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Spillover-effects, crowding-in and the contributions of FDI to growth in China: A review of the literature

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Spillover-effects, crowding-in and the contributions of FDI to growth in China

A Review of the Literature

Markus Taube

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This is a discussion paper series. You are welcome to communicate your comments to the authors:

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This discussion paper represents the first stages of ongoing research. The review of the literature presented is anything but comprehensive and should be seen as a first attempt to get an overview of existing research agendas and results. Excellent research assistance is gratefully acknowledged to Hinrich Voss and Tobias Kulka. An earlier version of this discussion paper was presented at the 'Second CNRS-CASS Academic Conference' in Lyon on June 20-21, 2005.

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Keywords

Foreign direct investment, spillover-effects, crowding-in, Chinese economy

Abstract

The paper presents a review of theoretical concepts and empirical findings on the issue of FDI-induced spillover and crowding-effects in the Chinese economy. Against the background of the peculiar characteristics of China's FDI-inflows the paper discusses various research agendas and results. It finds mostly inconclusive evidence, which is understood to result from an insufficient analytical differentiation of FDI and host economy actors. On the 'supply'-side of FDI it seems to be necessary to include the parameter of 'cultural affinity' in the analysis and differentiate between Overseas Chinese and non-Chinese investors (with the latter probably featuring a greater potential for positive externalities). On the 'demand'-side it seems to be adequate to differentiate between the state and collective / private domestic sector and analyze their respective incentives to actively explore potential spillover effects and actually appropriate new technologies introduced by foreign investors. It seems as if the harder the budget constraints and the more competitive the environment, the greater the realized spillover effects. It becomes obvious that most existing studies are working with data that does not reflect the dynamic developments of the recent ten years.

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1. Introduction

China's economic development during the last 25 years has been dramatic. Between 1979 and 2004 China's industrial output has been growing at an annual rate of 10.9 %, while GDP expanded by an annual average rate of 9.4 % during the same period. In the run of this process the Chinese economy has already closed a substantial part of the huge developmental gap separating it from the industrialized economies only two decades ago. Today China is highly competitive in a broad range of value chain segments in low-tech as well as high-tech industries (European Commission - DG Enterprise and Industry 2004).

These developments have been made possible by a revolutionary ideological reorientation (Qian 2000) triggering a market-oriented transformation process and a gradual, but nothing short of comprehensive opening of the economy to the global markets (Lardy 2002). In the run of these events step by step a business environment has been created that has been attractive to foreign investors and has allowed foreign direct investments (FDI) to bring their outstanding potential for an international transfer of impulses for economic development and growth to full play (Lipsey 2000; Romer 1993).[1]

Since the early 1990s China has experienced an enormous inflow of FDI. Today, foreign invested enterprises (FIE) are no longer a peripheral phenomenon, but rather a very considerable part of the Chinese economy. The 230.000 FIE in operation in 2003 have been creating about one third of China's gross industrial output value, have been providing jobs for 11 % of China's total labour force, contributed 20.8 %

---

[1] The main positive impulses FDI inflows may exert on the host country may be understood as:
- an expansion of domestic capital formation beyond the degree that could be financed with domestic savings;
- the provision of production and process technology formerly not known to the host country;
- the creation of jobs;
- the training of technical and managerial personnel;
- the introduction of modern management and organisational know-how;
- the possibility to use foreign invested enterprises (FIE) as a benchmark for local enterprises with respect to various parameters like capital and labour productivity, logistics, quality control etc.
- the promotion of the domestic export-industry plus the ensuing positive effects on the trade balance and the availability of foreign exchange.

to China's national fiscal revenue and operated 54.83 % of China's export volume and 56.18 % of its import volume (MOFCOM). These are certainly not figures of a negligible dimension.

The impression abounds that FDI has been key to channel the factors of production available in the Chinese economy in those usages that comply with China's comparative advantages and enable the economy to attain the dividends of a global division of labor. But while there is ample evidence for a very positive direct impact of FDI on economic development in China (Lemoine 2000, Jiang 2004), the empirical evidence for indirect effects, i.e. positive externalities from FDI is scarce.

In the light of this phenomenon, this discussion paper will focus on the evidence of FDI-induced spillover-effects and crowding phenomena. No original empirical research is presented, but rather a review of the existing literature and its main findings. The paper is structured as follows. In chapter 2 the key features of China's attraction of FDI are presented. These data provide a first empirical background for the subsequent discussion of potential linkages between FDI inflows and economic development and growth. Chapter 3 opens the stage for the discussion of an potential FDI – growth nexus with a general review of the literature on FDI-induced spillover-effects and crowding phenomena. This review is in chapter 4 complemented with a survey of China specific research agendas and results. Chapter 5 discusses the empirical evidence and pinpoints analytical problems and key issues for research.

2. Key Features of China's FDI Inflows

In order to analyze the indirect effects of China's FDI-inflows on its economic development and growth, it is first of all necessary to understand the quantitative development of these inflows over time, their regional as well as sectoral distribution, and various other structural parameters that might have an impact on the realization of positive externalities.

2.1. Quantitative Developments

Originating in a central command economy the initial legal and institutional basis for an inflow of FDI to China was established only in the late 1970s and early 1980s. But despite of various measures to attract foreign investors, FDI inflows picked up only slowly in the 1980s (Khan 1991). It was not before China's strong commitment to a market economy in the early 1990s that the country was able to attract truly substantial amounts of FDI.[2] The first "FDI-boom" began in 1992[3] and came to a halt in the turmoil of the Asian crisis. A short period of consolidation was quickly followed by the take-off of the second "FDI-boom" which finds its basis in China's accession to the WTO in late 2001 (figure 1). In 2002 China eventually surpassed the USA and advanced to the very top of the globe's most attractive destinations for FDI.[4]

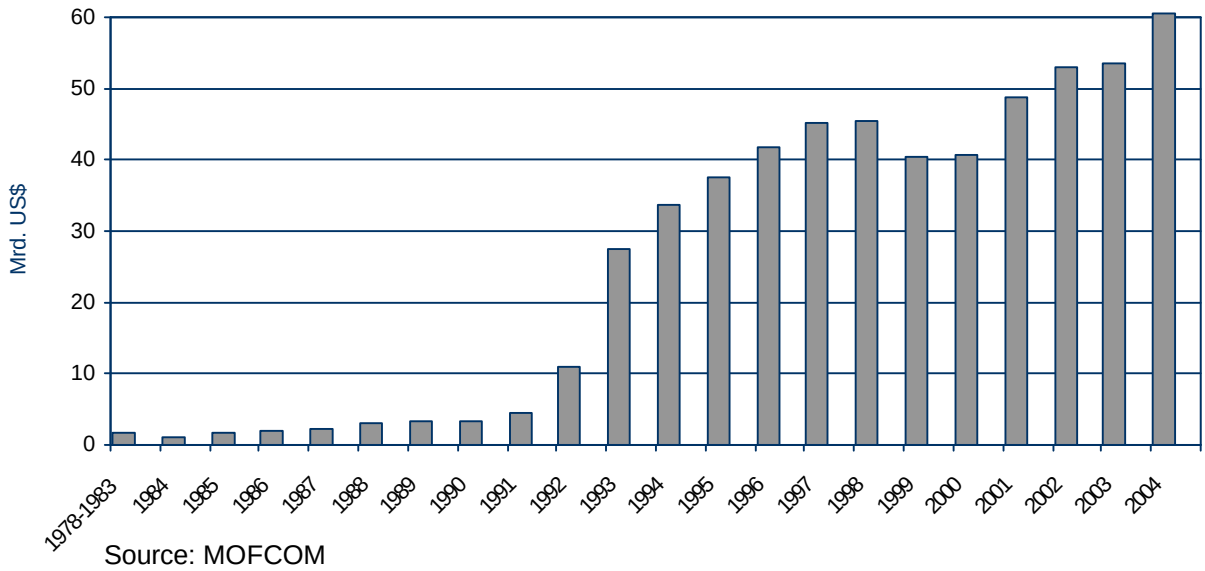
---

2 Such a wait-and-see attitude is consistent with the experience among other developing economies. Due to insufficient market information foreign investors delay their investment decisions until pioneer investors provide them with further insights into the market environment and the reliability of the host countries FDI policies (Huang/Shirai 1994).

3 In 1992, the first year of substantial FDI inflows to China, FDI-flows to South Korea and Chinese Taipei dropped by 31% respectively 51%, thereby pointing at a considerable diversion effect in China's favour (UNCTAD various). It should also be noted that the upswing of FDI inflows to China coincides with a general increase in FDI flows to developing countries. Average annual flows directed towards developing countries in 1990-1993 were double those of 1987-1989 (UNCTAD various; Lardy 1995).

4 China fell behind the USA again in 2003 when the USA recuperated from a dramatic fall in FDI inflows in the preceding year.

Figure 1: FDI Inflows to China 1978-2003, bn. US$



Since 1992 China has been extremely successful in the attraction of FDI. While the bulk of FDI is still being exchanged between the industrialized economies, China has become the prime destination for FDI in the developing world. China has been absorbing 20-25% of all FDI directed towards these countries and a multiple of the FDI the whole African continent has been able to attract (UNCTAD various).[5]

2.2. Regional Distribution in China

The attraction of FDI to China differs dramatically between its various regions. As depicted in table 1 China's FDI inflows have been heavily concentrated in the coastal provinces (the Eastern region). These provinces have absorbed a total of 84.31 % of China's FDI inflows up to 2003, while the central Chinese provinces have attracted only 8.93 % and Western China a mere 4.50 %. On the provincial level Guangdong seems to constitute a class of its own. During the 1980s Guangdong absorbed nearly one half of all FDI China attracted during this period.

[5] The outstanding position of China remains unchallenged even if taking into account that part of the resources classified as inflowing FDI has in reality been 'round-tripping' money, i.e., money that had been illegally brought out of the country in the first place and then brought back under the label 'FDI' in order to benefit from special incentives reserved for foreign invested enterprises.

In the 1990s, when the volume of China-bound FDI rose exponentially, the province still hosted more than one quarter of the national FDI stock. Taking the period as a whole Guangdong has absorbed nearly one third of all FDI stock China attracted since the beginning of the reform era (OECD 2000, MOFCOM).[6]

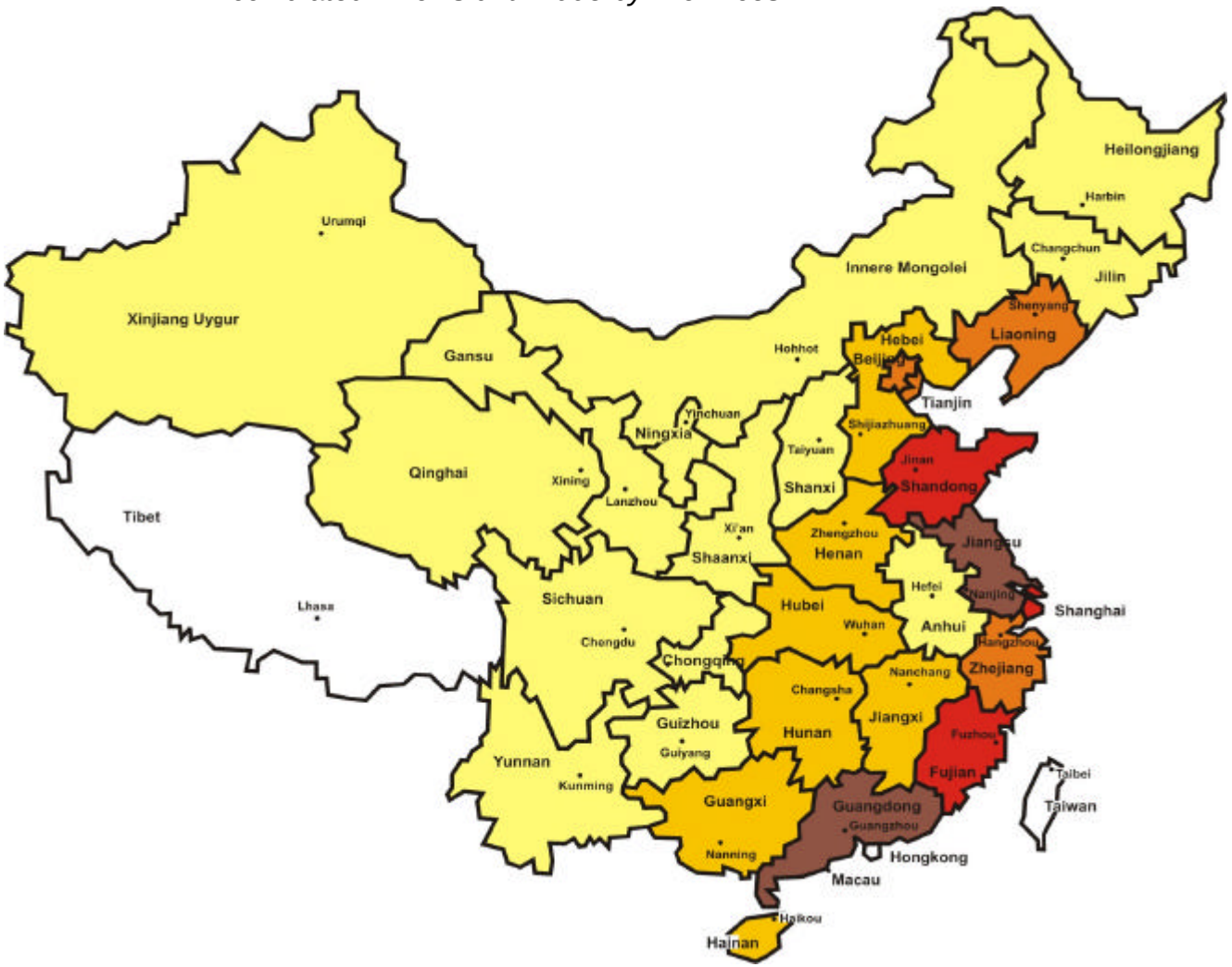
[6] Bringing the analysis to the next level, one would observe that in Guangdong itself FDI have been highly concentrated in a few localities (i.e. the Pearl River Delta and the Shantou area) as well.

Table 1: Actually Realised FDI Inflows
- Accmulated Inflows until 2003 by Provinces -

	Acculumlated Inflow, in Mio. US$	%-Share in total Accumulated Inflow	%-Share in total Inflow in the year 2003*
National Total	**501.471**	**100,00**	**100,00**
East China	**422.799**	**84,31**	**82,83**
Beijing	20.082	4,00	4,10
Tianjin	18.525	3,69	2,87
Hebei	9.214	1,84	1,80
Liaoning	23.596	4,71	5,28
Shanghai	42.372	8,45	10,22
Jiangsu	71.399	14,24	19,74
Zhejiang	21.455	4,28	9,31
Fujian	43.866	8,75	4,86
Shandong	35.380	7,06	11,24
Guangdong	129.280	25,78	14,62
Hainan	7.630	1,52	0,79
Central China	**44.791**	**8,93**	**10,9**
Shanxi	2.185	0,44	0,40
Jilin	3.695	0,74	0,36
Heilongjiang	4.682	0,93	0,60
Anhui	4.122	0,82	0,69
Jiangxi	5.803	1,16	3,01
Henan	5.718	1,14	1,01
Hubei	10.614	2,12	2,93
Hunan	7.972	1,59	1,90
West China	**22.551**	**4,50**	**3,22**
Inner Mongolia	1.013	0,20	0,17
Guangxi	8.163	1,63	0,78
Sichuan	3.956	0.79	0,77
Chongqing	3.321	0,66	0,49
Guizhou	0.534	0,11	0,08
Yunnan	1.230	0,25	0,16
Tibet	0.000	0,00	0,00
Shaanxi	4.090	0,82	0,62
Gansu	0.615	0,12	0,04
Qinghai	0.128	0,03	0,05
Ningxia	0.184	0,04	0,03
Xinjiang	0.424	0,08	0,03
Central Ministries and Commissions	**9.805**	**2,06**	**k.A.**

* 53.504 Mio. US$
Data: MOFCOM; own calculations.

Figure 2: Regional Distribution of Actually Realized FDI Inflows
- Accmulated Inflows until 2003 by Provinces -

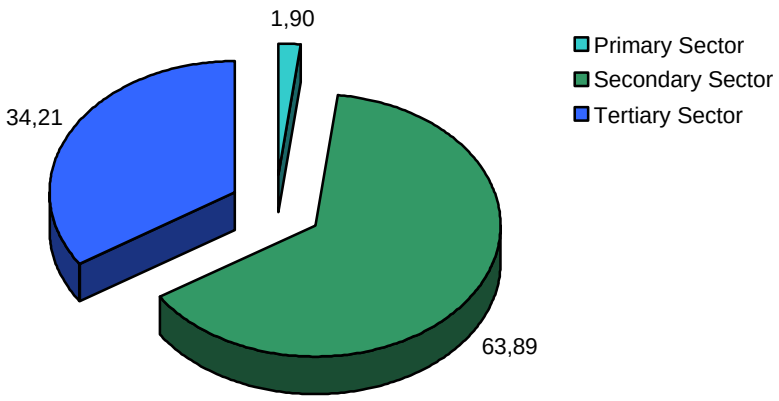


Data: Table 1.

2.3. Sectoral Distribution

The focus of foreign investors in the PR China obviously lays in the manufacturing industries. As documented in figure 3, until 2003 two thirds of all FDI inflows have been flowing into manufacturing while the service industries have been able to attract one third. The primary sector has been of only marginal importance for China's attraction of FDI.

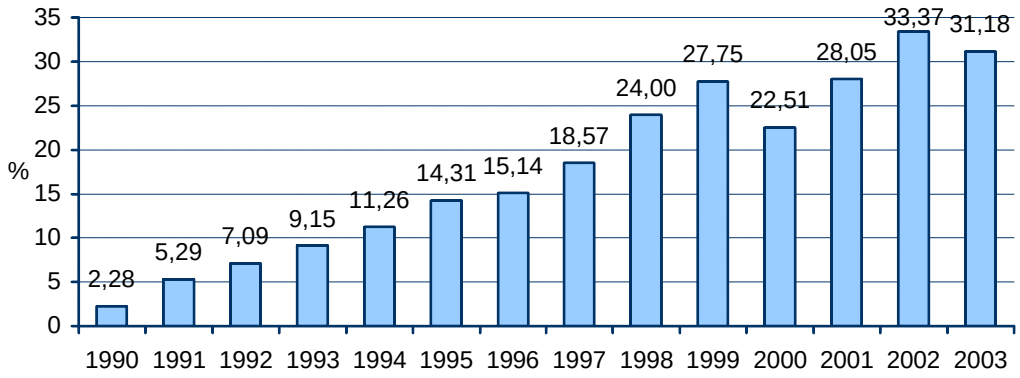
Figure 3: Sectoral Distribution of FDI
- Accumulated Inflow until end of 2003 in % -



Daten: MOFCOM.

The relative importance of foreign invested enterprises (FIE) for China's manufacturing industries becomes especially obvious when looking at their share in industrial production. Since the beginning of the 1990s the contribution of FIE to China's gross industrial output value has risen dramatically. Today FIE command a share of about one third (see figure 4). In certain industry branches like passenger cars, the share of FIE in total output goes up to 98 % (cp. table 2).

Figure 4: Contribution of FIE to China's Gross Industrial Output Value - Percentage Share, 1990-2003 -



Daten: MOFCOM.

The distribution of China's FDI inflows to various sectors, however, does not follow market parameters alone, but has been and still is rather heavily regulated by the Chinese government. The "Foreign Investment Industrial Guidance Catalogue", which is regularly updated and modified, outlines in which industries foreign investors are welcome, restricted or not permitted. As documented in table 2 at the time being FIE have an especially strong impact on the production of electronic and telecommunication equipment, office machinery, leather and sports goods, furniture, as well as garments and plastic products.

Table 2: Share of Foreign Invested Enterprises in China's Industrial Production - Gross Industrial Output Value by Sector 2003 –

	Total bn. yuan RMB	FIEs bn. yuan RMB	Share
Manufacture of Communication Equipment, Computers and other electrical equipments	15.839,76	12.209,21	77,08%
Manufacture of Measuring Instruments and Machinery for Cultural Activity and Office Work	1.636,72	1.105,73	67,56%
Manufacture of Articles For Culture, Education and Sport Activity	965,90	572,90	59,31%
Manufacture of Leather, Fur, Feather and Related Products	2.274,05	1.160,14	51,02%
Manufacture of Furniture	719,97	358,95	49,86%
Manufacture of Textile Wearing Apparel, Footware, and Caps	3.426,02	1.589,51	46,40%
Manufacture of Plastics	3.063,83	1.310,29	42,77%
Manufacture of Artwork and Other Manufacturing	1.306,62	543,93	41,63%
Manufacture of Transport Equipment	11.214,05	4.535,61	40,45%
Manufacture of Foods	2.290,07	883,19	38,57%
Manufacture of Rubber	1.312,90	482,50	36,75%
Manufacture of Electrical Machinery and Equipment	7.916,19	2.787,82	35,22%
Manufacture of Metal Products	3.857,40	1.345,41	34,88%
Printing, Reproduction of Recording Media	1.027,22	345,16	33,60%
Manufacture of Beverages	2.233,22	711,58	31,86%
Manufacture of Paper and Paper Products	2.526,05	793,17	31,40%
Processing of Food from Agricultural Products	6.152,32	1.653,61	26,88%
Processing of Timber, Manufacture of Wood, Bamboo, Rattan, Palm, and Straw Products	992,79	263,03	26,49%
Production and Distribution of Gas	272,64	70,27	25,77%
Manufacture of General Purpose Machinery	5..11,21	1.429,30	25,03%
Manufacture of Textile	7.725,20	1.827,15	23,65%
Manufacture of Raw Chemical Materials and Chemical Products	9.244,86	2.175,20	23,53%
Manufacture of Medicines	2.889,98	636,00	22,01%
Manufacture of Chemical Fibers	1.448,40	290,79	20,08%
Manufacture of Special Purpose Machinery	3.831,65	768,71	20,06%
Production and Distribution of Electric Power and Heat Power	6.858,60	1.238,80	18,06%
Recycling and Disposal of Waste	49,94	8,93	17,88%
Manufacture of Non-metallic Mineral Products	5.653,25	959,28	16,97%
Smelting and Pressing of Non-ferrous Metals	3.564,07	471,99	13,24%
Processing of Petroleum, Coking, Processing of Nuclear Fuel	6.235,26	632,09	10,14%
Smelting and Pressing of Ferrous Metals	10.007,37	874,23	8,74%
Extraction of Petroleum and Natural Gas	3.479,02	253,40	7,28%
Mining and Processing of Nonmetal Ores	486,75	25,39	5,22%
Production and Distribution of Water	431,09	16,85	3,91%
Mining and Processing of Non-Ferrous Metal Ores	573,28	5,78	1,01%
Mining and Processing of Ferrous Metal Ores	350,93	2,50	0,71%
Manufacture of Tobacco	2.235,81	12,36	0,55%

Data: National Bureau of Statistics (NBS); own calculations.

These sectoral foci of foreign investors have been changing over time. During the 1980s and far into the 1990s the FDI flowing towards China had been mostly resource-oriented. The basic business model was relying on China's abundant supply

of low cost unqualified labor, which was employed in low-tech export processing industries. The value chain segments operated in China had been greatly restricted. In recent years this picture has been changing dramatically. China has been able to enlarge its range of value chain segments and is on the way to become a full fledged production location. At the same time foreign investors have not only been given greater leeway to sell their products on the domestic markets, but are now also facing considerable market volumes. These developments imply automatically substantial shifts in the relative attractiveness of industries and business models. In recent years global market oriented business models and industries like the IT industry and the PC and peripherals operations have been complemented by strong FIE commitments in China's domestic market-oriented sectors like the automotive industry.

Not only the sectoral distribution of FDI has been subjected to heavy handed state-intervention. Government and regulatory agencies have had a decisive influence on the business environment in which foreign investors have been allowed to operate. Depending on the respective sectors, foreign investors have been facing restrictions with regard to their maximum equity share in Joint Ventures, have sometimes been forced to cooperate with specific Joint Venture partners, have been forced to established research & development laboratories in China and been prohibited from transferring outmoded technology and machinery, have seen themselves being pushed towards export-oriented business models, have until China's WTO accession been facing local content regulations, etc. All these market interventions have had an impact on the environment in which FDI might have induced positive spillover- and crowding effects.

2.4. Origin of FDI and Cultural Affinity of Investors

The bulk of China's massive FDI inflows have not originated in the world economy's traditional industry centres, but are rather characterized by a high degree of cultural affinity of the investors. Most foreign investors belong to the Overseas Chinese community (see table 3). Overseas Chinese have also been the first to commit their capital and economic resources to mainland China. Their capacity to take recourse to networks based on social capital has provided them with informal means to protect their investments and gain access to lucrative business fields at a time when in-

vestors from the triad economies were still deterred by an insufficient formal institutional framework. Since then they have been dominating the foreign invested enterprise sector, although with the gradual establishment of a formal institutional setting and China's accession to the WTO their relative importance is shrinking.

Table 3: Regional Origin of China's FDI Inflows
- Accumulated Inflows until 2003 -

Country of Origin	Number of Projects	in %	Actually Realized FDI, Mio. US$	in %
World	465.277	100,00	501.471	100,00
EU	16.158	3,47	37.872	7,55
Hong Kong	224.500	48,25	222.575	44,38
Japan	28.401	6,10	41.394	8,25
Singapore	11.871	2,55	23.531	4,69
South Korea	27.128	5,83	19.688	3,93
Taiwan	60.192	12,94	36.488	7,28
USA	41.340	8,89	44.088	8,79
Virgin Islands	8.877	1,91	30.165	6,02

Note: The bulk FDI originating in the Virgin Islands are actually stemming from Taiwanese investors who are circumventing restrictions on FDI in mainland China enacted by Taiwanese government.

Data: MOFCOM; own calculations.

Foreign investors with a high cultural affinity (here proxied by FDI originating in Hong Kong, Macao and Taiwan) and those from other parts of the world (i.e. first of all the OECD economies) have traditionally been concentrating their investment activities in different regions of mainland China. About one third of China's total industrial output by all FIE is created in the province of Guangdong and another third in the Shanghai – Jiangsu – Zhejiang growth triangle. The industrial output value of foreign funded enterprises excluding those with capital from Hong Kong, Macao and Taiwan (FFE), however, is first of all generated in the Shanghai – Jiangsu – Zhejiang growth triangle, which accounts for nearly 40% of the total. In Guangdong FFE generate only 20% of their national total, leaving enterprises with capital from Hong Kong, Macao, Taiwan (HMT), with a far greater leverage on industrial development in the province (Taube / Ögütçü 2002; MOFCOM). HMT realize nearly 50% of their industrial output value in this single province (see table 4).

Table 4: Contribution of FIE (FFE, HMT) Located in Various Provinces to National Total Industrial Output Value by FIE, 2001

	2001			Change to 1991 in %-points
	FIE	**FFE**	**HMT**	**FIE**
National Total	**100.00**	**100.00**	**100.00**	
Eastern Region	**88.75**	**87.76**	**90.05**	**-4.17**
Beijing	4.84	6.29	2.96	-0.33
Tianjin	5.02	7.51	1.78	1.68
Hebei	1.54	1.36	1.82	0.13
Liaoning	3.29	4.44	1.78	-1.91
Shanghai	14.34	18.45	9.02	-3.22
Jiangsu	12.25	15.09	8.55	2.22
Zhejiang	5.63	5.27	6.09	2.44
Fujian	6.70	4.12	10.04	1.27
Shandong	3.83	6.78	3.50	2.31
Guangdong	31.19	19.65	46.18	-6.50
Hainan	0.15	0.16	0.14	0.29
Central Region	**8.76**	**9.68**	**7.58**	**3.48**
Shanxi	0.27	0.25	0.30	-0.63
Jilin	1.52	2.29	0.51	1.36
Heilongjiang	0.42	0.44	0.40	0.09
Anhui	0.91	1.01	0.77	0.59
Jiangxi	0.39	0.49	0.26	0.13
Henan	0.75	0.67	1.35	0.18
Hubei	1.40	1.68	1.05	0.63
Hunan	0.66	0.58	0.49	0.37
Western Region	**2.47**	**2.56**	**2.36**	**0.68**
Inner Mongolia	0.24	0.28	0.19	0.07
Guangxi	0.70	0.62	0.43	0.18
Sichuan, incl. Chongqing	1.35	1.45	1.21	0.56
Guizhou	0.08	0.10	0.06	-0.24
Yunnan	0.26	0.23	0.29	0.13
Tibet	0.00	0.00*	0.00	0.00
Shaanxi	0.52	0.56	0.46	0.01
Gansu	0.13	0.07	0.21	0.10
Qinghai	0.02	0.00	0.04	0.02
Ningxia	0.07	0.10	0.04	0.02
Xinjiang	0.05	0.05	0.05	-0.16

* value: 0.0003

FIE: foreign invested enterprises (comprising FFE and HMT)
FFE: foreign funded enterprises excluding those with capital from Hong Kong, Macao and Taiwan
HMT: enterprises with capital from Hong Kong, Macao, Taiwan

Source: Guojia tongjiju (various) and own calculations.

2.5. Main Characteristics of China's FDI Inflows

As shown above China's FDI inflows feature some distinct characteristics that have to be considered when analyzing a potential FDI-growth nexus and externalities resulting from China's FDI inflows in particular.

Feature 1: China's FDI inflows are characterized by at least two well-defined historical periods. The 1980s saw only moderate inflows. Very substantial inflows have been registered only from 1992 onwards.

Feature 2: China's FDI inflows are not evenly distributed over the whole country but are rather heavily concentrated in a few regions.

Feature 3: China's FDI inflows have been subjected to heavy handed governmental guidance. State interventions have been the major factor shaping the environment in which FIE have been operating and might have created positive externalities.

Feature 4: China's FDI inflows feature a cultural duality. FDI by Overseas Chinese are structurally distinct from FDI originating in the OECD economies.

3. FDI, Spillover-Effects, and Crowding Phenomena in the Literature

The question if and how FDI contribute to economic growth in the developing world has for many years already been an issue of academic debate (see Hirschman 1958 for one of the earliest studies). While in the past the discussion had been subjected to dogmatic beliefs and ideological programs, today there exists a consensus according to which FDI are generally seen to have a substantial potential to contribute positively to economic development. There exists consensus that positive externalities and therefore impulses for economic development and growth outside the FIE-sector can first of all be expected when host regions succeed in realizing *spillover-* and *crowding-in effects* (De Mello / Luiz 1997; Markusen / Venables 1999).

Spillover-effects are here defined as an improvement of productivity in the domestically owned enterprise sector of a given industry which can be clearly attributed to externalities resulting from FIE. Crowding effects are understood as the impact of FDI on the investment behaviour of domestic enterprises. FDI may substitute domestic investment and therefore ‘crowd-out’. It can as well ‘crowd-in’ complementary domestic investments, which would not have been realized without the initial foreign investment. Spillover- and crowding effects are closely related. Spillover-effects may on the one hand induce domestic investments in so far as new knowledge is applied and technologies are implemented. On the other hand it is complementary domestic investment that may create the necessary preconditions for the realization of spillover-effects in the first place. Crowding-effects are usually studied from a macroeconomic perspective, while studies dealing with spillover-effects are focusing on industries or individual enterprises.

In recent years a substantial number of papers have been published dealing with (missing) evidence of FDI-induced spillover-effects in developing and transformation economies (cp. table 5). While those studies that are able to identify positive spillover-effects are still in the majority, the overall picture is ambiguous. As a matter of fact, some renowned economists have been questioning the existence of positive spillover-effects in general (Krugman 1998; Rodrik 1999).

Table 5: Results of selected research programs dealing with spillover-effects in developing and transformation economies

Author	*Date of publication*	*Observation period*	*Identification of spillover-effects*	*Spillover-effects not observable or with only minimal intensity*
Hu / Jefferson	2002	1995-1999	China (short-term: textile industry, long-term: both industries)	China (short-term: electronics industry)
Sjöholm	1999	1980, 1991	Indonesia	--
Aitken / Harrison	1999	1976-1989	--	Venezuela
Aitken / Hanson / Harrison	1997	1986-1990	Mexico	--
Kokko / Tansini / Zejan	1996	1988-1990	Uruguay (subsample with small technology gap towards FDI)	Uruguay
Harrison	1996	Morocco: 1985-89 Venezuela: 1983-88	--	Morocco, Venezuela (short-term)
Kokko	1994	1970	Mexico	--
Blomström / Kokko / Zejan	1994	1970, 1975	Mexico	--
Aitken / Harrison	1991		--	Venezuela
Haddad / Harrison	1991	1985-1989	--	Morocco
Blomström	1986	1970, 1975	Mexico	--
Own compilation.				

Even more ambiguous results can be identified with respect to research programs dealing with crowding-in or crowding-out effects in developing and transformation economies (see table 6). The impact of FDI on domestic investment is shown to fluctuate in a very broad range. While some authors can identify clearly positive effects (Agosin / Mayer (2000), Bosworth / Collins (1999)), others present equally convincing results indicating negative effects (e.g. Fry (1993) für Chile).

Table 6: Results of selected research programs dealing with crowding-effects in developing and transformation economies

Author	*Date of publication*	*Observation period*	*Identification of crowding-in*	*Identification of crowding-out*
Mišun / Tomšík	2001	1990-2000	Hungary, Czech Rep.[7]	Poland
Agosin / Mayer[8]	2000	1970-1996	Ivory Coast, Ghana, Senegal, South Korea, Pakistan, Thailand	Central Africa, Nigeria, Sierra Leone, Zimbabwe, Bolivia, Chile, Guatemala, Jamaica, Dominican Republic
Bosworth / Collins	1999	1978-1995	--	58 Developing Economies
Borensztein / Gregorio / Lee	1998	1970-1989	69 Developing Economies	--
Fry	1993	1966-1988	Malaysia, Korea, Thailand, Philippines, Indonesia	Argentina, Egypt, Brazil, Chile, India, Mexico, Nigeria, Pakistan, Sri Lanka, Turkey, Venezuela
Own compilation.				

Against the background of this highly in-homogenous empirical evidence the necessity arises to move on to more disaggregated levels and try to analyse which determinants contribute to the realization of positive spillover- and crowding-in effects and which determinants support crowding-out effects.

[7] The information processed for the Czech Rep. is based on yearly data for 1993-2000, and alternatively based on quarterly data for 1995-2000.

[8] Agosin / Mayer (2000) differentiate between *crowding-in*, *crowding-out* as well as neutral effects. Neutral effects are shown for: Gabon, Kenya, Morocco, Niger, Tunesia, PR China, Indonesia, Malaysia, Philippines, Sri Lanka, Argentina, Brazil, Columbia, Costa Rica, Ecuador, Mexico and Peru.

3.1. Theory-oriented Studies

Based on theoretical reasoning Rodríguez-Clare (1996) has introduced a model-theoretical approach according to which positive externalities of FDI can be expected, whenever

- the costs of communication between parent company and offshore production works are comparatively high. Rodríguez-Clare (1996) expects to observe especially strong linkage-effects for foreign invested enterprises that are rooted (parent company) in economies with large variations in terms of cultural and social structures as well as the system of law in comparison to the host economy.

- the stage of economic development in the host economy comes close to that of the parent company's. According to this approach any strategies designed to promote economic development in less developed regions by means of attracting foreign investors hold little promise of success.

- foreign invested enterprises employ production processes that to a high degree make use of local inputs. Linkages originating from foreign invested enterprises that are located close to the end of the value chain (i.e. close to the final consumer) are regarded as especially beneficial for the realization of spillover- and crowding-in effects.

Blomström / Globerman / Kokko (2000) present a theoretical approach for the analysis of spillover-effects and their determinants that is based on a differentiation of various 'supply'- and the 'demand'-structures for transferable technologies.[9] The supply of technologies that might be appropriated by local players is interpreted as depending on the foreign investors' cost benefit calculation: with what probability will the costs arising from a (potential) loss of proprietary knowledge and technology be over-compensated by the (potential) increase of the total corporate value made possible by the newly gained access to resources and/or markets. The demand for

[9] A similar approach is also employed by Burger (1998).

appropriable technologies is in analogy understood as being determined by the cost benefit function of the domestic enterprises. Spillover-effects are therefore not interpreted as a ‘free lunch’ for the domestic enterprises, as a free of cost transfer of new technology provided by the foreign investor. Rather they are understood as an offer to increase a company’s competitiveness and long-term corporate value, an offer, however, which has to be actively explored and involves costs (reverse engineering, training programs, etc.) as well as entrepreneurial risks. As a consequence the evidence of spillover effects must – inter alia – be dependent on the market value of the respective technology, the costs of protection against involuntary loss of proprietorship, the costs of absorbing the new technology and integrating it into existing corporate structures, as well as the competitive pressure prevailing in the host economy. This latter aspects implies that state owned enterprises with recourse to soft budget constraints (Kornai 1980) have only limited incentives to actively explore spillover-effects (Taube 2003).

A set of hypotheses dealing specifically with the crowding-phenomenon has been introduced by Agosin / Mayer (2000) and Bosworth / Collins (1999):

- FDI that introduce new products and services to an economy go along with positive impulses for the built up of the national capital stock. A crowding-out of domestic investors does not come about.

- FDI in sectors where domestic players are already engaged in similar activities bear a high potential for crowding-out effects.

- If foreign investors and domestic enterprises command similar technological standards, the competitive pressure arising from FDI may induce an increased investment activity of domestic enterprises as well. Such crowding-in phenomena, however, are contrasted with crowding-out effects, if the technological gap between domestic players and foreign investors is too high and the domestic enterprise sector cannot compete on an equal footing.

- FDI that do not induce crowding-out effects are not automatically prone to promote a crowding-in of domestic investments. In order to facilitate such effects,

the foreign investment projects have to become integrated in the domestic industrial fabric and establish forward- and backward-linkages.

– Greenfield-FDI go along with larger crowding-in effects than M&A transactions.

In contrast (or addition) to these theoretical approaches, the empirical literature emphasises the following parameters as of primary importance for the existence of spillover- and crowding effects.

3.2. Empirical Results

It seems to be trivial to state that the degree to which a foreign invested enterprise's manufacturing activities make use of local pre-products and emphasize **local content**, constitutes an important factor for the realization of backward linkages and therefore spillover-effects: the higher the local content, the greater the spillover-effects to be realized (Reuber et al. 1973). However, the analytical value of such a statement is greatly enhanced when considering the experience that foreign invested enterprises achieve especially high local content values, whenever they are catering primarily for the **domestic market** and do not implement an export-oriented business model. The local content seems also to increase with the **history** of a foreign investment project. The longer a foreign invested enterprise is based in an economy, the higher its local content (Reuber et al. 1973; Blomström / Kokko 1996).

The results of Schoors / van der Tol (2002), however, point in a different direction. In their study of the Hungarian transformation economy they come to the conclusion, that a strong **export orientation** is of great importance for the realization of positive externalities from foreign investment projects.[10] This result is consistent with a hypothesis put forward by Bhagwati (1978) and empirically confirmed by, inter alia,

[10] Szanyi (2002) extends this argument to the labor-intensive export processing industry and shows that in this fashion Hungarian enterprises have been able to achieve substantial positive spillover-effects. Bao / Lai (2003), however, see the reasons for a postulated lack of substantial spillover-effects in China just in the predominance of this business model.

Balasubramanyam / Salisu (1991) and Balasubramanyam / Salisu / Sapsford (1996) that FDI which are located in an export oriented environment excert greater growth impulses (positive externalities) than such which are embedded in a domestic market oriented environment. Moran (1998) supports these findings with case study research in Mexico and Asia.[11]

Irrespective of the discussion outlined above, the absorbtion of new technologies seems to be for the more feasible, **the less the newly introduced technologies differ from technologies already employed in the host economy** (Blomstrom 1986; Kokko 1994; Kokko / Tansini / Zejan 1996). The probability of positive spillover effects rises therefore when the technological capacities and knowledge bases of foreign invested and domestic enterprises are laying closely together. The larger the gap, the lower the capability of local enterprises to successfully absorb new, superior technologies (Knell / Radoševic 2000). From this perspective it seems to be impossible to achieve large strides in industrial development by means of FDI induced spillover-effects alone. Spillover effects cannot result in technological quantum leaps.[12]

These results are to a certain extent supported by the Borensztein / De Gregorio / Lee (1998) study. Here the existence of a **minimum stock of human capital** is shown to be a *conditio sine qua non* for the realization of FDI induced positive growth effects in the host economies (69 developing economies in the Borensztein / De Gregorio / Lee study).

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[11] This effect stands in direct contrast to the hypothesis that domestic market oriented foreign investment projects achieve greater linkage- and therefore spillover-effects. One possible explanation to unravel this paradox might be seen in the fact that the various studies highlight different forms and modes in which potential efficiency improving measures are made accessible to domestic players by foreign invested enterprises. While the former argument highlights the direct backward linkages emanating from foreign invested enterprises, the latter argument concentrates on global standards for process and product quality as well as efficient production management which are emanating from the global markets and are transmitted via foreign investors.

[12] Sjöholm (1999), however, comes to the conclusion that large technology gaps go along with greater (!) spillover-effects. Sjöholm argues that the relationship between technology gap and spillover-effects should not be understood as a linear function. In contrast, in the early stages of overall economic development he argues spillover-effects may become greater, the greater the underlying technological gap. It is only after the ‘supply’ of FDI introduced technologies exceeds a certain treshold of complexity, that the local capacities for technology appropriation become insufficient and the spillover-intensity is reduced. With this reasoning Sjöholm is able to integrate the Borensztein / De Gregorio / Lee (1998) results in his framework.

A comparatively well established result of the empirical literature is the great importance of a **competitive environment** for the realization of spillover effects: A high intensity of the competitive process is promoting spillover effects (Sjöholm 1999; Kokko 1996; Blomström / Kokko / Zejan 1994). The reasoning underlying this interrelationship has to be seen in the fact that positive externalities stemming from FDI inflows are not a free lunch. Rather they have to be actively explored and substantial initial costs have to be born (Kathuria 2000). Competitive surroundings creative the incentives and motivate entrepreneurs to invest in the appropriation of new technologies and facilitate spillover-effects.

Confronting the set of hypothesis dealing with the phenomenon of crowding effects with the empirical literature, all the arguments outlined above find their empirical support. Of central importance, however, seems to be the technology nexus. Kokko (1994), for example, shows that in the case of Mexico a **large technology gap** (a high productivity differential) between foreign invested enterprises and local enterprises in connection with **large market shares by the foreign invested enterprises** does not only inhibit the realization of spillover-effects, but at the same time results in an accelerating crowding-out of domestic enterprises.

3.3. Conclusion and Hypothetical Linkages

In conclusion it can be stated that the theoretical as well as empirical literature discussed above provides us with some (not always unambiguous) indications what parameters have to be in place in order to facilitate positive spillover- and crowding effects from FDI. The main hypothesis to be derived may be summarized as follows:

Hypothesis 1: The larger the cultural gap between parent and FDI-venture the greater the positive externalities of FDI.

Hypothesis 2: The smaller the developmental / technological gap between FDI-‘country of origin’ and host economy the greater the positive effects.

Hypothesis 3: The closer a FDI-venture is operating at the end of the value chain, the greater the potential for backward linkages (local content) and positive externalities.

Hypothesis 4: The greater the incentives / pressure (hard budget constraints, strong competition) for domestic enterprises to constantly improve their operations, the more positive externalities from FDI will be explored.

Hypothesis 5: FIE that do not introduce new products may harm (crowd out) the domestic industry.

Hypothesis 6: Without adequate human capital in the host economy, no positive externalities from FDI can be realized.

The evidence for export or domestic market oriented FIE is inconclusive with regard to the direction of its causality.

One finding, however, seems to stand out: the growth enhancing and development promoting potential of FDI has to be actively explored by the host regions (OECD 2002) and is dependent on the existence of specific structural and institutional preconditions (Nunnenkamp 2002:a; Lim 2001).

4. FDI-induced Spillover- and Crowding Effects in China

Against the background of the quantitative and structural characteristics of China's FDI inflows (chapter 2) and the theoretical as well empirical discourse in the general literature (chapter 3), the discussion will now proceed to the question in how far FDI inflows may have had an indirect impact on economic development and growth in China, especially in the form of FDI-induced spillover-effects and crowding phenomena.

During the 1980s the discussion what role FDI might play in and for the Chinese economy was primarily an inner-Chinese discourse on the compatibility of FDI with the ideological foundations of the state.[13] It has been only after the first Chinese FDI-boom in the middle of the 1990s that a literature sprang up which dealt with the structural characterists and determinants of China's FDI inflows (e.g.: Broadman / Sun 1997, Chen 1997, Development Bank of Japan 2003, Henley / Kirkpatrick / Wilde 1999, Khan 1991, Lemoine 2000, Qu / Green 1997, Zhang Xiaohe 2000). Research agendas dealing explicitly with the FDI-growth nexus and the spillover and crowding phenomena in particular are in the minority. In the face of China's impressive economic growth statistics, FDI are obviously often *a priori* deemed to provide positive stimuli. But in the end, what are the mechanisms, what are the linkages by which FDI promotes economic development in China?

One of the very first papers discussing the issue of FDI-induced spillover-effects by Hiemenz / Li (1988) comes to the conclusion that positive externalities of FDI inflows had been hardly observable. The strongest indications for positive effects were found in export-oriented operations. For the middle of the 1980s already Hiemenz / Li observe significant regional distinctions in the empirical evidence of FDI-induced positive externalities.

A similar conclusion is derived in Luo (1999) who is analyzing the impact of FDI on the industrial structures of the Special Economic Zone Xiamen during the years 1980-1995. According to her qualitative research Xiamen's FIE had been isolated

13 See for example the documentation in Hsu 1991.

from the domestic economy and were hardly in a position to create any spillover-effects.

Another piece in the jigsaw is provided by Young / Lan (1997). Their questionnaire-based survey of FIE in Dalian shows that the vintage of the technologies employed in the FIE had been on average only two years younger than those employed by the domestic industry. The technology gap between domestic industry and FDI-parent companies, however, had rather been in the range of 20 years. The hypothetical demand for only minor technology gaps between foreign investor and host economy is therefore fulfilled. However, in the Young / Lan study the evidence of positive externalities and spillover-effects in particular remains comparatively weak.

Dees (1998) studies the impact of FDI on the total Chinese economy. He comes to the conclusion that during the 1980s FIE did not have an observable positive impact on productivity. It has to be noted that during this period, FIE were clearly dominated by Overseas Chinese and being largely isolated from the Chinese market followed a export-oriented business model.[14] During the 1990s, however, he observes significant spillover-effects. These results imply that during this period FIE did contribute to a reduction of Romer's (1993) ‚idea gap' (in contrast to the ‚object gap') in the Chinese economy.[15]

Shen / Geng (2000:a), Bao / Lai (2002) as well as Cheng (2002) come to similar conclusions and see FDI as a facilitator of productivity increases in China and a means to reduce the technology gap between China and the leading industrial economies. For Cheng (2002) and Shen / Geng (2000:b) this positive effect hinges on China's well educated labor force and its comparatively strong human capital endowment.

Chen (2000) and especially Bao / Lai (2002), however, reject the idea of positive externalities. In their analysis the productivity increases in the Chinese economy are caused by the addition of a modern ‚foreign' capital stock. In their understanding

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14 The dominant business model was circumscribed as 'having both heads abroad' (liang tou zai wai), implying the preproducts were imported to China, here assembled and eventually re-exported on the global markets.

productivity increases are mostly confined to FIE-internal developments. They identify only minimal spillover-effects on the domestic enterprise sector. The lack of significant spillover-effects is deemed to be the result of:

- a concentration of FDI in export processing industries which rely on the import of pre-products and export of final products without creating a significant number of contact points with the Chinese economy;

- a sub-optimal utilization of the educational function of FIE due to (a) the fact that staff that has been employed and trained in FIE is often not willing to change back into the domestic enterprise sector as FIE provide them with better renumeration and high social prestige, and (b) the governmental discrimination of private entrepreneurship which has made a change into the private sector highly unattractive for staff employed in FIE.[16]

- measures by FIE designed to prevent the loss of proprietary knowledge and technology and which inhibit spillovers to the domestic enterprise sector.

However, the results of the Bao / Lai (2002) study seem to be biased in so far as the analysis does not differentiate between various regions in China. A detailed regional analysis should produce quite distinct results. Export processing oriented FIE, for example, are highly concentrated in the Cantonese Pearl-River-Delta, while FIE located in the Shanghai metropolitan area are conducting a broad range of different and highly versified business models.

Zhang / Zhang / Zhang (2001) present a different line of reasoning. In their analysis the lack of significant spillover-effects is caused by a lack of competitive pressure, an insufficient human capital stock as well as a tendency of Chinese enterprises to strive for the appropriation of tangible technologies, but neglect the complementary

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15 Similar also Yang / Chao (2000).

16 The specific importance of the private enterprise sector for the realization of positive externalities from FDI (Taube 2003) has in the case of China been highlighted by Huang Yasheng (Huang 2001, IMF 2002). In his understanding, the massive inflow of FDI has to a considerable extent been caused by a faulty incentive system in the state enterprise sector and heavy discrimination of the domestic private sector (Huang 2001, 2002, 2003).

intangible knowledge. As a result new technologies cannot be employed to their full potential.

The issue of ownership forms and their relevance for the realization of spillover effects has been introduced to the literature by Li et al (2001). They find indications that China's state owned enterprises have not been able to realize any spillovers based on demonstration or transmission-effects. In the terminology of Blomström / Globerman / Kokko (2000) this might be interpreted as a lack of incentives to invest in the appropriation of new technologies.
A highly differentiated study has been presented by Hu / Jefferson (2002). They do not only differentiate between two sectors, i.e. textile and electronic industry, but also test for the parameter ‚cultural affinity' by differentiating between FDI originating in Hong Kong, Macao, Taiwan and FDI originating in the rest of the world. However, a differentiation for various regions in China is missing. In contrast to Bao / Lai (2002), Hu / Jefferson establish at least in the longer term positive spillover effects. With respect to the parameter ‚cultural affinity' they come to the conclusion that FDI originating in Hong Kong, Macao and Taiwan have had a significantly smaller impact on productivity developments than FDI originating in other parts of the world.

One of the probably most enlightening studies has been presented by Buckley / Clegg / Wang (2002). The authors differentiate not only on the 'supply'-side of appropriable technologies between Overseas Chinese investors and non-Chinese investors, but also differentiate on the 'demand' side of spillover effects between state owned enterprises and collectively owned enterprises. The results are in line with expectations and end the state of inconclusive results stemming from undifferentiated cross sections of the 'supply' and the 'demand'-side. Non-Chinese investors are shown to have significantly greater effects on productivity increases and export performance of domestic enterprises than Overseas Chinese FDI. On the 'demand-side state owned enterprise are identified as a clearly identifiable subgroup in the domestic enterprise sector that does not realize substantial spillover effects. Unfortunately the results are based on the 'third industry census' from 1995, and are therefore foregoing the most dynamic period of China's FDI inflows, which – as shown above – had begun to accelerate only in 1992.

With regard to the phenomenon of crowding effects it has already been mentioned that Agosin / Mayer (2000) have not been able to establish any definite proof for crowding-in or crowding out effects in China during the period of 1970-1996. However, with their study dealing with the national economy and not differentiating between various regions therein, this result does not imply that there have not been any crowding-effects in the Chinese economy. In the period under consideration the Chinese economy was characterized by a high degree of fragmentation and regional protectionism. Taking into account that China's FDI inflows have been featuring a strong regional concentration (Wu 2002), it might be presumed that FDI has a markedly different impact on domestic investment activity in those regions where it commands a large share in fixed capital formation (e.g. the Pearl River Delta) than in other regions where it is much less involved in the local fixed capital formation (e.g. in Qinghai province). A research agenda which is looking at the national economy as a whole misses these regional specifica and turns out quite ‚wrong' averages.

Huang (2003) does not explicitly deal with the crowding phenomenon. His analysis, however, provides strong indications for a crowding-out of domestic investors by FIE. Huang argues that China might have been absorbing more FDI than necessary or welfare maximizing, as domestic private enterprises have not been allowed to compete with foreign investors on an equal footing (see box 1). Buckley / Clegg / Wang (2002) provide support to the crowding-out hypothesis, showing that Overseas Chinese FDI has had a crowding-out effect on domestic state owned enterprises in industries where their products had been competing directly (e.g. textiles, food).

Box 1: Has China attracted too much FDI? – or Why there should exist a strong domestic private sector?

Huang's 2003 analysis draws the limelight on some serious problems in the relationship between the domestic private enterprise sector and FIE in China. Not only has private sector initiative not been sufficiently tapped in order to spread FDI-induced growth impulses over the economy, but private entrepreneurs have been systematically discriminated against (e.g. with respect to the availability and price of bank loans, access to international markets, provision of legal security, etc.) which has resulted in a substitution of domestic entrepreneurship by FIE. There can be some regions and industry branches identified where China might have attracted more FDI than necessary and is therefore foregoing economic rents, which could have flown to domestic actors instead. A substantial share of the economic activities conducted by and rents accruing to Southern China's export-processing low-tech FIE, for example, might as well have been generated by domestic enterprises.

By discriminating against the domestic private sector and discouraging the foundation and expansion of private enterprises, the Chinese government has been distorting the incentive structures potential domestic entrepreneurs have been facing. Under the given conditions a large number of potential entrepreneurs has therefore rather opted for working in a foreign funded enterprise where it has been possible to earn above-average salaries – without any entrepreneurial risks – than to take the risk of becoming a politically ostracized private entrepreneur.

In general it can be stated that FIE exert a strong attraction on the entrepreneurial and professional elite of their host economies. FIE are prestigious employers, offer above-average salaries, provide modern on-the-job-training and the possibility to substantially upgrade an employee's human-capital, i.e. market-value (de Backer and Sleuwaegen 2002). If in the face of these pull-factors potential private entrepreneurs are also pushed into dependent employment as private sector initiatives are discriminated against, the economy as a whole runs into the danger of wasting its entrepreneurial potential and obstructing the evolution of a strong domestic private enterprise sector.

5. Open Questions and the Way Ahead

Seen in perspective the evidence for FDI-induced spillover- or crowding effects in China is rather unsatisfactory. The empirical evidence for positive externalities from FDI is much weaker than intuition tells us. What is wrong: intuition or the empirics?

One major problem obviously lays in the data available for quantitative processing. Most studies presented here are based on the 'third industry census' from 1995, published in 1997. This is the only comprehensive data set available that allows detailed econometric analysis. Unfortunately in 1995 the second, decisive Chinese FDI-boom had just begun. Until then China's FDI inflows had been dominated by Overseas Chinese conducting export processing businesses from selected industrial regions in Southern China. Since then the Chinese FDI-'landscape' has changed dramatically. These recent developments remain mostly unexplored. However, with the next industry census scheduled for 2005 – with an expected publication date of 2007 – only incomprehensive, fragmented data sets are available for analysis.

But irrespective of the issue of data availability, the existing research results leave a wide array of questions unadressed. Bringing the major hypothesis brought forward in the literature into context with the specific characteristics of China's FDI inflows a substantial number of issues and open questions arises that seem not yet to have been consequently included in China-specific research agendas (see table 7).

Table 7: Issues Arising from the Characteristic Features of China's FDI-Inflows for the Operationalization of the Hypothesis-Bundle

	Feature 1 - time -	Feature 2 - region -	Feature 3 - government -	Feature 4 - culture -
Hypothesis 1 - cultural gap -	HMT have dominated China's FDI inflows during the 1990s, since then their share has been dwindling	HMT are heavily concentrated in certain regions (Pearl River Delta, Fujian, etc.)	Have HMT been treated differently, or have they been able to circumvent government regulation?	Differentiate between HMT and FFE! What business models are dominated by HMT?
Hypothesis 2 - technology gap -	Has the technology content of FDI been increasing over time? Has the technology content of FDI been changing in terms of its 'spill-over-fit' with host economy standards?	The various Chinese regions are featuring different technological development stages	Has state intervention been neutralizing the technology gap argument?	Do HMT and FFE FDI feature different technology contents?
Hypothesis 3 - value chain -	Have FIE business models changed over time?	Do FIE operate different business models in different regions?	What impact has state intervention have had on FIE-business models and their position in the value chain?	Do HMT and FFE operate different business models?
Hypothesis 4 - competition -	The incentives for Chinese enterprises to actively explore spillover effects have become much more pronounced.	Are there regional differences in the prevalence of competition and hard budget constraints?	Has state intervention increased or decreased the willingness of domestic enterprises to actively explore spill-over effects?	Is there a difference in the appropriability of technology from HMT and FFE?
Hypothesis 5 - new products -	FIE have been changing their production schedules and product mixes over time.	The various regions do feature different industry specializations	State interventions did have an impact on the FIE product mixes.	Is there a difference in the production schedules and product mixes of HMT and FFE?
Hypothesis 6 - human capital -	China's human capital endowment has over the last 25 years improved significantly	The various regions do feature very different human capital endowments	Have state interventions resulted in a channelling of scarce human capital into specific uses?	Have HMT technologies been more accessible, therefore demanding less human capital?
Own compilation				

Most of the issues outlined in the matrix above have not yet been adequately addressed in the literature. In order to do so, however, complex data sets will have to be accessed. In some cases, where available data sets are sub-optimal, quantitative studies might be enhanced in their explanatory power by means of case studies.

One major issue that remains pending seems to be the question of the role of 'cultural affinity' for the realization of positive externalities from FDI. With China's FDI inflows being characterized by a marked duality between Overseas Chinese and OECD-investors, China should be an ideal place to study this question not only on a China-specific level, but also in order to derive results of general applicability.

On the analytical level, however, a differentiation for cultural affinity may proof very tricky as FDI projects by Overseas Chinese and OECD members do not only differ according to cultural affinity. At the same time there exist distinct differences in terms of the business models employed, the size of the average investment project, the technology content, the business sector enterprises are operating in, etc. The integration of a cultural affinity variable into spillover-models, therefore amounts to a formidable measurement problem. What is declared as a cultural influence might in reality be an effect resulting from the business model, technology content, etc. going along with FDI projects by Overseas Chinese and OECD members

A further field still being greatly under-represented in the literature is the issue of 'demand' for appropriable technology as described in Blomström / Globerman / Kokko (2000). What incentives have Chinese state owned enterprises been facing with respect to the appropriation of new technologies? Has there been a strong entrepreneurial motivation to explore these opportunities or has the potential ‚supply' of technological innovations provided by FDI rather evaporated in an atmosphere of indifference? How have these structures changed over time and can we identify regional differentiations?

The regional dimension of FDI-induced spillover- and crowding effects in China is another still mostly untackled problem. This constitutes, however, a problem that implies important policy implications. Given the notion that the least developed economies as well as the most backward regions in a given host country feature the least

adequate prerequisites to achieve positive externalities from inflowing FDI (Nunnenkamp 2002:b) and the experience that it might be even more difficult to realize positive externalities from FDI-inflows than to attract them in the first place, the soundness of the overall design and policy-mix of China's 'Great Western Development Programme' becomes open to question. Is there really a chance to profit over-proportionally from FDI-flows into China's hinterland, or might a simply cost/benefit analysis rather indicate the vanity of such a – costly – effort?

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