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FDI distribution within China: An integrative conceptual framework for analyzing intra-country FDI variations

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Abstract The literature on foreign direct investment (FDI) has evolved in separate theoretical silos and a holistic conceptualization is yet to emerge. Research has focused mostly on inter-country differences and not much on explaining intra-country FDI variations. Traditionally FDI locations have been evaluated through country-level FDI determinants even though provinces differ widely in infrastructure and other attributes. Further, neither is the varying importance of FDI determinants to different industries factored in, nor are the differing FDI incentives from national and provincial governments integrated into a single framework. To address these gaps this study synthesizes insights from three streams of FDI research and develops an integrative conceptual framework that can comprehensively analyze intra-country FDI inflows. We demonstrate the usefulness of the framework by empirically analyzing FDI trends within China's 31 provinces. The study thus makes a substantive contribution by offering scholars, policy-makers, and practitioners a holistic conceptual and methodological approach for understanding FDI trends within a country.

Keywords FDI location decision · China · Investment incentives · Industry-specific FDI determinants · Intra-country FDI variations

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Foreign direct investment (FDI) has been researched through several isolated theoretical silos and an integrative perspective has not evolved. Selecting a suitable FDI location is essentially a firm-level transaction involving analyses of various elements in the global, national, and regional environments at the macro level and firm-specific factors at the micro level (Aharoni, 1966; Buckley, Devinney, & Louviere, 2007). Traditionally FDI flows and trends have been analyzed through country-level political, economic, demographic, and infrastructural variables; collectively called *FDI determinants* (Hofstede, 1980; Nigh, 1985; Root & Ahmed, 1978). Scholars are yet to advance a comprehensive perspective that can facilitate more fine-grained analyses of potential FDI locations and investment trends within countries. Hence the central research question of this study is: "Can intra-country FDI variations be better explained by integrating various FDI determinants into a holistic framework?"

Analyses using country-level FDI determinants perhaps made sense during the Cold War era when few Third World countries allowed FDI and thus multinational enterprises (MNEs) had limited intra-country location choices. The situation has changed dramatically and most developing countries now welcome FDI thus increasing prospective locations manifold (Dunning, 1998). Due to increasing competition for FDI even provincial governments are now offering lucrative investment incentives to different industries (UNCTAD, 2006). However, the current practice of using country-level FDI determinants does not allow more precise comparative evaluation of intra-country FDI locations. Moreover, although the institutional economics stream has examined the impact of government incentives upon FDI decisions (Mudambi & Navarra, 2002) this factor has not been integrated with other traditional FDI determinants.

There is, therefore, a need for conceptual integration of all factors that impact FDI at the provincial level. Our study addresses these gaps by presenting an integrative conceptual framework that can analyze FDI distribution in different industries and provinces within a country. The framework differentiates the relative importance of the province-level FDI determinants to different industries and also integrates the varying FDI incentives from the national and provincial governments.

This study thus makes several substantive contributions: (1) it synthesizes three different research streams within a single framework, namely, country-level FDI determinants usage from the traditional FDI theory, the investment incentives perspective from institutional economics, and firm-level strategy considerations; (2) it shifts the focus from broad-based country-level analyses to the more precise and useful province-level analyses of FDI inflows; and (3) it suggests a methodology for more accurate evaluation of FDI determinants as per their importance for different industries. Consequently, the study can provide useful insights to international business scholars, government policy-makers as well as to MNE managers. While the framework can analyze FDI variations within any country we illustrate its efficacy by empirically analyzing the regional disparities of FDI across the manufacturing, information technology (IT), and extractive industry sectors within the 31 provinces of China during 1999–2006.

Theoretical background

The location, control, and process of internationalization of MNEs lie at the core of the academic discourse in international business research (Eden & Lenway, 2001). The early literature had provided a theoretical rationale for cross-border production and FDI mainly through the industrial organization economics research stream; e.g., *costs of doing business abroad* and *internalization* (Hymer, 1960; Kindleberger, 1969), *firm-specific competitive advantages* (Buckley & Casson, 1976; Caves, 1971), *risk diversification* (Rugman, 1979), *product-life-cycle* theory (Vernon, 1966), and the *eclectic paradigm* (Dunning, 1980). The "Uppsala Model," which posited an incremental *internationalization process* (Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975), and *liability of foreignness* that highlighted the MNE subsidiary's disadvantages in the host country (Kostova & Zaheer, 1999; Zaheer, 1995) supplemented those approaches. Notably most theoretical perspectives focused on FDI only at the country level.

The post-World War II reconstruction revived economic activity and boosted international business mainly in Western Europe, which received massive investments from MNEs from the US. While the capitalist democracies welcomed FDI much of the rest of the world was hostile to it due to fears of neocolonialism. This induced most Third World countries in Asia, South America, and Africa to adopt the socialist economic model instead and enact very restrictive regulations against FDI; symbolized by Vernon's *Sovereignty at bay* (1971). Suitable FDI locations were sparse with hardly any intra-country location options and thus FDI analyses at country-level sufficed.

Potential FDI locations were evaluated mainly through various *FDI determinants* such as economic and political stability, host government policies, market size, gross domestic product (GDP), cultural distance, tax rates, wages, corruption, and production and transportation costs (Hofstede, 1980; Nigh, 1985; Root & Ahmed, 1978; Sethi, Guisinger, Phelan, & Berg, 2003). With such country-level variables, micro-analyses of FDI locations and trends were not feasible (Rugman & Verbeke, 2007).

The developmental economics literature has shown how FDI motivations change in step with the host country's economic development (Dunning, 1986; Narula, 1996). For instance, the *investment development path* shows that less developed countries attract mostly *resource seeking* and *efficiency seeking* FDI in product markets or labor-intensive production tasks, but as their technological infrastructure improves they attract FDI in greater value-added activities. Likewise, Ozawa's (1992) notion of the *stages of economic development* also links the pattern of FDI to the host country's stage of development. A country in pre-take-off stage attracts FDI in primary product and labor-intensive sectors, while one in the take-off stage attracts it in medium or large capital-intensive sectors. In this research stream too FDI determinants have been considered only at the country level.

The role of governments in providing a conducive environment for FDI by ensuring pre-requisites like political and economic stability, rule of law, and sound infrastructure has been examined in the institutional economics literature (North, 1991). In addition, potential FDI locations must have skilled labor, low wages, an open economy, and stable currency (Narula & Wakelin, 1998; Noorbakhsh & Paloni, 2001). Such pre-requisites take time to build, are incremental, path-dependent, and rooted in the institutional heritage of the host country. However, this literature applies infrastructure attributes generically without differentiating their relative importance industry-wise. Dunning and Lundan (2008) seek to integrate an institutional dimension into the *eclectic paradigm* with a view to bridging the macro and the micro levels of analysis.

The institutional economics literature has analyzed the role of government incentives (Dicken & Tickell, 1992; Woodward & Rolfe, 1993) under the following approaches: (1) liberalizing the general environment for trade and investment at the macro level; (2) incentives targeted to attract FDI into specific industries/sectors; and (3) project-specific incentives negotiated with individual MNEs (Sethi, Guisinger, Ford, & Phelan, 2002). Research however has shown that tax incentives and infrastructure supports do not always attract significant FDI, especially into the high-technology sector (Beattie, 2003; Mudambi & Mudambi, 2005).

In recent years some scholars have begun to analyze FDI flows within countries. For example, Mudambi and Navarra (2003) sought to explain FDI variations within Italy by examining political culture differences, while Mariotti and Piscitello (1995) explained the same by analyzing differences in information costs. Meyer and Nguyen (2005) linked FDI strategies to sub-national institutions within emerging markets and provided evidence from Vietnam. Nachum (2000) took an economic geography perspective to examine the clustering of financial and professional services FDI within the US. Likewise, Hennart and Park (1994) analyzed product- and firm-level determinants of a Japanese firm's propensity for manufacturing FDI into the US. Intra-country FDI determinants thus facilitate more fine-grained analysis of FDI locations by factoring in the firm's idiosyncratic requirements as per its industry and strategy (Bush, 2007).

Several studies have examined FDI into China through different theoretical perspectives. One research stream has sought to analyze the spatial and temporal variation in FDI among China's provinces (He, 2002; Hon, Poon, & Woo, 2005; Sun, Tong, & Yu, 2002; Wei, Liu, Parker, & Vaidya, 1999). Most such studies highlighted high volumes of FDI and agglomeration effects in the coastal provinces because of superior infrastructure, greater economic development, and establishment of special economic zones therein. Ethnic links to Taiwan and Macao also play a major role and significant FDI comes in as "*round tripping*" (UNCTAD, 2006). Another stream of literature has focused upon the entrepreneurial and institutional factors influencing FDI into China, which essentially provide yet another explanation for the evolution and concentration of industry clusters, especially in the coastal provinces (Ahlstrom, Bruton, & Yeh, 2007; Peng, 2005; Yang & Li, 2008). Redfern and Crawford (2009) examine the effect of the levels of industrialization of different provinces on the regional differences in business ethics in China.

In sum, FDI has been examined through several research streams but there is no holistic conceptual framework that synthesizes different perspectives. Furthermore, while there is now increased focus upon intra-country FDI flows, traditional country-level determinants cannot adequately describe or explain these flows. Finally, some important FDI determinants still remain understudied, especially their varying importance to different industries.

Conceptual framework

The FDI location decision is impacted by environmental as well as endogenous factors, but traditionally it has been evaluated through country-level FDI determinants (Barkema & Vermeulen, 1998; Dunning, 1993). Locations should ideally be evaluated on local factors but since location-specific data are seldom available FDI determinants must be at least at the province-level. Endogenous firm-strategy factors influence location decisions even more profoundly. Since the importance of FDI determinants varies as per each firm's strategy ideally those should be weighted firm-wise. However, such analyses would become unmanageable and therefore FDI determinants could be weighted industry-wise and applied to all MNEs within that industry. A stylized depiction of the conceptual framework is presented in Figure 1. We now discuss various factors in more detail.

Matching FDI determinants with MNE strategy

A potential FDI location could have several natural and man-made attributes that confer the MNE with a *location advantage*. In the past, researchers have analyzed

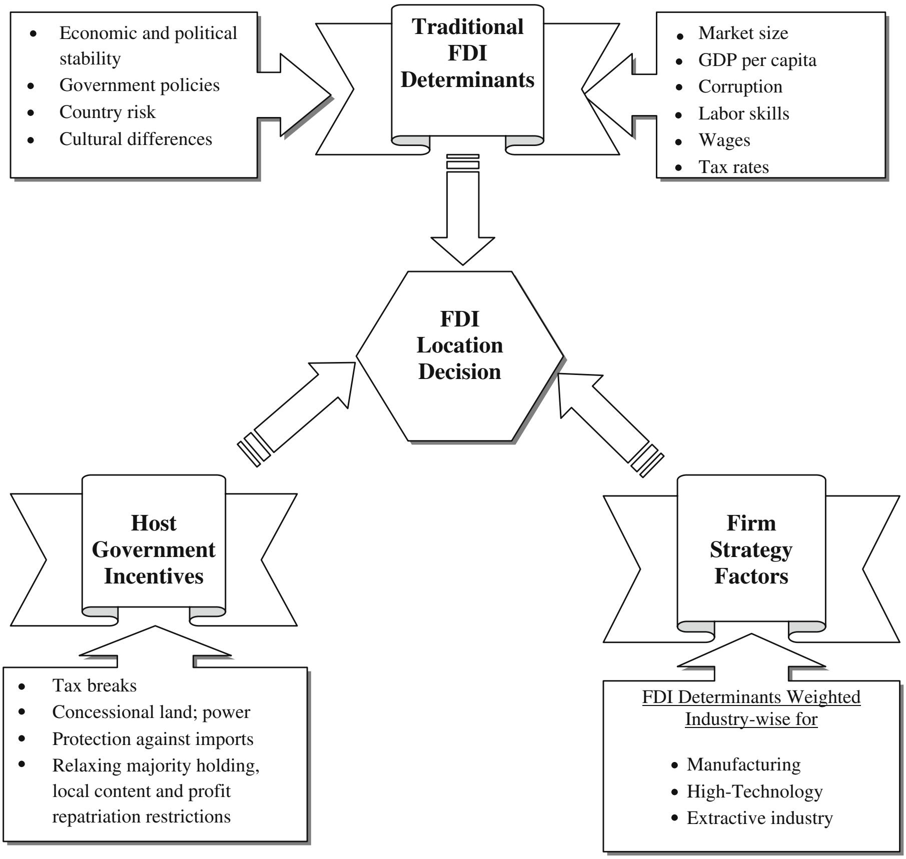


Figure 1 A refined FDI location decision framework

attributes such as geographical location (e.g., proximity to a port), terrain, climate, natural resources, economic development, infrastructure, logistics, skilled personnel, and wages as FDI determinants (Fagre & Wells, 1982; Root & Ahmed, 1978). However, empirical results have been mixed and no collection of determinants has been able to explain FDI variations comprehensively (Flores & Aguilera, 2007).

The notion of *fit* within the mainstream strategy literature emphasizes the alignment of the firm's strategy with its external environment (Andrews, 1971; Chandler, 1962). In the context of the FDI location decision, *fit* implies that the exogenous location attributes must closely match the endogenous firm-strategy requirements of the focal firm. However, the extant practice of assuming FDI determinants to be equally important for all industries is erroneous since the infrastructure and labor skill needs differ for each industry. For instance, geographical location, logistical infrastructure, power, low wages, and vocational skills are more important for the manufacturing sector, but communications, IT infrastructure, and technical skills are more critical for the high-technology sector. Similarly, the importance of location attributes for MNEs in the extractive industries (oil and gas) is also different from the manufacturing and high-technology industries.

The relative importance of FDI determinants to different industries must therefore be incorporated into any theory of FDI location decisions, particularly for emerging economies where FDI is crucial (Butkiewicz & Yanikkaya, 2008). Raw FDI determinants do not constitute *location advantages* till those closely match each firm's unique strategy. However, since attempts to match them to each firm's strategy could confound analyses each FDI determinant could be assumed to be equally important to all firms within that industry. FDI determinants should therefore be weighted as per their relative importance to each industry and only then could those be deemed to provide *location advantages* to all firms in that industry. We call such weighted FDI determinants *industry-weighted location advantages*. These must be derived separately for the manufacturing, high-technology, and extractive sectors to better explain intra-country FDI variations. We therefore hypothesize:

Hypothesis 1 FDI determinants, weighted according to their importance for respective industries, will better explain intra-country FDI inflow variations than un-weighted FDI determinants.

Government incentives

MNEs select FDI locations that have good infrastructure and other attributes that best match their firm strategy. However, governments often enhance the attractiveness of remote areas by offering more lucrative investment incentives (Mudmabi & Navarra, 2002). Most such incentives are broad-based and designed to attract general-purpose investments that promote basic economic development. However, to attract investment into high-technology industries governments offer targeted incentives that are customized to *fit* the strategic requirements of specific MNEs. Many national and even provincial governments are now increasingly competing for FDI through more lucrative incentives (UNCTAD, 2006). Differentials in such incentives contribute to the inter-province FDI inflow variations and hence need to be integrated into the framework.

FDI incentives can take the form of tax holidays and concessions, subsidized land, lower power tariff, protection against cheaper imports, and relaxation of majority ownership, local content, and profit-repatriation regulations. Studies have shown that host country's tax rates are among the most significant factors affecting the volume and location of FDI (He & Guisinger, 1993; Hines, 1996; Tung & Cho, 2001). A *Fortune* (1977) survey had found that of the 26 factors sampled corporate taxes ranked fifth in the FDI decision.

However, government incentives cannot compensate for the lack of intrinsic location advantages and attract FDI only if prerequisites such as sound political and economic environment, good infrastructure, etc. are met (Sethi et al., 2002). Furthermore, prerequisites for the high-technology sector such as communications, IT infrastructure, and technical skills are far more stringent than those for the manufacturing or extractive industry sectors. Developing countries especially seldom meet those prerequisites and consequently even large incentives fail to attract FDI into the high-technology sector. Mudambi and Mudambi (2005) found that incentives for the relatively undeveloped areas of the UK were negatively correlated to knowledge generation and concluded that incentives to resource-poor areas attract only low-technology. The infrastructure and labor skill requirements of the manufacturing and extractive industries however are less stringent and therefore the general-purpose incentives are more successful in attracting FDI into those sectors. Hence the following hypotheses:

Hypothesis 2a General-purpose incentives will be more effective in attracting FDI into the manufacturing and extractive sectors than in the high-technology sector within emerging economies.

Hypothesis 2b Targeted incentives for the high-technology sector will not be effective in attracting FDI into the high-technology sector within emerging economies.

Combining government incentives and industry-weighted location advantages

Empirical studies that analyzed FDI inflows using country-level FDI determinants have focused upon specific determinants such as tax rates, technology, or government policies while controlling for the other determinants (Li & Guisinger, 1992; Root & Ahmed, 1978). FDI inflows have also been analyzed at the level of a group of countries and regions (Nigh, 1985; Noorbakhsh & Paloni, 2001; Sethi et al., 2002). However, traditional country-level FDI determinants cannot analyze intra-country FDI variations, and no comprehensive collection of FDI determinants exists within this research stream that can fully explain FDI inflow variations even at the country-level. Some studies have analyzed regional FDI variations within China but their conclusions are broad-based and mainly highlight the concentration of FDI in the coastal regions (He, 2002; Sun et al., 2002; Hon et al., 2005; Wei et al., 1999; Zhang, 2001).

Government incentives have been analyzed as an FDI determinant within the institutional economics stream but have not been integrated with other determinants

(Cantwell & Mudambi, 2005; Mudambi & Mudambi, 2005). Such incentives are becoming increasingly attractive, which enhances their influence upon the FDI location choice. Hence, we integrate province-wise government incentives into the model with industry-weighted FDI determinants to increase the explanatory power.

Pertinently, none of the two sets of factors individually can fully explain intra-country FDI inflow variations. As Buckley et al. (2007) argue the FDI location decision is more an elaborate process than a single point decision for which MNEs comprehensively evaluate all relevant factors to select the best location overall. The final choice could involve several trade-offs between different determinants to ensure the right *fit* with the firm's strategy (Andrews, 1971; Chandler, 1962). Hence, it is the combined effect of industry-weighted location advantages and government incentives as represented by the interaction of both variables that more substantively influences the final choice.

As regards the relative importance of the two factors we believe that industry-weighted location advantages are overall more influential in the FDI location decision than government incentives. Absence of government incentives is unlikely to deter MNEs from investing in locations that provide strategic advantages, while conversely no FDI can be attracted merely through incentives in the absence of intrinsic location advantages.

The interaction of *industry-weighted location advantages* in each province with that province's *government incentives* therefore reflects their combined effect, and will more accurately mirror FDI inflow disparities between provinces than those factors individually. Such interaction terms must be derived for each industry.

Hypothesis 3a The interaction between a province's weighted location advantages for the manufacturing sector and government incentives will more accurately predict FDI inflow variations within a country than the un-weighted factors.

Hypothesis 3b The interaction between a province's weighted location advantages for the high-technology sector and government incentives will more accurately predict FDI inflow variations within a country than the un-weighted factors.

Hypothesis 3c The interaction between a province's weighted location advantages for the extractive industry sector and government incentives will more accurately predict FDI inflow variations within a country than the un-weighted factors.

In sum, the foregoing sets of hypotheses essentially assert that the combined effect of the industry-weighted location advantages and government incentives will provide more accurate explanations for inter-province FDI inflow variations than the un-weighted factors individually. Further, general purpose incentives will be more effective than the targeted incentives in attracting investment into the manufacturing/extractive and high-technology sectors respectively.

Erosion of location advantages

Intrinsic location advantages as well as government incentives can increase FDI inflows into any location. However, their net benefits are not linear and erode gradually. Empirical studies as well as anecdotal evidence have shown that increasing FDI into a location eventually leads to higher real-estate prices, tariffs, and wage levels, and therefore doing business in such locations becomes more expensive (Dunning, 1986; Narula, 1996). The strategy perspective also suggests that such saturation and cost escalations increase competitive intensity and cost pressures, which progressively make those locations unattractive for further investment (Dunning, 1998; UNCTAD, 2006). Fresh investment in such locations can therefore be expected to decline progressively.

Research in the institutional economics stream has linked FDI inflows to the level of development of countries and regions, and established that FDI would gradually seek out "greener pastures" in search of new markets, lower wages, and other location advantages (Mudambi & Navarra, 2002; Ozawa, 1992; Sethi et al., 2002). Sometimes national and/or provincial governments even withdraw FDI incentives in order to decongest polluted locations; e.g., the Chinese government prohibited inward FDI into manufacturing industries in the Beijing National Capital Region and shut down some plants to control pollution before the Beijing Olympics (Beijing Report, 2006; Ljungwall & Linde-Rahr, 2005). We therefore argue that the interaction of government incentives with industry-weighted location advantages will increase FDI inflows initially but further investment would progressively decline.

Hypothesis 4a The interaction between weighted location advantages for the manufacturing sector and government incentives will have an inverted U relationship with FDI inflows.

Hypothesis 4b The interaction between weighted location advantages for the high-technology sector and government incentives will have an inverted U relationship with FDI inflows.

Hypothesis 4c The interaction between weighted location advantages for the extractive sector and government incentives will have an inverted U relationship with FDI inflows.

This set of hypotheses thus predicts that FDI inflows into respective provinces would eventually decline as a result of saturation of those locations and increasing costs. In addition, as new locations become available with adequate infrastructure and lower labor costs fresh investments would likely shift to those locations.

Government incentives—location advantages matrix

The empirical model in Figure 2 shows the combined impact of varying *government incentives* and *industry-weighted location advantages* on FDI inflows. Province-wise FDI inflow variations can be mapped through a 2×2 matrix by combining high/low levels of *government incentives* with high/low *industry-weighted location advantage* scores. The logic is graphically presented in Figure 3 for the manufacturing sector and applied for analyzing FDI inflow variations

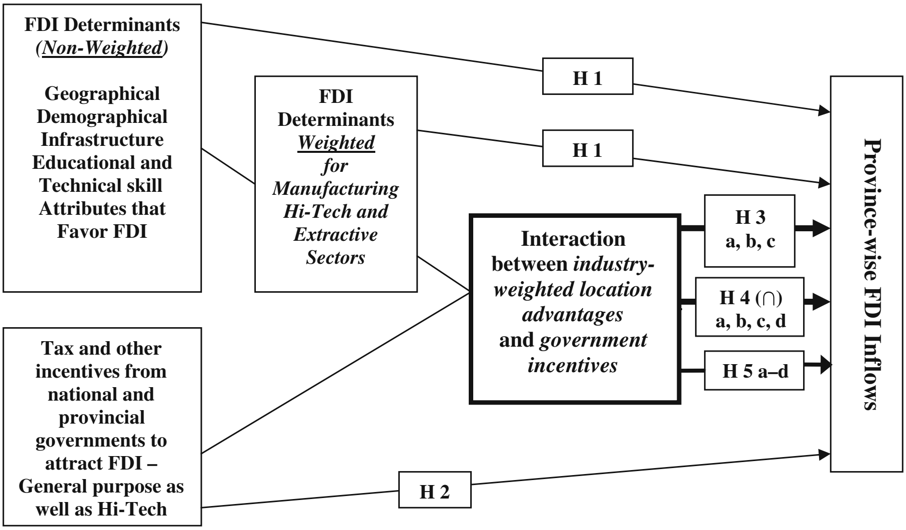


Figure 2 Model for explaining FDI inflow variations

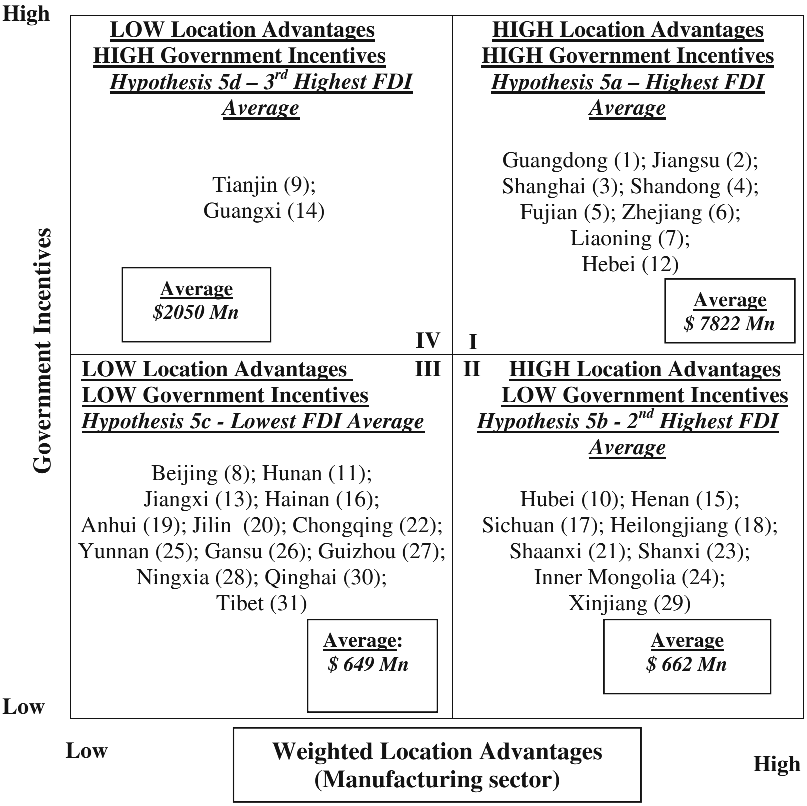
within China. Separate matrices can be made for the extractive industry and high-technology sectors.

Quadrant I represents the ideal situation of high *industry-weighted location advantages* along with high *government incentives*. This combination will attract the highest volume of FDI and MNE activity into that province. Such locations have good infrastructure, skilled labor, and other firm strategy-related attributes, and wherein national and provincial governments offer high incentives to accelerate economic development (UNCTAD, 2006); e.g., Shanghai, China or Bangalore, India. Economic development of such regions will be quicker than other locations.

Quadrant II represents high *industry-weighted location advantages* but low *government incentives*. Provinces within this quadrant would still attract sizeable FDI since the weighted location advantages would offset the paucity of government incentives. However, average FDI flows would be lower than that of provinces in Quadrant I.

Quadrant III represents the situation where both *industry-weighted location advantages* and *government incentives* are relatively low. Provinces in this category would have the lowest average FDI flows among all quadrants. Such provinces would generally be remote locations with inhospitable terrain, inadequate infrastructure, and poor labor skills. No significant FDI would materialize here until minimal infrastructure prerequisites are met. In some such provinces the government itself may discourage foreign presence because of security reasons or insurgency.

Quadrant IV represents the situation where high levels of *government incentives* exist but *industry-weighted location advantages* are relatively low, although not as poor in infrastructure and economic development as those in Quadrant III. Governments generally offer high incentives to such interior (but not remote) provinces with modest infrastructure, in order to decongest the adjoining highly saturated provinces and to spread economic development inland. Average FDI flows



1. Ranking of the province in FDI inflows is given in parentheses.
2. In the matrix based on the location advantages of the Hi-tech sector all provinces retain their position as for the manufacturing sector except the following:
   a. Hunan moves from Quadrant III to Quadrant II.
   b. Shanxi and Inner Mongolia move from Quadrant II to Quadrant III.
3. In the matrix based on the location advantages of the Extractive sector all provinces retain their position as for the manufacturing sector except the following:
   a. Shanghai moves from Quadrant I to Quadrant IV.
   b. Hubei moves from Quadrant II to Quadrant III.

Figure 3 China's provinces on the government incentives—weighted location advantages (manufacturing sector) matrix

in this quadrant will be more than those in Quadrant III but less than other quadrants. Hence the hypotheses:

Hypothesis 5a Provinces having high industry-weighted location advantages as well as high government incentives (Quadrant I) will have the highest level of FDI inflows.

Hypothesis 5b Provinces having high industry-weighted location advantages but low government incentives (Quadrant II) will have the second highest level of FDI inflows.

Hypothesis 5c Provinces having low industry-weighted location advantages as well as low government incentives (Quadrant III) would be the least attractive for FDI and would have the lowest level of FDI inflows.

Hypothesis 5d Provinces having low industry-weighted location advantages but high government incentives (Quadrant IV) would have the second lowest level of FDI inflows.

This set of hypotheses essentially seeks to predict average FDI inflows in various provinces, based on the combined impact of their *industry-weighted location advantages* and *government incentives*.

Methodology

We demonstrate the utility of the conceptual framework by empirically analyzing FDI inflow distribution within China, which attracted $79.13 billion FDI in 2005 (UNCTAD, 2006). China is a large emerging economy and its 31 provinces have very diverse location, demographic, and infrastructure attributes. Further, its provinces offer varying incentives and receive vastly different FDI inflows. China is therefore very suitable for the fine-grained analyses of intra-country FDI inflow variations.

We collected data for all provinces in China about their infrastructure, labor skills, and other attributes, which provide investing MNEs with a *location advantage*. We used archival data within the statistical yearbooks and online data tables of the National Bureau of Statistics of China, supplemented by *China foreign investment report-2006* of the Ministry of Commerce (2006). The following data were collected for 31 provinces for 1999–2006 (hence 217 FDI-year cases): (1) annual FDI inflows; (2) FDI stock in the preceding 5 years; (3) geographical location advantage; (4) electricity consumption; (5) telecommunications revenue; (6) total freight carried by all means (rail, road, and waterways); (7) railroad capacity; (8) oil production; (9) gas production; (10) graduates with vocational secondary education; (11) graduates with university education; and (12) wages.

Weighted FDI determinants

As discussed previously, the relative importance of *FDI determinants* varies significantly for MNEs in the manufacturing, high-technology, and extractive sectors. Hence we obtained relative weights of the *FDI determinants* for each sector from three industry experts who are experienced, highly-regarded independent consultants specializing in FDI into China. They were not apprised of the purpose of our study. Names and contact information of these experts were obtained from the directory of member consultants of the *FDI Promotion Center* of the World Bank's Foreign Investment Advisory Service (FIAS, 2007). Overall, we contacted five industry experts and three responded to our request.

The experts were asked to allocate 100 points among seven geographical location, infrastructure, and demographic attributes based on the relative importance of each

FDI determinant separately for the three sectors. We found that their inter-rater reliability was 0.64 overall across the 21 ratings. Since this was above the threshold of 0.6 (Nunnally, 1978) we averaged the ratings from the three experts, thus obtaining the relative weights of those seven *FDI determinants* separately for the manufacturing, high-technology, and extractive sectors.

Government incentives

Ever since China initiated economic liberalization in 1979 it has offered high incentives to attract FDI. China has set up 12 different types of *investment incentive zones* (IIZs) to channel tax and other incentives such as preferential access to land and power to foreign investment enterprises (FIEs). In 1991 China introduced a new law to rationalize levels of tax concessions and provide additional incentives to foreign investors for different sectors and regions (Tung & Cho, 2001).

The raw data on the type and location of IIZs and the applicable tax rate overall were compiled from Tung and Cho (2001) and are shown in Table 1. The number of IIZs in a province and the concessional tax rate applicable to different types of IIZs influences the FDI decision. We quantified the attractiveness score of each province from the numbers of high-technology and general-purpose IIZs in that province, duly weighting them as per the applicable tax rate.

Variables and measures

Dependent variable Our dependent variable, labeled *FDIflow*, was the annual province-wise FDI inflows from 2000–2006 measured in millions of US dollars (USD). It was compiled from the statistical yearbooks of the National Bureau of Statistics of China and the *China foreign investment report-2006* published by its Ministry of Commerce (2006). All data are at the province level, which is the unit of analysis.

Independent variables We compiled data for three sets of independent variables for the years 1999–2006, and lagged them by one year to assure temporal precedence for FDI inflows. The first set included the traditional FDI determinants such as various infrastructure, natural resources, and worker skill variables (Nigh, 1985; Root & Ahmed, 1978; Sethi et al., 2003). All variables were standardized to accurately depict the relative share of the province for each attribute.

GeogStd denoted the province's geographical location advantage. While some studies had dichotomously applied the Chinese government's classification of coastal and inland provinces, for greater accuracy we weighted each province on a scale of 1–5 based on its distance from a seaport (Zhang, 2001). *ElectStd* was the province-wise annual electricity consumption in 100 million kilowatt hours (kWh). *TelecomStd* was the telecom revenue of each province in 100 million Yuan, which proxies for province-wise annual telecom usage. *FreightStd* represented the total annual freight carried within each province by all means of transportation. *PetStd* was the annual petroleum production in each province in 10,000 tons. *GasStd* was the annual gas production in each province in 100 million cubic meters. *VocEdStd*

Table 1 China's investment incentive zones and their tax rates.

Investment incentive zones	Location	Tax rate
Special Economic Zones—5 Zones	Shenzhen, Zhuhai, Shantou, Xiamen, Hainan	15% for all FIEs
Coastal Open Cities—14 Cities	Dalian, Qinhuangdao, Tianjian, Yantai, Qingdao, Lianvungang, Shanghai, Ningbo, Wenzhou, Guangzhou, Zhanjiang, Beihai, Nantong, Fuzhou	24% for FIEs in mfg industries
Economic Coastal Open Zones—10 Provinces and Cities	Guangdong, Fujian, Zhejiang, Jiangsu, Shand, Tianjian, Hebei, Shanghai, Liaoning, Guangxi	24% for FIEs in mfg industries
Economic and Technology Development Zones—32 Cities	Dalian, Qinhuangdao, Yianjin. Yantai, Harbin, Qingdao, Lianyungang, Nantong, Minhang, Hongqiao, Caohejing, Ningbo, Wenzhou, Weihai, Xiaoshan, Fuzhou, Guangzhou, Nansha, Daya, Bay, Zhanjiang, Kunshan, Yingkou, Rongqiao, Dongshan, Shenyang, Changchun, Hangzhou, Wuhan, Wuhu, Chongqing, Beijing, Urumchi	15% for FIEs in mfg industries
Investment Districts for Taiwan Investors—4 Districts	Xiamen: Xinglin, Haicang, Jimei; Fuzhou: Mawei	15% for FIEs in mfg industries
Shanghai Putong New Area	Shanghai Putong New Area	15% for FIEs in mfg industries
Tax Bonded Areas—13 Cities and Areas	Shenzhen Futian, Shenzhen Shatoujiao, Shantou, Guangzhou, Xiamen, Fuzhou, Dalian, Ningbo, Zhanjiagang, Waigaoqiao, Tianjin, Haikou, Qingdao	15% for FIEs in mfg industries
New High Technology Industrial Development Zones—52 Zones	Beijing, Wuhan, Nanjing, Shenyang, Tianjin, Weihai Xian, Chengdu, Zhongshan, Changchun, Harbin, Chengsha, Fuzhou, Hefei, Baoding, Anshan, Jilin, Guangzhou, Chongqing, Hangzhou, Mianyang, Baoji, Guilin, Zhengzhou, Lanzhou, Shijiazhuang, Daqing, Guiyang, Jinan, Shanghai, Caohejing, Dalian, Luoyang, Zhuzhou, Shenzhen, Xiamen, Hainan, Suzhou, Wuxi, Xiangfan, Baotou, Changzhou, Foshan, Huizhou, Zhuhai, Urumchi, Nanning, Qingdao, Weifang, Zibo, Kunming, Taiyan, Nanchang	15% for FIEs in Hi-tech industries
State Tourist Districts—11 Districts	Dalian Chinshihtan, Qingdao Shilaoren, Tai Hu Hangzhou Zhi Jiang, Shanghai Hengsha Dao, Fujian Wuyis Shan, Meizhou Dao, Guangzhou Nan Hu, Kunming Dian Chi, Shanya Yalong Wan, Bei Hai Yintan	24% for FIEs in the district
Provincial Capitals—18 Open Cities along the Yangtze River—6 Cities	Urumchi, Nanning, Kunming, Harin, Changchun, Xian, Shijiazhuang, Taiyuan, Hefei, Nanchang, Zhengzhou, Chengdu, Guiyang, Huhhot, Lanzhou, Xining, Wuhu, Wuhan, Hongqing, Yueyang, Yinchuan, Jiujiang, Huangshi, Changsha	24% for FIEs in mfg industries
Border Open Cities—13 Cities, Towns and Counties	Heihe, Suifenhe, Hunchun, Manzhouli, Erenhot, Tacheng, Bodong, Pingxiang, Wanding, Hekou Shi, Ruili Xian, Dongxing Zhen, Yining	24% for FIEs in mfg industries
Suzhou Industrial Park—1 Park	Suzhou	15% for FIEs in infrastructure projects

Adapted from Tung and Cho (2001).

was the number of vocational education graduates in each province, which denoted worker skills needed for the manufacturing and extractive sectors. *HighEdStd* was the number of university graduates in each province, denoting skills needed in the high-technology sector.

The second set of independent variables was based upon the *government incentives* in each province, both general-purpose as well as targeted incentives for the high-technology sector. *IncentGen* was the FDI attractiveness score of each province based on general-purpose incentives and was used in regressions for the manufacturing and extractive sectors. *IncentHiTech* was the FDI attractiveness score of each province based on FDI incentives for the high-technology sector.

The third set of independent variables was the *weighted location advantages* for manufacturing, high-technology, and extractive sectors respectively. In sum therefore the first set of independent variables is the traditional *un-weighted* FDI determinants. The second set of independent variables focuses on *government incentives*. The third set of independent variables is the *weighted location advantages* for each industry.

Specifically, *LAMfg* is the annual aggregated infrastructure, natural resource, and labor skill advantages score of each province based on the expert-assigned weights for the manufacturing sector. *LAHitech* is the annual aggregated infrastructure, natural resource, and worker skill advantages score of each province based on the weights for high-technology sector. *LAExtract* is the annual aggregated infrastructure, natural resource, and worker skill advantages score of each province based on weights for the extractive sector. *InterMfg* and *InterExtract* are the interaction terms of *LAMfg* and *LAExtract*, respectively with *IncentGen. InterHiTech* is the interaction term of *LAHiTech* and *IncentHiTech.*

Control variables Data for the control variables were also complied for all 31 provinces for 1999–2006 from the statistical yearbooks of the National Bureau of Statistics of China. *FDIstock* was the province-wise aggregated stock of FDI inflows in millions of USD in the preceding five years. *Pop* was the province-wise population in millions. *Wages* was the average money wages in each province in Yuan.

Regression methods

The paneled time series cross-section data were analyzed using generalized least square (GLS) regression models. The more preferred *fixed effects* method was used to test Model 1. However, this method could not be used on other models that included the *government incentives* variable since province-wise tax incentives have remained constant across the 6-year period and therefore the variable drops out. Consequently all other models were tested using the *random effects* method.

Results

Table 2 presents the descriptive statistics and correlations. Results of the GLS regressions run in Models 1 to 9 are in Table 3. China's 31 provinces are plotted in

Table 2 Descriptive statistics and correlation matrix.

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
Location Advantages (manufacturing)	2.82	1.93	1.00											
Location Advantages (hi-tech)	2.64	1.94	.95**	1.00										
Location Advantages (extractive)	2.81	2.42	.96**	.86**	1.00									
Interaction (manufacturing)	29.30	54.79	.63**	.73**	.50**	1.00								
Interaction (hi-tech)	16.93	25.19	.74**	.84**	.63**	.92**	1.00							
Interaction (extractive)	28.18	54.33	.66**	.75**	.54**	.99**	.93**	1.00						
Incentives (hi-tech)	4.81	3.37	.66**	.75**	.52**	.83**	.91**	.84**	1.00					
Incentives (general)	7.03	9.84	.52**	.62**	.36**	.92**	.75**	.83**	.73**	1.00				
FDI Flow	1490.27	2614.90	.56**	.69**	.41**	.88**	.77**	.87**	.66**	.84**	1.00			
FDI stock	446301	90542	.54**	.68**	.41**	.82**	.75**	.81**	.61**	.74**	.89**	1.00		
Population	4123.37	2631.82	.59**	.69**	.44**	.44**	.59**	.46**	.60**	.30**	.41**	.39**	1.00	
Wages	13680	5461.09	.07	.15*	.05	.29**	.13	.27**	−.00	.34**	.39**	.43**	−.23**	1.00

**$p<0.05$

Table 3 Regression results of models 1–9.

Variable	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
FDIstock	0.001	1.12	0.002****	9.94	0.001****	10.38	0.001****	6.0	0.001****	7.37	0.001****	5.98	0.001****	5.86	0.001****	7.27	0.001****	5.87
Population	1.848****	3.48	0.102	−1.62	0.107**	2.51	0.112	0.20	0.027	0.450	008	0.14	0.011	0.18	0.031	0.49	0.009	0.16
Wages	0.031	0.72	0.023	1.04	0.017	0.86	0.015	0.76	0.017	0.81	0.014	0.71	0.009	0.45	0.011	0.54	0.010	0.50
GeogStd	Dropped																	
ElectStd	−105878.6*	−1.67																
TelecomStd	48129.9	1.41																
FreightStd	94539.8	1.24																
PetStd	6249.9	0.34																
GasStd	6094.7	0.66																
VocEdStd	−59311.82	−1.72																
HigherEdStd	−33473.9	−0.94																
LAMfg			2149.8****	4.89			935.6**	2.04	819.8*	1.65	880.0**	1.92	582.1	1.20	782.9	1.53	691.9	1.45
LAHiTech			−142.7	−0.52			−45.3	−0.18	−74.9	−0.27	51.5	0.21	83.2	0.33	−224.9	−0.77	113.0	0.46
LAExtract			−1233.1***	−6.00			−592.3***	−2.62	−494.8***	−2.05	−616.6***	−2.70	−479.9***	−2.07	−479.8**	−1.93	−580.6***	−2.50
IncentGen					107.9****	6.95	7.93	0.30	91.03****	5.01	37.80**	1.70	−53.6	−1.46	93.5****	5.04	−2.05	−0.07
IncentHiTech					4.41	0.10	−118.6**	−2.21	−89.7	−1.21	−117.5***	−2.17	−126.0***	−2.35	−208.8**	−1.85	−120.3***	−2.20
InterMfg							25.53****	4.29					53.0****	4.21				
InterHiTech									17.2†	1.61					67.9†	1.79		
InterExtract											19.9****	4.08					40.4****	3.51
InterMfgSQQ													−0.07***	−2.44				
InterHiTechSQ															−0.245+	−1.61		
InterExtractSQ																	−0.06**	−1.94
Intercept	−5475.96	−1.33	−1633.2****	−3.57	−629.0**	−1.77	−431.2	−0.98	−754.4*	−1.65	−464.9	−1.06	−28.2	−0.06	−330.5	−0.59	−195.7	−0.42
Adjusted R^2	0.336		0.837		0.867		0.885		0.873		0.884		0.890		0.874		0.887	

β and z values are reported.

*p<0.10; **p<0.05; ***p<0.01; ****p<0.001.

the 2×2 matrix in Figure 3 as per their categorization as high or low along the *government incentives* and *industry-weighted location advantages* dimensions. The high/low categories are based on whether each province's score is above or below the provincial averages. The graph in Figure 4 depicts how the combined effect of *government incentives* and *industry-weighted location advantages* closely mirrors and better explains the inter-province variations in FDI inflows than either of those two variables independently. Figures 5 and 6 show the GDP growth rate and the distribution of industries within China to illustrate regional disparities.

Given the rather large number of independent and control variables, we were particularly watchful for multicollinearity. We however found that despite the high R^2 suggesting possible multicollinearity most regression coefficients are individually significant at high levels with the hypothesized sign (Johnston, 1984). More importantly, the signs remained stable across all the models during various multicollinearity diagnostics such as variable transformation and small data changes (Gujarati, 1995). Thus, collinearity does not appear to be a problem.

Hypothesis 1 suggested that *FDI determinants*, when *weighted* for different industry sectors, would better explain FDI inflow variations than the *un-weighted* factors. Model 1, which had regressed *un-weighted* factors, shows that only *ElectStd* (t=–1.67, p<.10), *VocEdStd* (t=–1.72, p<.10), and *Pop* (t=3.48, p<.001) are significant. Further, *ElectStd* and *VocEdStd* are negative, which is counterintuitive. On the other hand Model 2, which regressed *industry-weighted location advantages*, shows that *LAMfg* (z=4.89, p<.0001), *LAExtract* (z=–6.00, p<.0001), and *FDIstock* (z=9.94, p<.0001) are all significant. Furthermore, Model 2 has a higher R^2 (0.837) than Model 1 (0.336), which implies that *FDI determinants* when weighted for different industry sectors have higher explanatory power than the un-weighted factors. Therefore, Hypothesis 1 is largely supported by our data, though only for the manufacturing and extractive sectors since the high-technology sector coefficient is not significant. As such, this finding suggests that provincial FDI related to high-

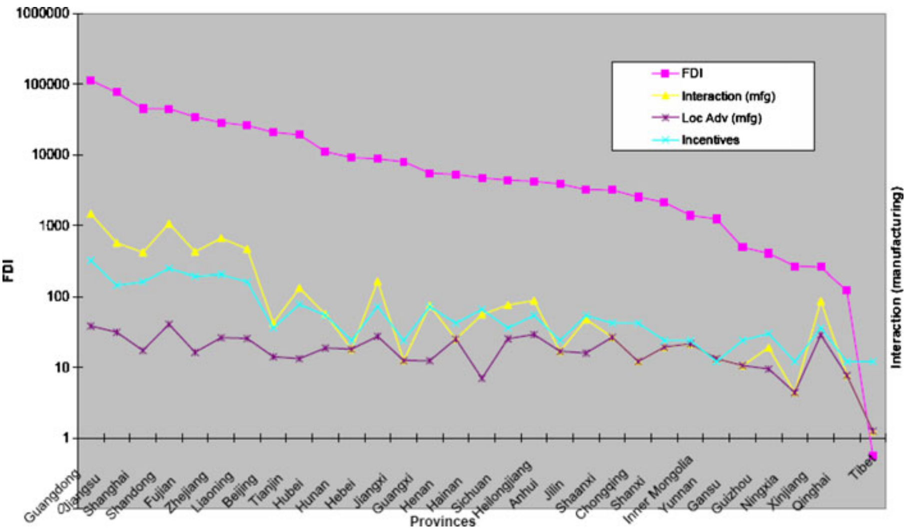


Figure 4 Interaction (mfg) best mirrors FDI flow variations

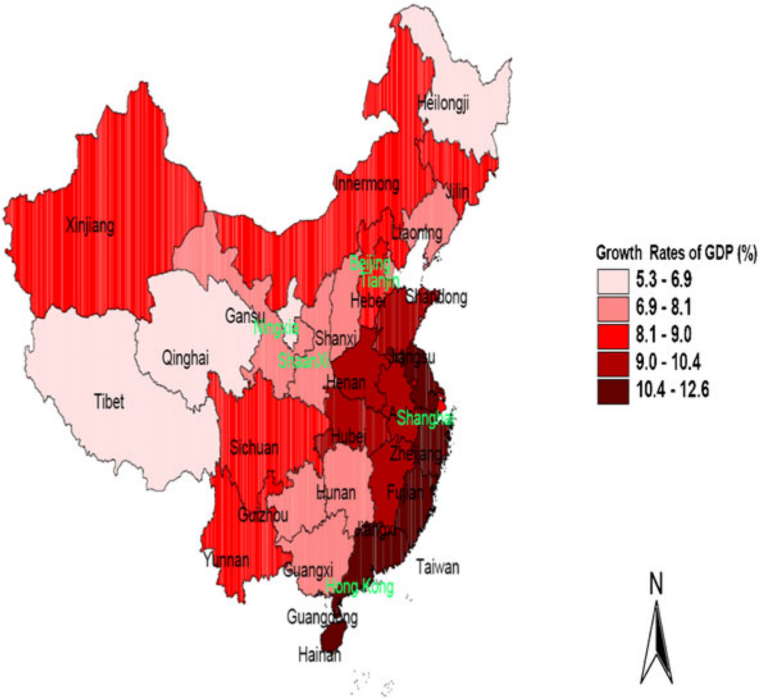


Figure 5 GDP growth rates in China. National Bureau of Statistics of P.R. China (2005)

technology may follow a different logic than that used for the manufacturing or extractive sectors.

Model 3 tests Hypotheses 2a and 2b that general-purpose incentives would be more effective in attracting FDI into the manufacturing and extractive sectors but the targeted incentives will not be effective in attracting FDI into the high-technology sectors. In Table 3 *IncentGen* (z=6.95, p<.0001) is significant whereas *IncentHiTech* is not significant. This result confirms that the general-purpose incentives are effective but the targeted incentives are ineffective. Hypothesis 2, therefore, is supported by our data which implies that targeted incentives, in and of themselves, are not sufficient inducements for provincial FDI within emerging economies.

We tested Hypotheses 3a, 3b, and 3c in Models 4, 5, and 6 respectively by including *government incentives*, the three *industry-weighted location advantage* variables, and the interaction term of each sector separately. We tested the interaction terms one by one to avoid potential multicollinearity problems.

In Model 4, the significant variables are: *LAMfg* (z=2.04, p<.05), *InterMfg* (z= 4.29, p<.0001), *FDIstock* (z=6.00, p<.0001), *IncentHiTech* (z=–2.21, p<.05), and *LAExtract* (z=–2.62, p<.01). As hypothesized the interaction term *InterMfg* is positive and highly significant, which means that *industry-weighted location advantages* and *government incentives* combined provide a better explanation for inter-province FDI variations than those factors individually. Hypothesis 3a is therefore supported by our data.

Figure 6 Industry distribution in China. Source: http://www.lib.utexas.edu/maps/middle_east_and_asia/china_industry_83.jpg

In Model 5, *InterHiTech* (z=1.61, p<.10), *FDIstock* (z=7.37, p<.0001), *IncentGen* (z=5.01, p<.0001), *LAMfg* (z=1.65, p< 0.10), and *LAExtract* (z=–2.05, p<.05) are significant. In this model, the focal variable *InterHiTech* is positive and significant, thus signifying the higher explanatory power of the interaction term. Thus Hypothesis 3b is also supported.

In Model 6, the significant variables are *InterExtract* (z=4.08, p<.0001), *FDIstock* (z=5.98, p<.0001), *IncentGen* (z=1.70, p<.10), *IncentHiTech* (z=–2.17, p<.05), *LAMfg* (z=1.92, p<.05), and *LAExtract* (z=–2.70, p<.01). In this model too the focal variable *InterExtract* is positive and strongly significant, and hence Hypothesis 3c is also supported by our data. These results reinforce our contention that the interaction of government incentives and location advantages provides a better explanation for the provincial FDI inflow variations than either variable by itself.

Hypotheses 4a, 4b, and 4c sought to test whether the interaction of *weighted location advantages* of respective industries and *government incentives* bore a curvilinear, inverted "U" relationship signifying that their effectiveness in attracting FDI would diminish over time. We therefore introduced the squared interaction term of each industry in Models 7, 8, and 9 respectively, one by one to avoid collinearity. The significant variables in Model 7 were *InterMfg* (z=4.21, p<.0001), *InterMfgSQ* (z=–2.44, p<.05), *FDIstock* (z=5.86, p<.0001), *LAExtract* (z=*–2.07*, p<.05), and *IncentHiTech* (z=–2.35, p<.05). This suggests that the interaction of the general-purpose *incentives* with *weighted location advantages* in the manufacturing sector had a curvilinear relationship with provincial FDI inflows, which declined over time. Hypothesis 4a thus finds strong support.

In Model 8, *InterHitech* (z=1.79, p<.10), *InterHitechSQ* (z=*–1.61*, p<.10), *FDIstock* (z=7.27, p<.0001), *IncentGen* (z=5.04, p<.0001), and *IncentHiTech* (z=–1.85, p<.10) are significant. The focal variables *InterHitech* and *InterHitechSQ* are positive and negative respectively, though marginally at the 0.1 level. Thus, the combined impact on FDI inflows of *incentives* for high-technology sector and the *weighted location advantages* in that sector though initially positive diminishes over time. Hypothesis 4b is thus supported.

In Model 9, the significant variables are *InterExtract* (z=3.51, p<.0001), *InterExtractSQ* (z=–1.94, p<.05), *FDIstock* (z=5.87, p<.0001), *IncentHiTech* (z=–2.20, p<.05), and *LAExtract* (z=–2.50, p<.05). Here too the inverted U relationship is borne out by our data, which denotes the diminishing impact of the interaction between *incentives* and *location advantages* on FDI inflows into the extractive sector. Thus, Hypothesis 4c is also supported.

We verified Hypotheses 5a, 5b, 5c, and 5d by mapping China's provinces in the 2×2 matrix described earlier. The four quadrants in the matrix represent different combinations of location advantages and government incentives; i.e., high/low levels of *industry-weighted location advantage* and high/low *government incentives* scores. All provinces were bifurcated into *high*/*low* groups depending whether their *location advantage* score for the manufacturing sector was above/below the national average. Similarly all provinces were bifurcated into *high*/*low* categories as per their *incentives* scores. Four combinations were thus obtained, *High–High* (Quadrant I), *High–Low* (Quadrant II), *Low–Low* (Quadrant III), and *Low–High* (Quadrant IV). All provinces plotted in the matrix in Figure 2 are based on this gradation.

Quadrant I (*high* location advantages and *high* incentives) has Guangdong, Jiangsu, Shanghai, Shandong, Fujian, Zhejiang, Liaoning, and Hebei provinces, which rank first to seventh and 12th in FDI inflows, having the highest annual average of $7822 million. Guangdong has the second highest *weighted location advantages* (manufacturing) score and the highest *government incentives* score, and due to this strong combination it attracted the highest FDI among China's provinces. Most provinces in this quadrant are China's coastal provinces, which are the most developed and have traditionally attracted very high volumes of FDI. Hypothesis 5a thus has strong support.

Quadrant II (*low* incentives but *high* location advantages) contains eight provinces with FDI rankings from tenth to 29th. Hypothesis 5b had claimed that Quadrant II provinces would attract substantial FDI and have the second highest average of FDI inflows. However, although Quadrant II has eight provinces, their average at $662 million, while more than Quadrant III, is lower than that of Quadrant IV. Hypothesis 5b therefore is only partially supported.

Hypothesis 5c argued that provinces with *low* incentives and *low* location advantages would attract the least FDI and have the lowest average. Quadrant III has 13 provinces, most with low FDI rankings, and has the lowest average. As such, Hypothesis 5c is supported.

Hypothesis 5d argued that provinces with *high* incentives but *low* location advantages would attract less FDI than provinces in Quadrants I and II and have the third highest average of FDI inflows. Quadrant IV has only Tianjin and Guangxi provinces and is indeed less attractive to MNEs than Quadrants I and II. However, their annual FDI average at $2,050 million is substantially higher than Quadrant II provinces. Hypothesis 5d is therefore only partially supported by our data, suggesting that an additional (unknown) factor might be influencing this result.

Discussion

Hypotheses 1 to 4 have been fully supported by our data. In Hypothesis 1 while the manufacturing and extractive industry sectors find support the coefficient for the high-technology sector is not significant. These results thus establish that it is the combined effect of *weighted location advantages* and *government incentives* that explains inter-province FDI inflow variations—better than the *weighted location advantages* or *government incentives* individually. As hypothesized FDI inflows also eventually declined when the location advantages gradually eroded.

The general-purpose incentives are positive and significant in Models 5 and 6 but the incentives for high-technology sector are negative and significant in Models 4 and 6. This suggests that while the general-purpose incentives have been successful in attracting FDI, high-technology sector incentives have been ineffective in China. However, since many high-technology IIZs in China opened relatively recently their effectiveness in attracting FDI into high-technology sector might be felt after a longer time-lag.

Hypotheses 5a, 5b, 5c, and 5d have important managerial and policy-making implications since they seek to establish the actual pattern of FDI inflows into China's provinces; both geographical as well as industry sector distribution. While Hypotheses 5a and 5c were strongly supported, Hypotheses 5b and 5d found only partial support. We investigated this anomaly further and found that the government offers very high incentives for FDI into Tianjin and Guangxi to decongest the adjacent Beijing and Guangdong provinces. Furthermore, due to increasing land prices and wages in Beijing and Guangdong MNEs are investing more into these neighboring provinces (Wu, 2004; Huang, 2002). Consequently, although Quadrant IV has only two provinces (Tianjin and Guangxi) and thus as hypothesized it is less attractive for FDI than Quadrant II provinces, its FDI inflow average is higher than Quadrant II because of the above-cited reasons.

Although Beijing falls in Quadrant III it has a very different profile from other provinces in this quadrant. Even though the government strongly discourages manufacturing industries in the national capital region to control high pollution, Beijing still ranks eighth in FDI inflows (Ljungwall & Linde-Rahr, 2005). This apparent anomaly is attributed to the agglomeration effect of the FDI accumulated in the early years of economic liberalization (Hu & Owen, 2005). Beijing also attracted substantial FDI in infrastructure and services sectors for the Olympic Games (Beijing Report, 2006).

The 2×2 matrix in Figure 2 is based on the weighted location advantages for the *manufacturing* sector. We plotted all of China's provinces separately on two additional matrices based on the location advantages for the *high-technology* and *extractive* sectors respectively. As indicated in the footnotes of Figure 3 all provinces retained their positions in the same quadrants as in the *manufacturing sector* matrix, except the following: (1) In the matrix based on location advantages for the *high-technology* sector Hunan moves from Quadrant III to Quadrant II, which signifies that it is attracting more FDI in the *high-technology* sector than in the *manufacturing* sector. This finding was also verified independently (Hunaninvest, 2007). (2) In the *high-technology* sector matrix Shanxi and Inner Mongolia move from Quadrant II to Quadrant III, which signifies that most of the FDI they receive is for *manufacturing* projects and not the *high-technology* sector. (3) In the *extractive* sector matrix Shanghai moves from Quadrant I to Quadrant IV, which indicates that Shanghai receives most FDI in the *manufacturing* and *high-technology* sectors and very little in the *extractive* sector (Wu, 2004). (4) In the *extractive* sector matrix Hubei moves from Quadrant II to Quadrant III, which too indicates its low FDI potential in the *extractive* sector.

In sum, most Hypotheses have been fully supported while Hypotheses 1b, 5b, and 5d are partially supported by our data. The overall results demonstrate that this framework can better explain intra-country FDI inflow variations. It can also explain such variations within a broader region. Its explanatory power is further illustrated in Figure 4, which has plotted together province-wise FDI inflows and their respective *incentives*, *location advantages* (manufacturing), and *interaction* scores. Figure 4 shows that the province-wise FDI inflows line and the *interaction* score line are the closest, while there is a much larger gap between the province-wise FDI inflows line and the *incentives* and *location advantages* lines respectively. The *interaction* scores therefore more closely mirror province-wise FDI inflow variations.

This graph supports our contention that neither *location advantages* (even when weighted by industry) nor *government incentives*, by themselves, accurately reflect province-wise FDI inflow variations. Only the *interaction* score between the two closely mirrors those variations and thus can be used for prediction. We plotted similar graphs for the *weighted location advantages* of the *high-technology* and *extractive* sectors and exactly the same pattern was observed there too. However, because of space constraints only the *manufacturing* sector graph is provided in Figure 4.

It will be evident from Figures 5 and 6, which depict province-wise GDP growth rates and industry distribution respectively, that China's coastal provinces are the most developed in infrastructure, education, and resources and have the highest growth rates. The substantial location advantages of these provinces were reinforced by the large number of IIZs set up there, which enjoyed attractive incentives. Hence, due to their combined impact these provinces received the highest volumes of FDI. Besides, agglomeration effects also enhanced FDI into the coastal provinces (He, 2002; Hu & Owen, 2005). Though China is also setting up IIZs in the central and interior provinces they do not attract high FDI due to the relatively less developed infrastructure, education, and economy—hence *low* location advantages. Landlocked provinces like Qinghai and Tibet especially attract negligible FDI due to remote location and poor infrastructure. Besides, the government discourages foreign access to Tibet due to political unrest.

Hebei, Hubei, Guangxi, Henan, and Hunan provinces are also attracting quite high levels of FDI due to several factors. They have fairly well-developed infrastructure and human resources, and their proximity to the more expensive coastal provinces makes them attractive cheaper alternatives. The government also offers higher incentives to provinces like Tianjin and Guangxi to spread economic development inland.

Implications

The framework presented in this study synthesizes insights from three research streams—the traditional *FDI theory*, *institutional economics*, and the *firm-strategy* perspectives—which hitherto have been explored in isolation from each other. It thus provides a more holistic view of various factors impacting FDI location decisions. This integration enables more precise and comprehensive understanding of FDI inflow variations, both across and within countries. Since many more potential FDI locations are now available due to economic liberalization within emerging economies, it is essential to conduct more fine-grained analyses of intra-country locations.

Extant literature examined FDI locations and inflows mostly through country-level FDI determinants despite the vast differences between provinces. Furthermore, even though various FDI determinants have varying degrees of importance for different industries in the literature those have been applied uniformly to all industries. This is neither logically sustainable nor does it reflect actual MNE practice. Our study contributes a methodology to weight FDI determinants as per relative importance to different industries. Our model thus fills a vital gap in the literature by enabling more accurate analyses of FDI inflow variations within countries and regions.

This study has demonstrated the explanatory power of the framework by analyzing inter-province FDI inflow variations within China in different industries. Although the empirical analysis covered a limited time-period, the results are robust and strongly supported by statistical and anecdotal evidence of FDI distribution within China. The results highlight the potential for the generic application of the model for similar analyses in any other country. The framework will thus be very useful to MNE managers since it will enable them to better match the firm strategy requirements with the industry and/or firm-specific FDI incentives among the increasing number of contending FDI locations now becoming available.

Evaluation of potential FDI locations is an on-going process. Research has shown that FDI locations that were earlier attractive could eventually become unattractive for further investment because of increasing competitive intensity and escalation of real-estate prices and wages in those locations. In some cases the national and/or provincial governments themselves create disincentives to decongest locations and encourage FDI into the less-developed provinces. Concurrently new attractive FDI locations also become available as a result of the measures taken by national and provincial governments to improve infrastructure and attractive investment incentives (Wu, 2004; Ljungwall & Linde-Rahr, 2005; Sethi et al., 2002). MNE managers thus need to keep track of this changing dynamic for which this model can be a useful analytical tool.

Government policy-makers are responsible for creating the right political and economic environment for FDI, for taking measures to develop infrastructure, and for providing investment incentives. This framework can help them better evaluate the efficacy of such investment incentives and the time-lag for the benefits to materialize. More even economic development of the backward areas is a major concern of most developing countries and through this framework policy-makers can fine-tune policies for attracting investment. This study and some prior studies (Mudambi & Mudambi, 2005) have shown that incentives designed to attract investment into the high-technology sector have generally been less successful. Government policy-makers can therefore use these insights to design better-targeted FDI incentives for technology acquisition by focusing upon the IT infrastructure, developing higher technical skills, and opening up special technology parks.

This study thus makes substantive contributions to theory and practice by shifting the focus away from country-level analyses to more precise province-level analyses of FDI inflows. We present more accurate means of matching firm-strategy to location advantages and also integrate different government incentives. For MNE managers the framework integrates key location-specific, sector-specific, and strategic factors that impact the FDI location decision. It can be useful to MNE managements for comprehensive evaluation of potential FDI locations within countries and regions, and to government policy-makers for devising better targeted development measures and FDI incentives.

Avenues for further research

Although official Chinese data sources are often inconsistent (Bajpai & Dasgupta, 2003), the fact that our theoretical predictions were largely supported by the data is reassuring. Our study period was limited to 1999–2006, but using this framework for longer periods of time with multiple lag periods and utilizing province-level data on risk and governance variables would be of interest to future theory and research. This empirical study was limited to a single emerging economy, but this framework can also be tested on other countries that have large intra-country FDI inflow variations such as India, Russia, and Brazil. In addition, the conceptual framework can also be used to analyze FDI inflow variations within countries that are part of a regional economic grouping such as Association of South East Asian Nations.

We believe that this study makes useful contributions to the FDI literature because it integrates all important FDI determinants as per their relative importance to different industries as well as the general-purpose and targeted investment incentives within a single framework. We have demonstrated its efficacy in providing more fine-grained analyses of intra-country FDI inflow distribution, which was not possible with the extant methodologies. We encourage other scholars to refine and extend these insights in multi-country studies using this framework as it provides a more comprehensive analytical tool and directions for MNE managers.

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