shanghai, the YRD SEZ was launched. It aimed to use the YRD as the

engine of Chinese development. It would play a leading role in industrial upgrade and technological innovations, the integration with the international economy, and the building of a contemporary market economic system. The Chinese government has poured a large amount of resources into the development of the YRD SEZ. In the Eighth Five-Year Plan (1991–1995), the Chinese government invested nearly \$5 billion in basic construction in Pudong alone, including building bridges, freeways, port docks, electricity and water supplies, and so forth. Another \$20 billion in 1996–2000 was invested to build a new airport, subway, tunnel, and communication centers. Pudong was considered as an “SEZ among SEZs” and enjoyed even more privileges than other major SEZs, such as allowing the development of large, tariff-free zones, and branches of foreign financial institutions.³⁶ As Peng describes, now “chain-reaction dynamism” is occurring in China.³⁷ The Yangtze River Valley and the Bohai-Yellow Sea (BYS) areas are the areas that are rising after the resurgence of the YRD. The BYS area includes two cities, Beijing, Tianjin and three provinces, Hebei, Shandong and Liaoning.³⁸ After getting strong footholds in South and East China, overseas Chinese capital is making inroads into Central and North China, followed by Western investment.

Today the BYS SEZ’s conditions for integration into the global economy and development have significantly improved. As China’s opening up gradually spreads from the south to the north, the Chinese hope that the BYZ SEZ will become the third “growth center” in the Chinese economy after South China and the YRD SEZ. The BYS SEZ has relatively rich natural resources and good conditions for agriculture. Its transportation facilities are relatively reliable. Its level of industrialization and quality of education are also far above average in China. If the BYS SEZ also succeeds, the geo-economic chain reaction is expected to continue and may gradually revitalize sub-regional integration in Northeast Asia.³⁹

Table 1. Changes of Proportions of China’s total FDI in Major SEZs

Name of the SEZs	1990	1993	1996	1998	2000
South China	51.3%	40.7%	36.7%	37.4%	36.5%
Yangtze River Delta	9.9	25.7	25.5	25.4	25.2
Bohai-Yellow Sea	21.4	19.6	21.3	22.2	23.1
Northeast China	8.7	6.5	6.6	6.9	6.7

Source: calculated from *China Statistical Yearbook*, various years.

The data in Table 1 show that the South and Coastal SEZ reached its limits in the early 1990s, while the YRD SEZ rose dramatically. The BYS SEZ showed some momentum in the past few years, while Northeast China remained stagnant. Together these factors shaped different business environments and resulted in different returns on capital and risk levels for foreign investments in the regions. According to the transaction cost theory (Williamson 1981), special policies favorable to TNCs, advanced physical, social facilities and liberalized market plans can help investors

reduce information needs and costs, and improve the efficiency of production and marketing. As a result, foreign investments in China show very uneven distributional patterns.

In the next section, we will discuss two dependent variables (GDP growth and the level of FDI) and their determinants, explanatory variables, and construct two empirical models (FDI-led growth model and growth-driven FDI model) to test hypotheses generated from the literature review.

Data, Models and Hypotheses

The regional scope covered by this study includes 29 provinces, municipalities and autonomous cities (simplified as “provinces” hereafter) in China, with 12 provinces located in the coastal, 9 provinces in the central, and 8 provinces in the western region. The data set for the provinces in China over the period from 1995 to 2000 are utilized in this study. They are mainly from the *China Statistical Yearbooks* (SSB 1996-2001). Chinese statistics are internally consistent and accurate enough for empirical work.⁴⁰ The models used in this study can be applied to the whole sample consisting of 174 observations that are drawn from 29 provinces for 6 years.

Since the major part of this study focuses on investigating the relationships between regional FDI distributions and regional economic growth and determinants of economic growth and FDI at regional levels, the first step is to identify a suitable basis for grouping China’s provinces into regions. Two bases are considered: the first is a functional classification based on the value of FDI hosted by particular regions; the second is geographical one reflecting different stages of regional development. The first alternative classifies provinces into high, medium and low FDI regions, HFDI, MFDI and LFDI respectively. This is a regional codification adopted by Zhang and Felmingham.⁴¹ According to them, the HFDI provinces received FDI more than \$500 million annually, while the MFDI received FDI between \$100 to 500 million and the LFDI had FDI less than \$100 million per annum. The second basis, suggested by Sun, is to divide China’s provinces into the following geographical regions: the most developed (the coastal region), the less developed (the central), and the western regions.⁴² The geographical basis is preferred for two reasons: the demarcation of HFDI, MFDI and LFDI is arbitrary and the results of the analysis may be affected by changing these arbitrary benchmarks; the second is that the geographical basis reflects adequately the varying degrees of development across China and conforms to earlier provincial studies. This paper, hence, will apply the geographical basis for classification. The coastal region includes 12 provinces and provincial-level cities: Guangdong, Fujian, Jiangsu, Zhejiang, Shanghai, Shandong, Hebei, Beijing, Tianjin, Liaoning, Guangxi and Hainan. The central (inland) region contains 9 provinces: Heilongjiang, Jilin, Shanxi, Henan, Hubei, Hunan, Jiangxi, Anhui and Inner Mongolia. The western (far inland) region is comprised of 8 provinces: Shaanxi, Sichuan, Qinghai, Yunnan, Guizhou, Gansu, Ningxia and Xinjiang. Chongqing, currently a metropolitan city in China, is excluded from this

study, because it was a part of Sichuan province before achieving the status directly under the jurisdiction of the central government in 1997. Tibet is not included in this study, since it has no FDI record during the research period.

To analyze determinants of economic growth and FDI distributions at provincial level, this study develops two models based on the literature. In the theories of international political economy, there are two complementary hypotheses: the FDI-led growth hypothesis and the growth-driven FDI hypothesis. On the one hand, the FDI-led growth hypothesis is derived from a neoclassical aggregate production function comprising global economic integration.⁴³ It is well documented that FDI inflows and international trade, especially exports, may increase competition, permit the realization of comparative advantage, enable countries to purchase goods from abroad, and provide opportunities to gain access to new technology as well as managerial skills.⁴⁴ FDI inflows consequently cause not only the acceleration of global economic integration but also economic growth and development in host countries. On the other hand, the growth-driven FDI hypothesis contends that rapid economic growth is the most important factor to attract FDI, and it postulates a positive relationship between FDI, GDP growth and GDP per capita.⁴⁵ The higher the growth rate of GDP, the greater the incentives for FDI.⁴⁶

Based on the approach by Zhang (1999), Gruben and McLeod (1998), Borensztein *et al* (1998) and Wang and Swain (1995), the proposed hypotheses for the relationships between FDI and economic development over the research period can be modeled as two linear equations that include human capital (*hc*), regional dummy (*rd*) and the time trend (*t*) as explanatory variables. The resulting empirical models are as follows:

$$(1) \text{gdp}_t = \beta_0 + \text{fdi}_t\beta_1 + \text{hc}_t\beta_2 + \text{rd}_t\beta_3 + t_t\beta_4 + \varepsilon_t$$

$$(2) \text{fdi}_t = \beta_5 + \text{gdp}_t\beta_6 + \text{hc}_t\beta_7 + \text{rd}_t\beta_8 + t_t\beta_9 + \varepsilon_t$$

where *gdp* is the real value of gross domestic product (100 million RMB); *fdi* is the real value of actually used foreign direct investment (US \$ million) and ε is a stochastic disturbance term. Ideally, the same currency unit would be used for the two economic variables.⁴⁷ It is, however, inappropriate to convert the US \$ value of FDI into the Chinese currency unit, because movements of the *renminbi* (RMB) value against foreign currencies were subject to a sharp and irregular pattern associated with artificial policy changes by the Chinese government.⁴⁸

The rationale for including *hc*, *rd* and *t* in the equations is explained as follows. For the human capital variable (*hc*), Benhabib and Spiegel find that a higher level of human capital raises the responsiveness of the growth rate to the initial income gap. Hence, human capital stock plays an important role as an absorptive capacity for a country which has a larger gap in income per worker, and is technologically lagging behind.⁴⁹ Borensztein *et al* also find that there is a strong

complementary effect between FDI and human capital: FDI contributes to economic growth only when the host country has a minimum threshold stock of human capital. For the human capital variable, this study uses the proportional ratio of general population attending in regular secondary and secondary special schools.⁵⁰ According to Barro and Lee, the measure of secondary educational attainment as the proxy of human capital is the most significant correlation with economic growth and social development.⁵¹

The regional dummy variable (rd) is expected to capture special geographical and historical reasons for provinces with high economic growth. The relationship between FDI and economic performance varies across different geographic regions due to the differences in regional, social, economic and political conditions. In different regional contexts, the impact of FDI on GDP growth is expected to be different. Based on the typology used by Sun,⁵² three regions are distinguished not only by geographic features and distance from the coast, but also by social and economic characteristics such as the level of economic development, the degree of economic openness, industrial structure, factor endowments, and economic policies. Moreover, the demarcation of the three geographical regions is a widely used framework for analysis of regional development in China as well as for the policy framework by the Chinese government for regional development. Therefore, the three regions are appropriate units for cross-provincial spatial analysis of the relationships between FDI and economic growth. In this study, provinces in the coastal region take the value of one, while those in central and western regions take the value of zero.

For the time trend variable (t), Zhang argues that including a time trend variable enables empirical models to explain the effects of an upward trend in the relationships between FDI and economic growth that cannot be clarified by other variables in the models.⁵³ In this study, the time trend variable takes values 1 through 6 from 1995 to 2000.

Equations (1) and (2) are estimated with national time-series data. As in many studies with time-series estimations, we take logarithms of all variables in regressions to reduce heteroscedasticity. Table 2 reports ordinary least-square (OLS) estimates of equation (1) with time-series data from 1995 to 2000.⁵⁴ The fit of the model is very good in terms of the significance of *F* statistic and there are no signs of multicollinearity. The significant and positive coefficient of FDI suggests that international economic penetration has a positive effect on Chinese economy. This result is consistent with the proponent of the FDI-led growth hypothesis.⁵⁵ The coefficient of human capital is significant and has a positive sign, indicating that accelerating improvement of educational conditions enhances economic growth. This result also supports the advocate of the human capital hypothesis.⁵⁶ The insignificant coefficient of the regional dummy variable seems to indicate that the phenomenon of booming Chinese economic growth cannot be differentiated by regions. In other words, the trend of rapidly economic growth is not a regional characteristic but the

national trait. The significant and positive coefficient of the time trend variable suggests that time contributes significantly to the upward momentum of Chinese economic growth.

Table 2. Estimates of Determinants of Economic Growth in China

Independent Variables for <i>FDI-led Growth Model</i>	Coefficients	T statistic
<i>Estimation of Equation (1): $gdp_t = \beta_0 + fdi_t\beta_1 + hc_t\beta_2 + rd_t\beta_3 + t_t\beta_4 + \varepsilon_t$</i>		
Constant	-7398.54***	-23.63
Foreign Direct Investment (fdi)	0.09***	3.45
Human Capital (hc)	1397.09***	28.16
Regional Dummy (rd)	51.79	0.46
Time Trend (t)	208.04***	7.82
Adjusted R ²	0.915	
F statistic	469.46***	
Observations (all three regions)	174	

Note: Dependent variable is the real value of gross domestic product (100 million RMB). The sample size is 174 (29 provinces and municipalities from 1995 to 2000).

*** indicates significant at the 1 per cent level; ** indicates significant at the 5 per cent level; * indicates significant at the 10 per cent level.

Table 3. Estimates of Determinants of FDI Distributions in China

Independent Variables for <i>Growth-driven FDI Model</i>	Coefficients	T statistic
<i>Estimation of Equation (2): $fdi_t = \beta_5 + gdp_t\beta_6 + hc_t\beta_7 + rd_t\beta_8 + t_t\beta_9 + \varepsilon_t$</i>		
Constant	-330.76	-0.20
Economic Growth (gdp)	0.66***	3.45
Human Capital (hc)	-9.96	-0.03
Regional Dummy (rd)	1469.99***	5.48
Time Trend (t)	-159.61**	-2.02
Adjusted R ²	0.566	
F statistic	57.60***	
Observations (all three regions)	174	

Note: Dependent variable is the real value of actually used foreign direct investment (US \$million). The sample size is 174 (29 provinces and municipalities from 1995 to 2000).

*** indicates significant at the 1 per cent level; ** indicates significant at the 5 per cent level; * indicates significant at the 10 per cent level.

Table 3 reports estimates of equation (2) with the same time-series data from 1995 to 2000. The fit of the model is also very good in terms of the significance of *F* statistic, although the equation explains 56 percent of the variation in determinants of actually used FDI distributions. There is no sign of multicollinearity. The significant and positive coefficient of GDP suggests that rapid economic growth attracts FDI. This result is consistent with the growth-driven FDI hypothesis.⁵⁷ The insignificant

coefficient of human capital suggests that there is no decisive relationship between human capital and FDI during the research period and FDI distributions are determined by factors other than the human capital condition. In this regard, the significant and positive coefficient of the regional variable explains that the coastal region is a better location for a business operation since the region gives favorable economic policies to TNCs, such as advanced physical and social facilities, liberalized market plans, and a positive location-specific factor. The different geographical conditions account for different logistic costs of imported raw materials, access to export markets, and the outcome of the regional emphasis of the opening policy. This result is also consistent with the location-specific hypothesis⁵⁸ and the transaction cost hypothesis.⁵⁹ The significant and negative coefficient of the time trend variable suggests that the 1997 Asian economic crisis positively generated unusual volume of foreign direct investment in China, and since then, FDI has adjusted its balance to the equilibrium.

In sum, the findings of the equation (1) are consistent with not only theoretical predictions but also a widespread belief that China's booming economy in the reform era is a result of both internal forces (continuing improvements of human capital) and external forces (large foreign capital inflows). The results of the equation (2) also confirm not only theoretical predictions but also support the propositions that economic (growth momentum), geographical (regional specifications) and historical (time trend) conditions have simultaneously played a critical role for attracting FDI. However, the results disapprove the impact of human capital on FDI in China during the research period.

REGIONAL ANALYSES OF ECONOMIC GROWTH AND FDI

The estimates of equations (1) and (2) are useful for a better understanding the economic dynamics between GDP growth and FDI distribution at the national level analysis. However, the specification with time-series and cross-sectional data is of limited use in revealing patterns of regional economic growth and regional FDI distributions. In particular, we want to know how the levels of economic growth and regional FDI distributions were affected by regional characteristics and what determines the two dependent variables. The preceding discussions of theories and regional patterns of Chinese economy suggest that among the main determinants are economic growth, foreign capital inflows, human capital, and geographical-historical factors. The resulting specification of the regional economic models with time-series cross-section data is thus given as:

$$\begin{aligned} gdp_t &= \beta_0 + fdi_t\beta_1 + hc_t\beta_2 + t_t\beta_3 + \varepsilon_t \\ fdi_t &= \beta_0 + gdp_t\beta_1 + hc_t\beta_2 + t_t\beta_3 + \varepsilon_t \end{aligned}$$

Table 4. Estimates of Determinants of Economic Growth and FDI at Three Regions

The Coastal Region (n=72; 12 provinces)				
<i>Estimation of Equation (3): $gdp_{ic} = \beta_0 + fdi_{ic}\beta_1 + hc_{ic}\beta_2 + t_{ic}\beta_3 + \epsilon_{ic}$</i>				
<i>Estimation of Equation (4): $fdi_{ic} = \beta_0 + gdp_{ic}\beta_1 + hc_{ic}\beta_2 + t_{ic}\beta_3 + \epsilon_{ic}$</i>				
	FDI-led Growth Model gdp determinants		Growth-driven FDI Model fdi determinants	
	Coefficients	T statistic	Coefficients	T statistic
Constant	-7621.15***	-15.78	1095.26	0.32
Real Value of GDP (gdp)			0.92**	2.37
Foreign Direct Investment (fdi)	0.08**	2.37		
Human Capital (hc)	1426.64***	19.40	-61.63	-0.10
Time Trend (t)	239.67***	5.14	-324.35*	-1.81
Adjusted R ²	0.92		0.43	
F statistic	275.16***		19.41***	
The Central Region (n=54; 9 provinces)				
<i>Estimation of Equation (5): $gdp_{ict} = \beta_0 + fdi_{ict}\beta_1 + hc_{ict}\beta_2 + t_{ict}\beta_3 + \epsilon_{ict}$</i>				
<i>Estimation of Equation (6): $fdi_{ict} = \beta_0 + gdp_{ict}\beta_1 + hc_{ict}\beta_2 + t_{ict}\beta_3 + \epsilon_{ict}$</i>				
	FDI-led Growth Model gdp determinants		Growth-driven FDI Model fdi determinants	
	Coefficients	T statistic	Coefficients	T statistic
Constant	-4624.73***	-6.82	270.09	0.81
Real Value of GDP (gdp)			0.20***	4.77
Foreign Direct Investment (fdi)	1.56***	4.77		
Human Capital (hc)	876.88***	7.53	-24.90	-0.41
Time Trend (t)	202.14***	5.51	-41.56**	-2.67
Adjusted R ²	0.81		0.54	
F statistic	77.83***		22.46***	
The Western Region (n=48; 8 provinces)				
<i>Estimation of Equation (7): $gdp_{tw} = \beta_0 + fdi_{tw}\beta_1 + hc_{tw}\beta_2 + t_{tw}\beta_3 + \epsilon_{tw}$</i>				
<i>Estimation of Equation (8): $fdi_{tw} = \beta_0 + gdp_{tw}\beta_1 + hc_{tw}\beta_2 + t_{tw}\beta_3 + \epsilon_{tw}$</i>				
	FDI-led Growth Model gdp determinants		Growth-driven FDI Model fdi determinants	
	Coefficients	T statistic	Coefficients	T statistic
Constant	-5067.34***	-6.74	-105.80	-0.44
Real Value of GDP (gdp)			0.12***	4.31
Foreign Direct Investment (fdi)	2.40***	4.31		
Human Capital (hc)	955.08***	7.03	23.36	0.52
Time Trend (t)	148.22***	3.75	-11.82	-1.17
Adjusted R ²	0.88		0.76	
F statistic	126.98***		50.99***	

*** indicates significant at the 1 per cent level; ** indicates significant at the 5 per cent level; * indicates significant at the 10 per cent level.

Table 4 reports parameter estimates of the three regions, which suggests the following main points. First, although regression F statistics are significant at conventional levels in practically all 6 combinations, the FDI determinant models in all three regions explain only 43 percent, 54 percent and 76 percent of variations as compared to 92 percent, 81 percent and 88 percent of explanatory power in the GDP determinant models. This suggests that the FDI models in all three regions, particularly in the coastal region, need to be more model-specified by adding factors other than those included in the models. Multicollinearities do not seem to be a problem since most of the independent variables have significant coefficients. Second, the overall pattern of economic growth at the regional level is similar to the national pattern reported in Tables 2 and 3. The estimated coefficients of FDI, human capital and time trend in the GDP models are significant at the level of 1 percent throughout all three regions, while only the GDP variable in the FDI model has consistently significant and positive coefficients throughout all three regions. These results suggest that (1) economic growth in all three regions is affected by foreign capital inflows (FDI), educational attainment (human capital) and developmental momentum (the time trend); (2) FDI distributions in Chinese regions are not determined by social (a proxy of human capital), geographical (regional specification) or historical (time trend) conditions, but purely by economic factor (the level of GDP growth) over the research period. Third, comparisons across all regions indicate some interesting points. The most salient change occurs in the coefficient of the FDI and GDP variables. Foreign capital and economic growth were the most important forces shaping China's regional patterns in the second half of the 1990s. This finding is consistent with widely held beliefs about the increasing importance of FDI in the Chinese economy⁶⁰ and its regional distribution pattern, especially within the Pearl Delta and the Yangtze Delta.⁶¹ This pattern may create a "synergic effect" that generates a "virtuous circle" between the FDI-led growth hypothesis and the growth-driven FDI hypothesis.⁶²

CONCLUDING REMARKS

This study has attempted to address two questions: (1) how we can explain the dynamic relationships between economic growth and FDI distributions at national and regional levels in China, from 1995 to 2000; (2) what determines Chinese rapid economic growth and unprecedented volume of FDI at national and regional levels during the research period. Two empirical models are developed to test the two main hypotheses of FDI-led growth model and growth-driven FDI model based on the analyses of time-series and cross-provincial data generated from a sample consisting of 174 observations that are drawn from 29 provinces for 6 years (1995-2000).

At the national level, we find that economic growth is a result of both internal forces (continuing improvements of human capital and upward momentum of growth) and external forces (large foreign capital inflows). We also discover that economic (growth momentum), geographical (regional specifications) and historical

(time trend) conditions have simultaneously played a critical role in FDI distributions. However, unlike *a priori* expectation, the human capital factor has little influence on FDI distributions in China during the research period. This result implies that the level of China's human capital, measured by school attainment, is already too high to differentiate the causes of FDI distributions, and that foreign investors' criteria for the decision-making may rely on factors other than human capital variable in the Chinese case. This result should generate another research question for the further research on the relationship between human capital and FDI inflows in LDCs.

At the regional level, we find that economic growth in all three regions is affected by foreign capital inflows (FDI), educational attainment (human capital) and developmental momentum (time trend). This result implies that the overall pattern of economic growth at the regional level is similar to the national trend, and is consistent with main findings of earlier studies on the Chinese economic "miracle." However, FDI distributions in the regions are not determined by social (a proxy of human capital), geographical (regional specification) or historical (time trend) conditions, but purely by economic factors (the level of GDP growth) during the research period. This result suggests that the determinants of FDI distributions at the regional level are different from those at the national level, and implies that foreign investors are primarily concerned with the level of economic growth in a region when they decide to invest in China although other factors may also play a certain role in their decision making.

The results also suggest that rapid economic growth and FDI distribution patterns may be associated with a "synergic effect." In other words, China may have actualized the two main hypotheses of FDI-led growth model and growth-driven FDI model simultaneously. However, this study does not identify the nature of the catalyst between the two supplementary hypotheses nor the determinants of the synergic effect due to the lack of detailed data. The results also imply that a liberalized economic environment and well-developed social and economic infrastructure in the central and the western regions would help to attract FDI, which in turn would contribute to steady economic growth and social development in those regions.

For the future research, two areas should deserve more attention. First, it would be interesting to examine a wide range of social and policy factors and analyze the impact of FDI on local governments' economic policies. This study does not perform such an analysis due to the lack of social and policy data at the provincial level. Second, it would be useful to examine the impact of FDI on the development of the domestic market, because, presumably, the nature of the synergic effect can be better explained by considering three-dimensional forces such as GDP growth, FDI inflows and domestic market development. In doing so, the Chinese "miracle" of unprecedented economic growth and FDI inflows may provide some more generalizable lessons for economic and social development in the other LDCs.

Notes

¹ Kevin Zhang, "What Explains China's Rising Urbanization in the Reform Era?" *Urban Studies*, vol.39, no.12, pp.2301-2315, 2002; Kevin Zhang, "How Does Foreign Direct Investment Affect Economic Growth in China?" *Economics of Transition*, vol 9, no.3, pp.679-693, 2001; Kenny Zhang, "FDI and Economic Growth: Evidence from 10 East Asian Economies," *Economia Internazionale*, November 1999; Haishun Sun, "Foreign Direct Investment and Regional Export Performance in China," *Journal of Regional Science*, vol. 41, no. 2, pp.317-336, 2001; Robin M. Leichenko, and Rodney A. Erickson, "Foreign Direct Investment and State Export Performance," *Journal of Regional Science*, vol. 37, pp. 307-329, 1997; Chung Chen, "Regional Determinants of Foreign Direct Investment in Mainland China," *Journal of Economic Studies*, 23, 1996; Chung Chen, Lawrence Chang and Yimin Zhang, "The Role of Foreign Direct Investment in China's Post-1978 Economic Development," *World Development*, vol. 23, pp.691-703, 1995; Nicholas R. Lardy, "The Role of Foreign Trade and Investment in China's Economic Transformation," *The China Quarterly*, vol.10, pp.1065-1082, 1995; Cindy Fan, "Regional Impact of Foreign Trade in China, 1984-1989," *Growth and Change*, vol. 23, pp.129-159, 1992; David R. Phillips and Anthony G. Yeh, "Foreign Investment and Trade: Impact on Spatial Structure of the Economy," in Terry Cannon and Alen Jenkins, eds., *The Geography of Contemporary China: The Impact of Deng Xiaoping's Decade*, (London: Routledge, 1990).

² The first country hit was Thailand, where problems at financial institutions set off a crisis of confidence that the government to abandon its exchange rate peg, thereby allowing its currency to drop sharply in value. The crisis then spread quickly. By the end of August 1997, the currencies of three neighboring countries, Malaysia, Indonesia, and the Philippines, had all been devalued substantially. The crisis continued to deepen despite approval in August by the International Monetary Fund (IMF) of an emergency loan package intended to help Thailand. Under pressure them, Taiwan and Singapore allowed their currencies to decline modestly during September and October but managed to avoid full-blown financial crises. Meanwhile, Hong Kong's exchange rate peg to the dollar came under severe pressure but was maintained, though its interest rates soared and its stock market plunged. Also during this period, Indonesia negotiated an emergency loan package with the IMF. The final domino to fall during 1997 was South Korea, whose currency dropped 25 percent in November. Korea had the largest economy among those in crisis, and the collapse of its currency peg contributed to further downward slides of several of the other crisis currencies despite the assistance of the IMF. For more details, see Joseph Whitt, "The Role of External Shocks in the Asian Financial Crisis," *Economic Review*, Spring Issue, pp.18-31, 1999 and Thomas J. Pempel, "Introduction," in Thomas J. Pempel, ed., *The Politics of the Asian Economic Crisis*, (Ithaca, NY: Cornell University Press, 1999), pp.1-14.

³ Simon Beck, "World Bank Says China's Poor Interior Being Ignored," *South China Morning Post-Business Post*, March 12, 1997; Foo Choy Peng, "China Eclipses US As Favorite Overseas Investment Destination," *South China Morning Post-Business Post*, April 11, 1997.

⁴ Hong Kong Standard, "Mainland's Reserves on the Rise," *Hong Kong Standard*, September 2, 1997; Enoch Yiu, "Foreign Currency Assets Dip to US \$96.2b in April," *South China Morning Post-Business Post*, May 23, 1998; Daniel Kwan, "Proposed Road Law Runs into NPC Barrier," *South China Morning Post-Business Post*, November 6, 1998.

⁵ For more details for the rationale of regional classifications, see the section of Models, Data and Hypotheses.

⁶ Colleen W.L. Tsai, "Determinants of Foreign Direct Investment and Its Impact on Economic Growth," *Journal of Economic Development*, vol.19, no.2, 1994; Christopher R. Torrissi, "The Determinants of Direct Foreign Investment in a Small LDCs," *Journal of Economic Development*, vol.10, no.1, 1985.

⁷ Denis O'Hearn, "TNCs, Intervening Mechanisms and Economic Growth in Ireland: A Longitudinal Test and Extension of Bornshier Model," *World Development*, vol. 18, no.1, 1990; Volker Bornschier, "Multinational Corporations and Economic Growth: A Cross National Test of the Decapitalization Thesis," *Journal of Development Economics*, vol. 7, 1980; Colin Stoneman, "Foreign Capital and Economic Growth," *World Development*, vol. 3, no.1, 1975.

⁸ Eduardo Borensztein, Jose De Gregorio, and Jong-Wha Lee, "How Does Direct Investment Affect Economic Growth?" *Journal of International Economics*, vol. 45, 1998; I. Otani and D. Villanueva, "Major Determinants of Long-Term Growth in LDCs," *Finance and Development*, vol. 28, no.3, 1989.

⁹ Kevin Zhang and Sean Song, "Promoting Exports: the Role of Inward FDI in China," *China Economic Review*, vol. 11, no. 4, 2000; Kenny Zhang, "FDI and Economic Growth: Evidence from 10 East Asian Economies," *Economia Internazionale*, November 1999.

¹⁰ Steven Kamin and Pia Wood, "Capital Inflows, Financial Intermediation, and Aggregate Demand: Empirical Evidence from Mexico and other Pacific Basin Countries," *International Finance Discussion Paper No. 583* (Washington D.C.: Board of Governors of the Federal Reserve System, 1997); Eduardo Borensztein, Jose De Gregorio, and Jong-Wha Lee, "How Does Direct Investment Affect Economic Growth?" *Journal of International Economics*, vol. 45, 1998; William Gruben and Darryl McLeod, "Capital Flows, Savings, and Growth in the 1990s," *The Quarterly Review of Economics and Finance*, vol. 38, no. 3, 1998; Kenny Zhang, "FDI and Economic Growth: Evidence from 10 East Asian Economies," *Economia Internazionale*, November 1999.

¹¹ Investment is most directly affected by FDI, but FDI may also impact GDP independently of fixed investment. However, this study does not conduct research on the impact of FDI inflows on the development of domestic investment because it is beyond the research questions proposed here.

¹² In an extreme case, a TNC may close down an acquired asset to reduce capacity in the region and increase its market power.

¹³ Borensztein *et. al*, 1998. The data sample covers the years 1970-1989.

¹⁴ Kamin and Wood also find a significant positive relation between FDI and real investment. Their study covers the period 1983-1994, which induces the first years of the FDI boom.

¹⁵ UNCTAD 1999, pp. 172-3.

¹⁶ Borensztein *et. al*, 1998.

¹⁷ UNCTAD (United Nations Conference on Trade and Development), *UNCYAD Handbook of Statistics*, 1999.

¹⁸ Human capital stock is measured by the average level of secondary school attainment in a sample of 69 developing countries. UNCTAD, 1999; International Monetary Fund, *International Financial Statistics Yearbook 2001*.

¹⁹ Zhang, 1999. These countries appear to have experienced FDI-led growth, except for China and Indonesia where the relationship was found to be bi-directional.

²⁰ Gruben and McLeod, 1998.

²¹ See Zhang, 1999 for a more systematic development of the growth-driven FDI hypothesis.

²² Zhang, 1999.

²³ *Ibid*.

²⁴ For the full description of three regions and their provinces, municipalities and autonomous cities, see the section of Models, Data and Hypotheses.

²⁵ Zhang and Song, 2000; Sun 2000; Haishun Sun and Frank Tipton, "A Comparative Analysis of the Characteristics of Direct Foreign Investment in China, 1979-1995," *Journal of Developing Area*, vol. 32, 1998, pp. 159-186

²⁶ Zhang, 2001.

²⁷ Due to a lack of data at the provincial industry levels, this study only investigates the relationships between FDI and economic growth in national and provincial settings using aggregate data at the provincial level.

²⁸ Sun, 2001.

²⁹ Sun and Tipton 1998, p.184.

³⁰ State Statistical Bureau of China, *China Regional Economy: A Profile of 17 Years of Reform and Opening-Up* (Beijing: China Statistical Publishing House, 1997).

³¹ Sun 2001; State Statistical Bureau of China, *China Foreign Economic Statistics 1979-1991* (Beijing: China Statistical Publishing House, 1993).

³² They are Shenzhen, Zhuhai and Shantou in Guangdong Province and Xiamen in Fujian Province. For more details for historical development of SEZs, see the last part of this section, Regional Uneven Distributions of FDI.

³³ Chen, 1996; Sun, 2000.

³⁴ Sun and Tipton, 1998.

³⁵ Hainan Island SEZ was approved by the 1st session of the 7th NPC in 1988.

³⁶ Nakeda Maruyama, *Economic Development in the Yangtze River Valley: China's Market Economy and Regional Development*, [Choko Ryuiki no Keizai Hatten: Chugoku no Shijo Keizaika to Chiki Kaihatsu], (Tolyo: Ajia Keizai Kenkyujo, 1993).

³⁷ Dajin Peng, "Invisible Linkages: A Regional Perspective of East Asian Political Economy," *International Studies Quarterly* vol. 46, 2002, p. 436.

³⁸ The other big potential of this BYS region is the economic cooperation with other regions of neighboring countries such as the west coast of North and South Korea and west Japan, primarily Kyushyu, see Peng, 2002, p. 437.

³⁹ China and South Korea are the most active in promoting the BYS SEZ. China is now the biggest destination of South Korean FDI. As much as 80 percent of Korea's FDI to China is in the Bohai region (Peng 2002, 436). The overseas Chinese are also playing an increasing role in the Chinese part of the BYS subregion, signaling the northward expansion of the overseas Chinese networks. Other measures are also taking effect. For example, the autonomous power of the local governments has been enhanced. The local governments have built many new free economic districts. If the geo-economic chain reaction can continue in East Asia, the emerging SEZs will resemble interlocking circles that connect different neighboring economies together. This is a very important trend of East Asian economic development (Peng 2002, p. 439).

⁴⁰ Zhang 2002; Sun 2001.

⁴¹ Qing Zhang and Bruce Felmingham, "The Role of FDI, Exports and Spillover Effects in the Regional Development of China," *Journal of Development Studies*, vol. 38, no. 4, 2002.

⁴² Sun, 2000.

⁴³ Gruben and McLeod 1998; Kamin and Wood 1997; Rati Ram, "Exports and Economic Growth: Some Additional Evidence," *Economic Development and Cultural Change*, vol. 33, no. 1, 1985.

⁴⁴ Constantin S. Voivodas, "Exports, Foreign Capital and Economic Growth," *Journal of International Economics*, vol. 3, no. 4, 1973; William G. Tyler, "Growth and Export Expansion in Developing Countries: Some Empirical Evidence," *Journal of Development Economics*, vol. 9, no. 1, 1981; Peter B. Rana and J. Edward Dowling, "The Impact of Foreign Capital in Growth: Evidence from Asian Developing Countries," *The Developing Economics*, vol. 26, 1988; Ram, 1985; Otani and Villanueva, 1989.

⁴⁵ Zhu Wang and Nathan Swain, *The Determinants of Foreign Direct Investment in Transforming Countries: Empirical Evidence from Hungary and China*, *Weltwirtschaftliches Archiv*, pp. 131-2, 1995.

⁴⁶ Torrissi, 1985.

⁴⁷ In the original statistical data, the real value of GDP at the provincial level is 100 million Yuan, while that of FDI is US \$ 1 million.

⁴⁸ Sun, 2001, p. 323.

⁴⁹ Jess Benhabib and Mark Spiegel, "The Role of Human Capital in Economic Development: Evidence from Aggregate Cross-Country Data," *Journal of Monetary Economics*, vol. 34, no. 2, 1994.

⁵⁰ Borensztein *et al.*, 1998.

⁵¹ Robert Barro and Jong-Wha Lee, "Sources of Economic Growth," *Carnegie Rochester Conference Series on Public Policy*, vol. 40, 1994.

⁵² Sun, 2000.

⁵³ Zhang, 2002.

⁵⁴ In order to conduct proper quantitative research, JMP 5.0.1 version of statistic software package is used for reasons of parsimony, accuracy, relevancy and simplicity.

⁵⁵ Gruben and McLeod, 1998; Kamin and Wood, 1997.

⁵⁶ Borensztein *et al* 1988; Benhabib and Spiegel, 1994.

⁵⁷ Wang and Swain, 1995.

⁵⁸ Sun and Tipton 1998; Chen, 1996.

⁵⁹ Oliver Williamson, "The Economics of Organization: The Transaction Cost Approach," *American Journal of Sociology*, vol. 87, 1981, pp. 548-77.

⁶⁰ Lardy 2002; Zhang 2001.

⁶¹ World Bank, *China 2020: Development Challenges in the New Century* (Washington DC: World Bank, 1997).

⁶² Zhang, 1999.