MASTER THESIS

China's regional economic development and its impact on multinational enterprises' strategic location decision.

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“To get rich is glorious”

(Deng Xiaoping)

Preface

Writing a thesis is like solving a difficult cross word puzzle. In the beginning you are searching for any word you know, and create a start. With the first letters filled in, occasionally new words can be found, however you know for certain you do not possess all the right answers. At moments you get stuck, assistance from an external source is necessary, in order to successfully proceed and fill in the remaining blank gaps. In the end, when more and more gaps are filled, the difficulty of finding the last words is decreasing and overall solution is nearby.

Basically the same story can be applied on writing the thesis. At first, you start with writing down anything which is familiar to you and has something to do with the chosen subject. Obviously, there is no structure yet, because the remaining chapters are still missing. Unknown territories have to be crossed to get to the next chapters and external support appears to be inevitable. Little by little, the thesis gets structured and the overall outline becomes apparent. From than on, al missing puzzle pieces are falling in the right position and become the final product, which lies in front of you.

For the inevitable support, some persons in particular have to be mentioned. First of all, I would like to thank my coach Barbara Krug, with whom I had informative, humorous and pleasant meetings with. She treated me as an equal sparring partner, did not oppose to all of my ideas, instead she supported me in achieving them. Thank you. Secondly, I want to thank Jan Siemons, partner at Ernst & Young, for all the facilities offered. E&Y's available knowledge and sources, undisputedly improved the quality of this thesis. In addition, I want to thank Douglas van den Berghe, senior manager at E&Y's International Location Advisory Services (ILAS) department. Despite his busy time schedule, he was willing to act as co-reader and delivered invaluable comments. Furthermore, I want to thank all my colleagues at ILAS for the support, knowledge sharing and pleasant times in the past six months.

Finally, let me conclude by addressing my gratitude to my parents. They have supported me in all possible ways. Due to their support I was able to spend the amount of time which is required to finalize this project. Last but not least, I want to thank Heleen, my girlfriend, for all the positive talks, encouragements and patience she had with me, despite my occasional moods.

Matthijs Weeink

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List of abbreviations

AEX	Amsterdam Exchange Index
CCP	China Communist Party
CEO	Chief Executive Officer
CFO	Chief Financial Officer
EHQ	European Headquarters
FDI	Foreign Direct Investment
FIEs	Foreign Invested Enterprise
FMCG	Fast Moving Consumer Goods
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
ICT	Information Communication Technology
MNEs	Multinational Enterprises
NEG	New Economic Geography
NPV	Net Present Value
PI	Profitability Index
PRC	Peoples Republic of China
SEZs	Special Economic Zones
SOEs	State Owned Enterprises

Executive summary

Since economic reforms in 1979, China has witnessed a remarkable economic growth. Chinese regions still enjoy huge amounts of foreign direct investments (FDI) and new plant sites and offices are set up in a vast pace. As a consequence, these regions have reduced poverty on a large scale and gross domestic product (GDP) per capita, increased. However, the geographical distribution of FDI in China and subsequently, the location pattern of foreign invested enterprises (FIEs) are highly unbalanced. In the early years of 2000, the coastal or Eastern provinces, together attract nearly 90% of all FDI invested in China. Only 3% of all FDI is flowing to western regions and the remaining part is invested in Central Chinese provinces. An illustrative example learns that during the 1990s, in the province of Guizhou, GDP per capita was only a one twelfth fraction of that of Shanghai, China's richest province at that time (Goodman, 2004).

A closer look to the provincial contribution to China's national GDP shows that the Eastern provinces show the largest share, however, with 55%, to a lesser extent in comparison to FDI. The Central and Western provinces contribute 25%, respectively 20% to China's national GDP. When FDI is compared to GDP one immediately recognize the fact that on behalf of their GDP, the Eastern provinces receive "too" much FDI, thus can be entitled as attractive provinces to invest in. Clearly, the Western and Central provinces' GDP share is much higher compared to their FDI share, suggesting that these regions lack a sound fundament for FDI. In 2000, the Chinese Communist Party (CCP) developed a new economic policy, emphasizing the potential of Central and Western provinces. Under the policy name *"Open Up the West"* the main task is set to reduce the tremendous social-economic differences and let the people in peripheral provinces share in the annual economic growth as well.

Since China is reaping the benefits of FDI and became a world manufacturer of production goods, the CCP acknowledged the fact that this tool could become important in reducing the large differences between eastern and interior provinces. Interesting question now is whether the geographical distribution of FDI over the past fifteen years has been dispersed more equally or still remains highly uneven, thus concentrated in eastern Chinese provinces.

The Theil index measures regional inequalities in general and for this purpose provincial concentration of FDI in particular. The time horizon spans fifteen years and provide useful insights with regard to the dynamic process herein. A straightforward advantage of this quantitative approach is the fact that, besides measuring the distribution of FDI *between*

groups of provinces, it also measures the distribution *within* a single group of provinces. Both elements of the Theil index determine the total score. Theoretically, if the FDI share is equal to the GDP share of each province, then the Theil index equals zero, indicating an equal distribution of FDI. In other words, no concentration of FDI whatsoever exists. However, a Theil index (*T*) higher than zero, per definition, indicates a provincial concentration of FDI.

Starting from 1990 (*T=0.85)* the Theil index rapidly decreased in the following three years to *T=0.40* in 1993. During this period, the Theil element *between* as well as the Theil element *within* caused the overall Theil index to drop. After 1993, the overall Theil index remained stable until 1999, indicating an unchanged FDI concentration degree. Basically, since the CCP in 2000 announced its new economic policy, the Theil index decreased again form *T*=0.41 in 2000 to *T*=0.28 in 2004. Yet, not due to reasons the CCP had hoped for. The declining Theil index is totally the result of a further decrease of the Theil *within* element of the Eastern provinces. The Theil element *between* eastern and interior provinces remained unchanged. In other words, there is less concentration of FDI in the Eastern provinces, whereas the uneven concentration of FDI between eastern and interior provinces still exists. Moreover, the Theil within element in the Central and Western provinces increased during 2000 - 2005, indicating that FDI is getting more concentrated here. Nevertheless, the overall Theil index has decreased due to the fact that the Theil within element of the Eastern provinces outweigh the Theil within element of Central and Western provinces.

In chapter 4, a micro economic analysis on the location decision process of FDI is accomplished. With regard to the Dutch MNEs response to the Chinese opportunities, it is fair to say that the location pattern is quite similar to the location pattern of all foreign invested enterprises. However, large manufacturing companies such as Philips, DSM and Akzo Nobel has shifted the focus somewhat more westwards. Particularly the province of Sichuan and the municipal of Chongqing proliferate themselves as a suitable manufacturing location. On behalf of the location pattern of financial institutions such as ABN-Amro and Fortis, clearly they locate in the more traditional Chinese locations, such as the cities of Shanghai, Guangzhou and Beijing.

The location pattern of Dutch MNEs, however, is presented as a static overview, not uncovering the true reasons behind the location making process. In the remaining of this chapter a location decision tool is analyzed in great detail. Special attention is paid on the locational costs of doing business. To support this side of the specific tool, three hypothetical investments are invested in three distinct Chinese locations. By incorporating all necessary locational costs of doing business, over a period of 10 years, the profitability of all three

investments can be estimated. As a fact, they represent a distribution centre, an electronics plant and a pharmaceutical plant. These kind of investment differ substantially by there size, the amount of labor needed, the amount of utilities used and the amount of external loans necessary. In addition the costs of these basic elements, required to get the plant or distribution centre operational, vary in all three locations. The cash flows are used to calculate profitability figures; therefore, showing which location offers the highest profitability to investment. Note, however, that this exercise only deals with the cost side of the location decision tool, ignoring locational benefits, such as access to sufficiently qualified labor, universities, international air- and seaports. Thus, for example, a location with higher cost of doing business can still be more attractive to MNEs due to the locational benefits. By all means, both sides of the location decision tool have to be incorporated in the final location decision. Table 1 shows the outcomes of the profitability indexes for all three types of investment per location.

Table 1 Outcomes of the cash flow analysis

		Changsa	Guangzhou	Shanghai
Profit Index to Net Investment	Distribution center	2,875	3,413	2,406
Net Present value (7% discount rate)	Distribution center	2,026	2,403	1,697
Profit Index to Net Investment	Electronics Plant	6,977	6,016	5,751
Net Present value (7% discount rate)	Electronics Plant	4,906	4,250	4,045
Profit Index to Net Investment	Pharmaceutical Plant	4,181	3,583	3,380
Net Present value (7% discount rate)	Pharmaceutical Plant	2,997	2,523	2,380

Source: authors own calculations

More figures, such as profitability indexes to equity, are presented in chapter four. In addition, the methodology is discussed in great detail, according one concrete example.

In sum, the locational costs for labor and utilities such as power, water and gas are deteriorating the comparative advantages of first tier cities such as Shanghai and to a lesser extent Guangzhou. First tier cities are characterized by their importance as a hub for international transports, financial services, and political importance. Clearly second tier cities with national and regional importance, such as Changsa, capitol of the province Hunan or Wuhan, capital of Henan, can benefit from this ongoing trend. In these cities, large supplies of skilled and unskilled labor are still available, competition is relative low and relative high grants and incentives can be expected.

However, not all kind of corporate activities are putting the same amount of emphasis on cost considerations. Low value adding activities, showing small mark ups are more likely to consider these cost advantages in contrast to high value adding activities. These kinds of

activities, such as pharmaceuticals, R&D centers and high technology manufacturers, require at least large consuming markets, the proximity of specialized suppliers and highly educated personnel. Until now, these location factors can only be found in the coastal Chinese agglomerations, where dense populations are found, all top universities are located and GDP per capita is high enough to sell these high quality products.

Clearly, there is a trade off between locational costs and locational benefits. When the cost advantages between coastal and interior provinces become larger, more and more sophisticating industries will abandon first tier cities and relocate within China to second tier cities in Central and Western provinces. In general, the Western provinces are still lacking a fundamental level of facilities, which will have a negative impact on the location decision of MNEs in the short run. Although, there is not yet scientific proof, relocations within China from eastern cities to Central Chinese cities are expected for the low and medium value adding activities, creating new knowledge, technology and opportunities. However, China's coastal cities will remain there strong position when it comes to financial services, R&D, and high tech industries. The reasons are manifold, however, the available infrastructure, legislation, institutions, proximity of specialized suppliers and agglomeration advantages are the most important ones.

1. Goals and objectives

§ 1.1 Introduction

Economic reforms of regions and consequently further integration into the process of globalization, has shifted the attractiveness of specific locations. Especially in the field of economic geography, there is a lot of literature discussing this theory. It is assumed that a reduction in transaction and labour costs and a change of economic policies lead to relocations of firms from one region to another. One of the most spectacular economic reforms in recent history is the example of the People's Republic of China (PRC) which has resulted in substantial changes in the world economy.

This reform can be characterized by a diminishing influence of state owned enterprises and forces of market capitalism and privatization are introduced little by little. Simultaneously, gradual openness to capitalistic influences from the West and an ongoing integration into the world economy can be witnessed. Nevertheless, China's population and in particular economic reformers were somewhat skeptical towards full integration and economic openness until 1999. Since then, access to the World Trade Organization, increasing trade and financial flows with other developed and developing economies, plus further integration to the world market led China to attract substantial foreign direct investments (FDI), prosper economically, and reduce poverty on a large scale.

The emergence of China as the most attractive place for FDI has been surprisingly impressive. In the two decades since economic reform was initiated in 1978, China has become the largest recipient of FDI, leaving the US behind. By the end of 2001, the number of registered FDI projects is over 390.000 and the total amount of realized FDI in China reached as much as US$ 393.48 billion (Zhang, 2002). This immense growth has contributed to a fast economic development and double digit economic growth figures were no exception. Still today, the dynamic economic progress provides enough incentives for companies from all over the world to (re)locate their activities to China. Initially, low technological and export driven production sites were relocated into China, now all kinds of knowledge and capital intensive production as well as service based industries are relocating from all over the world to China. (World Investment Report, 2003). Unfortunately, economic growth and subsequently social wealth was not distributed equally over China and caused serious disparities among different provinces within China (Cheng, 2000, Wei, 2000).

§ 1.2 Objectives

In general, the thesis' objectives are related to provincial economic differences and strategic location decision making in China. As a consequence, the first objective is to gain more insights into what extent the economic developments alter among Chinese provinces or group of provinces. Groups of Chinese provinces are geographically determined and referred to as Eastern, Central or Western Chinese regions. Second objective is to unfold the reasons and consequences behind these differences and how the Chinese government is coping with growing issue. A third objective is to push knowledge further in the field of diverging and converging forces shaping the economic environment into a pattern of core and peripheral regions. This is by far a new exercise, however, still very relevant for particular countries dealing with regional inequalities. Provincial or regional economic differences can be measured in various ways. The methodology used in this thesis is limited to provincial FDI and Gross Domestic Product (GDP) to quantify the provincial inequalities. In addition, the next objective is to gain better insights in the provincial concentration of FDI and provincial GDP in China. The ratio FDI/GDP reveals which province can be regarded as attractive places to invest in?

To be able to uncover the way the Dutch Multinational Enterprises (MNEs) have acted in response to the Chinese opportunities, an exploration is conducted to the location pattern of Dutch MNEs in China. Final objectives are related to the essential factors influencing the location decision making process, thus determining the fit between corporate activities and geographical locations.

§ 1.3 Main question and hypothesis

It is broadly alleged that inward FDI accelerates economic development and brings new impulses into a particular location, due to invested capital, knowledge and job creating activities. In China, however, there is large variety in the provincial concentration of FDI and subsequently in the economic development among provinces. Since the start of economic reforms in 1991, the vast majority of FDI is flowing towards the coastal provinces, which are attracting most of the foreign invested enterprises (FIE's). It is worthy to conduct a research, whether this concentration degree between provinces and regions is changing or not? If so, in which direction and what are the spatial implications? In sum, the main question will be:

In which way and to what extent is the provincial concentration of foreign direct investments in China evolving over time and subsequently, how does this dynamic process affect the international location strategy of multinational enterprises?

To be able to analyze the provincial distribution of FDI and the location strategy of MNEs, a number of hypotheses need to be verified. First of all, the reasons behind the occurrence of international investments must be clear. Comparative advantages are regarded as a major influence in the process of attracting FDI, because they can bring competitive cost advantages to a companies' production process. Comparative advantages can be regarded as cost advantages for producing goods and services in a particular geographical entity, such as a nation or province. These cost advantages might determine the spatial distribution of FDI flows, which leaves hypothesis number one:

H1: Chinese inward FDI follows the pattern of provincial comparative advantages, which is determined by the locational cost of doing business.

Main concern is to verify to what extent this process is taking place in China. Due to the growing economic inequalities, the Chinese government has started an ambitious program to support interior provinces and allocate economic growth and development. The governmental program *"Open up the West"*, including large infrastructural improvements, was launched in 2000 and could cause companies to shift their interest to interior provinces. In this perspective it is relevant to see whether the provincial distribution of FDI is converging or diverging. This leaves the second hypothesis:

H2: Over time, the provincial distribution of FDI in China is improving, thus indicating the success of the economic policy and development program of the Chinese government.

When the spatial distribution of FDI is explored and China's provincial concentration degrees are measured, it is time to clarify the Dutch response to the attractiveness of China and its unique opportunities. An exploration towards the location pattern of Dutch MNEs in China and a comparison to all foreign invested companies in China, must point out whether the location behavior of Dutch MNEs can be characterized as entrepreneurial or conservative. Entrepreneurial behavior can be characterized by exploring opportunities in remote and unknown Chinese provinces instead of following the herd to the well known coastal provinces.

H3: The location behavior of Dutch MNEs in China, in comparison to all foreign invested enterprises, can be characterized as entrepreneurial.

Attractive locations are characterized by the abundance of locational benefits. Such benefits encounter for example the proximity of an international airport or seaport, access to a pool of

skilled labor and outstanding infrastructure facilities. However, next to locational benefits each location has its unique locational costs of doing business. There is a direct relationship with the locational advantages and costs, because attractive locations show a concentration of economic activities causes the locational costs of doing business to rise. Not surprisingly, the locational costs of Shanghai are higher compared to cities such as Wuhan or Changsa. Shanghai can be referred to as a first tier city because it serves an international or national interest while the latter two are referred to as second tier cities, showing national or provincial importance.

H4: The responsiveness of corporate activities comprising low added value, follows a relocation from first tier cities to second tier cities.

To sum, locational costs have significant influences in the strategic decision of foreign companies regarding the optimal location, yet this side of the location decision process is not highlighted frequently and thus deserves more attention. This enhances insights in the question which type of business activities are performing relatively well on a specific location while other activities are not. The combination of locational costs and locational benefits lead to a systematic approach which improves the location decision making process. This can avoid unacceptable high locational costs and improves the company's profitability.

§ 1.4 Relevancy

After the economic reforms were up to a point when foreign investments became profitable, China has welcomed an incredible amount of foreign companies inside their borders. However, only the coastal provinces seem to have benefited and undoubtedly, huge disparities between regions in China exist. In addition, the Chinese government recently realized that it had to interfere, in order to reduce those disparities and let the interior provinces share in the abundant economic growth. Therefore, in the first place, it is relevant to start with unfolding these disparities over a longer time period and conduct a research if, indeed, these disparities are decreasing.

Companies considering relocating to China should benchmark all regions within China and not just imitate or follow the herd. Particularly because Central or Western provinces offer a wide range of new possibilities such as new markets, less competition, relative low rents and wages. These are important factors which influence the strategic relocation decision for MNEs in general. This Thesis will present a systematic location decision tool, which offsets the locational costs against the locational benefits. This is an appropriate tool, which can be used to benchmark different locations for different kind of economic activities.

§ 1.5 Contents

In chapter two a number of theories are introduction which explain economic development, and put emphasis on the phenomenon of regional economic and geographic differences. A closer look, to the comparative advantages, the transaction cost theory and the current economic geography, is necessary in order to explain patters of regional inequalities. What are the reasons behind China's success in achieving this remarkable economic growth and to what extent could the tremendous differences between provinces be explained by these theories? Subsequently, what should the Chinese government do, to minimize the differences according to those theories?

In 2000, the Chinese Communist Party (CCP) has pointed out, that the disparities between coastal and interior provinces are seen as a national problem. The CCP started an ambitious new policy with the purpose to support the inner provinces and called it; *Open Up the West*. Hence, they have witnessed FDI to be the catalyst behind economic development in eastern parts of China, since it brings new capital, lowers unemployment rates, introduces new (managerial) knowledge and skills, triggers agglomeration advantages and creates other indirect benefits. Not surprisingly, the government is eager to stimulate FDI in Western provinces and subsequently minimizing the giant gap between East and West. However, this stimulating policy of Western provinces is rather new. In the short history of FDI development in China, three distinct stages are to be witnessed in which the Western provinces lacked any attention or interest of public and private organizations.

Currently, five years later, it is interesting to investigate whether there is already evidence that shows this policy is successful. Clearly, this might be too early, since regional economic policies take at least five to ten years time to sort effect, however comparing the last five years to a previous period of 10 years, might indicate a change. Therefore a longer period 1990 – 2005 is used to show regional trends in the geographical distribution of FDI. Furthermore, this enables the opportunity to discover certain dynamics in the spatial flows of FDI and get a better understanding of the evolving process. To be able to benchmark relative FDI figures per province, ratios with the provincial GDP figures are premeditated. This uncovers which provinces are receiving relative much (or less) FDI considering their GDP, and thus can be characterized as attractive FDI locations. The figures and outcomes are outlined in chapter three.

Observably, all MNEs are spending considerable time and effort in finding their most advantageous location. Hence, it is widely acknowledged that a particular location is directly

influencing the MNEs performance. In order to verify the third and fourth hypothesis, the fourth chapter explores and explains the strategic location decision of MNEs at a micro level. A combination of relevant theory and applied research will be combined, to understand where MNEs with different corporate strategies and activities should locate. The practical data and knowledge will be obtained from an internship at Ernst & Young's consultancy department International Location Advisory Services, aiming at supporting MNEs, considering an international relocation.

The applied research handles three dissimilar investment scenarios, in three distinct Chinese regions. Extensive regional assessments uncovering the locational business costs have resulted in a cash-flow analysis which measures the profitability of the investment at all three locations. Since this thesis deliberately explores the opportunities in Central and Western provinces, Changsa capital of Hunan is one of the three regions. The other two regions are Guangzhou and Shanghai. The former city has been marked as the first city allowed to receive FDI in 1991 and the latter being the absolute number one city in attracting FDI at the moment. In the cash flows numerous factors such as transport costs, utility costs and labor costs, extensively discussed in the theories in chapter two, are included. Using this method, economic geography is combined with financial measures in order to show tangible results. Finally chapter five provides conclusions, policy recommendations and suggestions for further research.

2. Theories explaining regional economic diversity

§ 2.1 Introduction

A popular feeling is that something fundamental is happening in the world economy. The term *global shift* can be mentioned to capture the essence of the change. It seems that markets and production of goods and services globalize, and with regard to this ongoing globalization of markets, it has been argued that a move is made away from an economic system in which national markets are distinct entities. Entities, isolated from each other by trade barriers of distance, time and culture, and toward a system in which national markets are merging into one huge global marketplace (Hill, 1997).

Truly global MNEs like Coca Cola and Unilever are modern day proof that consumer preferences on certain aspects are converging, however a cautious approach is needed, because considerable differences in other fields such as culture and religion still exist. Notwithstanding this, there is no doubt that there are more global markets today than at any previous period in history. In addition, MNEs have chosen to complicate their business structure by locating different kind of activities in different countries. Next question is, why do companies make considerable foreign investments in distant countries, facing large risks and why does it choose for location X instead of region Y?

Because of China's highly uneven distribution in economic wealth, prosperity and regional development and its remarkable economic growth, theories in this chapter are adjusted to these aspects, leaving a combination of geographical and economical theories. In paragraph 2.2 a theoretical background is presented on how the two approaches, a geographical and economical, have dealt with the concerns described above. Theories derived from these insights are demonstrated, beginning with theories on international trade in paragraph 2.3. However, shortcomings of, and supplementations to these (traditional) theories have led to the theory of economy of scale, external economies and geographical concentrations, outlined in paragraph 2.4. Per definition, regional differences in natural resources and productivity create different economic developments. Are these differences reducing or increasing over time, when trade is allowed and production factors are mobile. In paragraph 2.5 regional converging forces are outlined. On the contrary, paragraph 2.6 describes regional diverging patterns between regions, which in practice happen more often than the former. What can be noticed is that in those theories, transaction costs are playing a role. Theoretical insights regarding this subject are presented in paragraph 2.7. The transaction cost theory is regarded as one of the most valuable theories in describing a firm's performance on a specific market, with a degree of uncertainty. Although moving to China

conceals huge uncertainty and high contact, contract and control costs, still many firms have made the decision to move. What factors are responsible for this? Up till now, it is uncertain why companies choose for location X instead of location Y. By combining the transaction costs with geographical regions in paragraph 2.8 and with the help of the location theory, outlined in paragraph 2.9, further insights are developed with regard to this subject. A brief summary and conclusions are drawn in paragraph 2.10. In the next chapter these theories will be applied on China's provinces and a country specific research, focusing on the spatial disparities between regions within China, will be conducted.

§ 2.2 Theoretical framework

The relationship between geography and economics has long been an asymmetric one. In constructing their theories and explanations of international or interregional patterns of trade, the geographers "borrowed" many concepts and perspectives of different schools of economics. However, the economic counterparts accorded little or no attention to the role of geography in the economic process. Recently, economists and geographers are joining each other more and more in developing "new theoretical frameworks" in which the economics of competitive advantage have emerged. Herein a key importance is assigned to the role that the internal geography of a nation plays in determining the nation's economic performance (Martin et al, 1996). Authors like Ricardo, Krugman, Keynes, Myrdal and others made a significant contribution to the theoretical framework of the economic geography, as a new scientific discipline.

§ 2.3 International trade theory

Classical economists argue that a country's wealth is depending upon its amount and quality of its natural production resources. Per definition, differences in amount and quality in natural resource exists, therefore, regional economical differences exists. Some countries have abundant oil and gas reserves, while other countries lack even a single source of energy. Classical economists are predominantly interested in regional differences in total costs, which are determined by the price of one good and the transport costs to get them on the market. One of the first explanations for international trade is given by David Ricardo. His theory was based on the existence of absolute and relative comparative costs differences between countries or regions. This theory is applied on the provincial differences within China, therefore the geographical unit is a province instead of a country.

Table 2.1 is an illustrative example of an absolute comparative cost difference between two Chinese provinces A (East) and province B (West), producing two goods X (Capital

intensive) and Y (labour intensive). Province A is twice as cheap in producing good X as province B is. In contrast, province B is twice as cheap in producing good Y.

Table 2 Example of an absolute comparative cost difference

	Province A	Province B
Costs good X	10	20
Costs good Y	20	10

Source: Lambooy et al 1997, p. 75

Assume each province has 100 production units and these production units can be allocated to produce goods X and Y. As a consequence, Province A is able to produce 10 units of Good X and 5 units of Goods Y. For Province B it is exactly the other way around with 10 units of Y and 5 units of X. The other combinations of produced units X and Y for both provinces are shown in table 3.

Table 3 Product combinations for province A and B without international trade

Province A		**Province B**	
Good X	Good Y	Good X	Good Y
10	0	5	0
8	1	4	2
6	2	3	4
4	3	2	6
2	4	1	8
0	5	0	10

Source: Author's example

In the current setting it is uncertain if both provinces are willing to trade goods with each other, because it is still in doubt whether consumers in province A are able and willing to pay for product Y, produced in province B. In contrast, it is not certain either, whether final consumers in province B are willing to pay for product X, produced in province A. If and to what extend trade occurs depends on the terms of exchange. If province A receives less than 0.5 Y for 1 unit of X, trade is not likely to expect, because then it can produce Y more efficiently themselves. On the contrary, province B will be reluctant to spend more than 2 units Y for 1 unit X because, likewise, province B would produce product X internally. Consequently, trade occurs when the terms of trade is between 0,5Y and 2Y units for 1X and 0,5X and 2X for 1Y. If both provinces negotiate well, then the most efficient '*exchange rate*' 1X = 1Y is the result. The cost of a single unit in terms of the other unit and the exchange rate is presented in table 4.

Table 4 Example of an absolute exchange rate

	Province A	Province B
Costs good X	1 X = ½ Y	1 X = 2 Y
Costs good Y	1 Y = 2 X	1 Y = ½ X
Exchange rate	1 X = 1 Y	1 Y = 1 X

Source: Lambooy et al 1997, p. 75

Assume, both provinces still have 100 production units and both provinces agreed in trading with each other on the terms of trade, 1X = 1Y. In this case, Province A is going to specialize on the production of good X because it has the largest comparative advantage compared to province B. Likewise, province B is going to specialize in producing good Y. Suppose, province A is producing 10 units of good X, of which 6 units are produced for the domestic market and 4 units are destined for export. Assume that province B produce 10 units of good Y, of which 6 units are destined for the home market and 4 for export. Both provinces will benefit optimal if they trade with each other 1X=1Y, as shown in table 5.

Table 5 Production combinations with and without international trade

	Province A		**Province B**	
	Good X	Good Y	Good X	Good Y
Without trade	6	2	2	6
With trade	6	4	4	6

Source: Author's example

The result of trade is a more favorable product combination of 6 X and 4 Y for province X and 6 Y and 4 X for province B. To conclude, the largest economical benefits for province A is, when all production factors are allocated to produce product X while the same holds for province B, allocating all its assets to produce good Y. International trade is improving the economic circumstances and is enabling a rise in prosperity.

In addition, an example of a relative comparative cost advantage shows that still both provinces are better off if they start to trade with each other at a certain exchange rate. Table 6 shows that province A is producing good X as well as good Y more efficient than province B

Table 6 Example of a relative comparative advantage

	Province A	Province B
Costs good X	10 (2)	15 (3)
Costs good Y	20 (4)	25 (5)

Source: Lambooy et al 1997, p. 76

The exchange rates shows that province A has the relative largest advantage in producing product X and therefore it must specialize in producing good, even though the province is cheaper in both goods. The ratios are 2 : 3 in comparison to 4 : 5. Again, by international trade, even the inferior position of province B can improve.

Table 7 Example of a relative exchange rate

	Province A	Province B
Costs good X	1 X = 0,50 Y	1 X = 0,60 Y
Costs good Y	1 Y = 2,00 X	1 Y = 1,67 X

Source: Lambooy et al 1997, p. 76

The price of 1 unit of good Y in province A is equal to 2 X, but at the same time the price in province B is only 1,67 X. Trade will occur if the exchange ratio for 1 Y is between 2,00 X and 1,67 X, lets assume 1,80 X what means that 1 Y = 0,55 Y. Note that the exchange rate of 1 X lie between 0,50 and 0,60 Y which means that both provinces have an incentive to trade with each other and both will benefit, for the same reasons as mentioned earlier.

The relative comparative cost advantage theory suggests that provinces specialize in producing a product, not because they have an absolute cost advantage in it, but because they enjoy a relative productivity advantage. It is a great theory in telling why provinces are willing to cooperate in international trade, and how this can be beneficial for both parties. The theory however fails in stating how and when a productivity advantage can occur. Neither does the theory explain the phenomenon of intra-industry trade. Other scholars have paid more attention to this and the theory on economies of scale in the next paragraph will point out what is meant by this.

§ 2.4 Economies of scale and imperfect competition

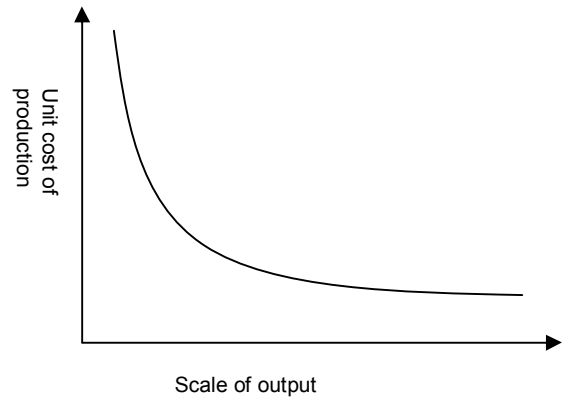
Instead of comparative advantages and perfect market competition, without any constraints, Krugman (1994), Martin and Sunley (1996), stated that increasing returns of scale and imperfect competition play a crucial role in explaining patterns of trade. Where the conventional trade economics fail, this theory helps to explain intra-industry trade between two countries, which has been expanding rapidly in recent decades. The concept of scale economies is well known and need little rehearsal. If specialization and trade are driven by increasing returns and economics of scale rather than by comparative advantage, the gains from trade arise because production costs fall as the scale of output increases. Companies are therefore constantly looking to expand their sales, in order to stay competitive at low costs. For that reason, a concentration of firms will occur at places with high population

densities, where a large population reduces the average cost of production due to the large size of the market.

In many cases, two kinds of benefits occur because of economies of scale. In the first place, internal economies, such as a higher efficiency, improved utilization rate of machines and process innovations may arise, resulting in lower cost per unit. These benefits within firms emerge on account of engineering or managerial considerations coping with a higher demand. In addition, also external economies may be obtained by the geographical concentration of activities. An externality is any occurrence or activity that lies outside the range of control of the individual firm, but has definite effects on the firm's internal production function (Ottoviana & Puga, 1997). Externalities are prone to market failures of various kinds and thus are not subject to the logic of the pricing system. These externalities may be either positive (e.g. information and knowledge spillovers that supply for free to a company) or negative (e.g. air pollution or cheap imitations, deteriorating the brands value). Many kinds of externalities exhibit increasing returns effects. This means that the more abundant they are, the more beneficial in proportional terms they become (in positive) or detrimental (if negative) to the firms that internalize them (*ibid.*). Both, internal as external economies, will lead to the geographical concentration of activities (Chrisholm, 1990).

With the formation of the Common Market and the European Free Trade Area after the Second World War, and with successive rounds of negotiation under GATT, there was a widespread feeling in the 1950s and 1960s that considerable scope was available to achieve scale economies, which had thus far not been realized. The emergence of highly successful multinational enterprises (MNEs) were seen as proof that scale economies really worked. Furthermore, due to all kinds of related economic activities that are triggered by MNEs, agglomeration advantages and externalities come to light. Therefore, in the literature about geographical concentrations and economic growth, this theory gained a strong position (Krugman, 2001). Figure 1 illustrates the way in which production costs are usually displayed in relation to scale of output.

Figure 1 Scale economies in production



It is not completely accurate to say that each cost curve has the same shape. Moreover, it is commonly acknowledged that at a certain point of scale, diseconomies of scale will occur what would result in an U shaped curve. Nevertheless, on this assumption level, scale economies will lead to the continuation of cumulative growth once it has become well established. The subject of cumulative growth will be discussed more in detail in the next two paragraphs. Herein several theories are outlined, which explain why and to what extent regions converge or in most cases, diverge from each other. The fact that China, since the reforms of 1978, has experienced undisputedly but highly uneven economic growth makes this a very relevant exercise.

§ 2.5 Regional converging forces

Heckscher and Ohlin, have rediscovered Ricardo's comparative cost model. They explicitly looked for reasons why relative cost differences exists. Their contribution is therefore known under the term 'factor endowment theory'. Let's assume that region A has a large labor pool but scarce capital and region B has abundant capital but a small labor pool. Then, in region A the wages will be relative low and the interest on capital relative high, where in region B it is the other way around. In addition, region A has to specialize on producing labor intensive products and region B must specialize in capital intensive products. Heckscher and Ohlin were keeping the production assets constant, which means that there is no mobility of labor or capitol flowing from one region to the other, whatsoever.

Samuelson (1948) argued that this is unlikely because the cheap labor pool in region A will move to region B where a higher wage can be earned. The same is true for capital, what will flow from region B into region A due to a higher return (interest). This process of labor migration and flows of capital will proceed as long as there is a difference in reward for the production factors between the two regions. In time, both regions have the same labor and capital structure and show complete equal compensation for labor and capital and at this

point, further migration of labor or flows of capital is redundant. In the short run, international trade occurs because regions still have an absolute or relative comparative advantage until the moment that the differences in the production structure is disappeared. This implies that regions have no differences in production factors anymore and therefore regions can produce at the same level of costs, making trade obsolete (Leamer, 1998).

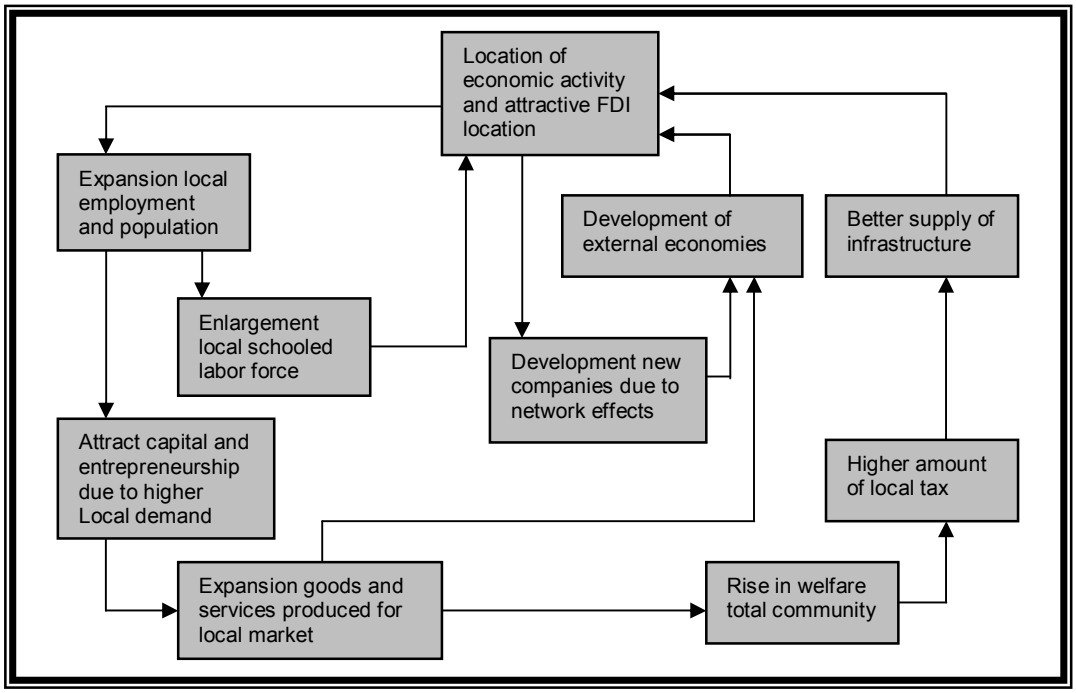
Thus, according to classical economists, free trade and complete mobility of production factors cause a converging effect and disparities between regions decline. For the sake of simplicity, they neglect transport costs and other factors disturbing free trade, such as trade barriers, customs and quotas. Furthermore, the theory does not pay attention to differences of technological development between regions. Finally, the classical economists assume there is only one market form, that is to say a complete transparent market condition, which can be entered or left by anyone. Most of the markets today have hybrid structures, such as oligopolies or even duopolies and monopolies.

§ 2.6 Regional diverging forces

The concept of regional divergence refers to the fact that the gap between regional economic developments is growing. Although there have been examples of regions converging, the trend of regions diverging from each other occurs more often. Myrdal's cumulative growth theory has made significant contributions to these thoughts of regional divergence. In this paragraph an overview of this theory is presented, what will lead to new insights and knowledge, which can help to explain the tremendous regional differences in China. More detailed analysis of this topic can be found in the next chapter.

Myrdal (1957) presented his cumulative growth model as part of his research to regional underdevelopment. This principle describes the process of geographical concentration due to favorable production facilities or a desirable investment circumstance in combination with regional economic development. Thus, Myrdal clearly looked after regional production environments and connects them with regional differences in economic development. Despite the fact that his first effort was to explain the relationship between developed and developing countries, nowadays his theory is frequently used to describe regional disparities within countries. A simplified model is used to illustrate central elements of the theory.

Figure 2 Myrdal's cumulative growth theory



Source: Lambooy et al 1997

Myrdal makes use of the argument that companies, which are settled in prosperous regions have a competitive advantage upon their rivals, which are settled in more peripheral regions. To start, the market size is larger and thus economies of scale can take place. Next to that, local pool of labor is more schooled, skilled and specialized which have a positive effect on the number of innovations. Furthermore, infrastructure is more often up to date and meets higher standards, external economies rise, agglomeration advantages emerge and so on.

What happens if there is a large increase in production? This production reduces the amount of unemployment and in the case of minimal unemployment, external labor (with family) has to be attracted, which increases the local population. Not only low schooled labor, but also higher educated employees will come, plausibly starting up new business and ventures, diverging product offerings and expand the amount of goods and services produced for the local market. This in turn reshapes the regional production environment. The improved production environment is a pull factor for other companies, causing agglomeration benefits and positive external economies.

Because labor is relative scarce, higher wages are earned resulting in a rise in prosperity of the community as a whole. Higher net income means expanding supporting industries and sectors as well. Furthermore, due to a rise in population, new collective facilities, for example a theater, cinema or a court yard are sustainable. Again, the positive advantages have in turn

a positive effect on the regions' attractiveness. The cumulative advantages come hand in hand with the negative disadvantages for peripheral regions. These disadvantages are referred to as *'backwash'* effects.

When the growth effects in the growing region lead to economic developments new (negative) features will arise. High rents and labour costs, congestion problems, little expansion possibilities and other driving forces will lead to a de-concentration process. This process causes spatial 'spread effects' however it will not come as far as convergence in regional-economic differences, due to four reasons.

1. The agglomeration of economic activities in the core region causes heavy competition between firms in their battle for suitable labor and limited space to expand. The weakest firms will lose and vanish, forcing the rest of the firms to produce very efficient and thus stay competitive.
2. Growth regions have the ability to attract new growth impulses, because all knowledge and information channels are there already. Large knowledge centers, education facilities, specialized pool of labor are all strong factors that determine the spatial pattern of innovations.
3. Growth regions have the advantage of the external economies, due to the large size and diversity of the market. Notwithstanding other weaknesses, firms operating in peripheral regions lack these kinds of external economies. Therefore an entrepreneur or manager thinks twice when choosing a suitable location for the company.
4. Backwash- and Spread effects happen on different levels of geographical scope, with regard the physical distance. The first type of effects occurs in the most peripheral regions, whereas spread effects take place in regions that are in the vicinity of the core region. Spread effects are caused by cities growing out of their borders and companies and a part of the employers find their new place to stay in adjacent regions.

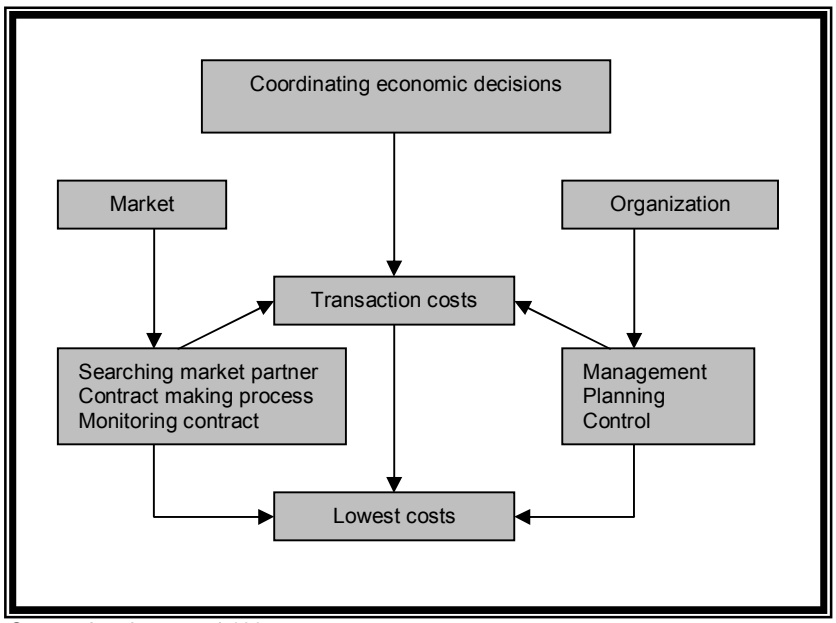
To sum, despite the de-concentration process described above, it is likely that the dominance of the core region remains intact, mainly because of the existing modern production environment. Moreover, according to Myrdal, core regions will become stronger and peripheral regions are getting weaker. Of course, this is an interesting statement, which has to be validated for China. This part of the research will be conducted in the next chapter, when the disparities and dynamic process, regarding China's regional distribution of GDP and FDI is described.

In Myrdal's cumulative growth model, economic growth effects are encouraged by stimuli caused by firms and institutions which are positively related to one another. When a key firm is settled and a large number of local vendors, suppliers and distributors but also educational and public institutions can take an advantage of such an opportunity, then the production environment is improved. This seems a logic thought, but why does a key firm choose for local economic actors and not do it all internally? In the next paragraph the role of transaction costs is outlined, which provides better insights into the question why firms choose to do it internally or externally by the market. Additionally, it explains why firms choose to move certain part of the production process to other parts in the world.

§ 2.7 Transaction cost theory and internalization of production

Until the development of transaction cost theory, economists did not have a sound theory discussing why firms exist and grow into MNEs. Transaction costs theory seeks to explain which activities are organized within the firm and which ones are performed by independent agents. It is a theory of the role and size of firms. Since MNEs are firms that extend their hierarchies across national boundaries, transaction costs theory can throw considerable light on the reasons behind the existence and the international extension of such firms (Hennart, 2000) With transaction costs are meant: *All costs necessary to bring a good or service to the market*. Coase (1937) predicted that the existence and behavior of a company could be explained by the degree of uncertainty, by operating on a (global) market. In his opinion different allocation mechanisms exist on the market as well as in organizations. The allocation on the market occurs through the invisible hand of demand and supply, whereas the allocation in an organization works via planning, management and internal prices (*ibid.*). He argued that the price of goods on the market is subject to high uncertainty because at a certain point of equilibrium, that is when there is still room for profit, new entrants will enter the market with better techniques or innovations and eventually destroy the temporary equilibrium and prices will drop. The main features of this theory are shown in figure 3.

Figure 3 Main features of the transaction cost theory



Source: Lambooy et al 1997

As shown in figure 3, transaction costs determine whether (inter)national production activities are internalized or obtained through the external market. Relative cheap labor costs and continuously decreasing transportation costs have made producing in developing countries for MNEs more and more interesting to internalize worldwide production. Therefore the answer to the question why there are Multinational Enterprises (MNEs) is simple answered by*: "whenever markets are internalized across borders because of lower transaction costs"* (Buckley & Casson, 1976).

Apparently, if produced on a large scale, the benefits to internalize global production systems outweigh the extra costs to produce in foreign markets in the middle and long run. Emphasis is made on the timeframe here. To be able to understand this better, Nooteboom (1994) made a clear distinction between three phases every transaction is going through.

- *Contact phase:* A transaction, per definition, needs two parties with one party delivering to a party who is receiving. They must be in contact with each other first, to establish this transaction. However, to find a suitable party, searching costs have to be made, which are part of the transaction costs. It takes time and considerable effort for Western firms, who are entering the Chinese market for the first time, to build a network (guanxi) with reliable Chinese partners. These costs can turn up extremely high, since the Chinese market is bureaucratic at times and to some extent hidden corruption occurs. When reliable partners are found, a durable and trustworthy foundation is laid resulting in decreasing searching costs.

- *Contract phase:* With a transaction, most of the time, agreements have to be made via a contract. In many cases, negotiations are necessary in order to create a suitable contract. The contracting costs are part of the transaction costs and again if a firm decides to go to China it faces among language problems, many other problems which have a negative impact on the contracting costs. In the beginning these costs are high because of the problems described above, but when the contractual procedure becomes a routine, no new contracts have to be signed and they continue on the routine and experience they mutually have established. Subsequently, the contract costs drop when that will occur.

- *Control phase:* Both parties agree with each other that they will see to it that the transaction will succeed according to the delivery agreements. These costs are referred to as monitoring costs, and together with the other costs they determine the transaction costs. At first these costs are high, because trust has to be earned and therefore control is obligated. Again, when the company feels that the partner can be trusted, there is enough confidence that the shipment or delivery will meet the standards and quality requirements what is agreed upon. Over time, the control costs will diminish to a minimal extent.

This example below deals with a fictitious company, producing products in China, destined for the (export) market in the Netherlands. For the sake of simplicity, some costs that determine the production costs are neglected. In this example only labor costs, location costs and transportation costs are taken into account.

Production costs per unit:	*Ynl*	*Ych*	
Labor costs per minute Netherlands & China:	*Xnl = 15*	*Xch = 4*	
Fixed (location) costs:	*Cnl = 500.000*	*Cch = 500.000*	
Transport costs per unit:	Q = 0	*Q =10*	
Amount of minutes spent on one unit:	*a = 5*	*a = 8*	
Amount of units produced per year:	*q = 100.000*		
(1) Ynl = (*a*.Xnl)q + Cnl	Ynl = (5*15) * 100.000 + 500.000		= 8.000.000
(2) Ych= (*a*.Xch)q+ q.Q + Cch	Ych= (8*4)*100.000+ 100.000 * 10 + 500.000		= 4.700.000

Note that in the example above, the productivity (*a*) in the Netherlands is higher, due to highly standardized and efficient production methods, which in reality is true in most cases.

Furthermore, fixed costs are remained equal, in order to simplify this example. As referred to earlier, producing in a foreign country (here China) brings transaction costs (TC) along. The transaction costs consist of contact, contract and control costs or C_1, C_2 and respectively C_3. These TC must be added up by Y_{ch} (including the wage, transportation and locational costs) to equal total costs of production Y_{total}. To sum, total costs of producing in China Y_{total} is equal to production costs Y_{ch} and transaction costs TC.

Transactions costs:	TC	All costs necessary to get the product on the market		
Contact costs	C1 = 750.000	Searching costs	E.g.	5 FTE Consultants
Contract costs	C2 = 1.500.000	Negotiation or contracting costs	E.g	5 FTE Lawyers
Control costs	C3 = 750.000	Monitoring costs	E.g	5 FTE Controllers

(3)	TC = C1 + C2 + C3	TC = 750.000 + 1.500.000 + 750.000 =	3.000.000
(4)	Ytotal = Ych + TC	Ytotal = 4.700.000 + 3.000.000 =	7.700.000

Source: Author's example

When the total costs of producing in China Y_{total} is at least equal or cheaper than producing in the Netherlands Y_{nl}, than moving the production to China would be an efficient option. Since the transaction costs may decline over time, even slightly more expenses will allow moving production to China.

(5)	Ytotal ≤ Ynl	7.700.000 ≤ 8.000.000

Source: Author's example

This simplified example shows that, next to production costs, the transaction costs play a significant role for companies, when considering a relocation to China. As a result, even when the extra costs are considered, still moving facilities to China might be a feasible plan to do. In this example, transaction costs occur in an economical setting in which this imaginary company tries to seek suitable Chinese partners, built up a network and try to reduce risks by long term trustworthy relationships with local suppliers and distributors. However, transaction costs could also be observed through a geographical point of view, where distance and locations play a role. This spatial dimension of transactions is the main theme in paragraph 2.8

§ 2.8 Geographical dimension of transactions

Transactions, not only exists between economic actors but in geographic space as well. They are therefore marked by attributes of location and distance, meaning that they are

stretched out between sets of origins and destinations, and that they accordingly acquire various costs as the space between these locations is spanned. This implies that locational proximity (geographical space) between companies that are inter-linked in economic space is often highly beneficial to all parties (Scott, 1998). The degree of benefit, however, is closely dependent on a number of critical qualitative features of the transactional system, as indicated in the following three points.

First, small scale transactions, in which the value of what is being transacted is low relative to its spatially dependent costs (e.g. a small batch order from a clothing manufacturer to a sewing subcontractor), will in general be economical only over short distances. Larger transactions enjoy economies of scale that make it possible to stretch them out over much longer distances.

Second, transactions that are continually changing in their specific actions and are asymmetrical in space and time are likely to be associated with high space-dependent costs. More standardized and predictable transactions can take advantage of significant savings in ordering, scheduling, packaging, investment in dedicated transportation facilities, and so on. Again, the diminishing contact, contract and control costs, described in the previous paragraph are an example of these savings. Companies that depend on irregular kinds of transaction often locate in dense and comprehensive agglomerations because the external economies of scope in such areas provide insurance against unpredictable eventualities.

Third, different modes of transaction have very different implications for spatially dependent costs. For example, face-to-face contacts encounters, where two or more individuals must come together at a single location in order to deliberate over some exchange, are typically very costly. By contrast, the electronic transmission of messages is easily accomplished over even intercontinental distances. Due to the emergence of internet and all innovations in ICT applications, costs of electronic transmission of (inter)continental transactions have dropped drastically. However, in many cases face-to-face contacts are necessary, for example to establish a trustworthy relationship or to close a business deal.

To sum these three points, companies whose transactions with one another are small in scale, irregular and unpredictable, and dependent on intensive face-to-face contact will probably find it to their advantage to be located in some sort of mutual proximity, whereas companies whose transactions with one another have the opposite characteristics are likely to be more free in their choices of location. However, costs of producing in dense agglomerations with scarce amount of land and high rents, such as for example Beijing or

Shanghai are (much) higher than producing in semi-urban or even rural areas, where rents and other costs are lower. These kind of considerations are closely linked to relative new theories bundled in the so called New Economic Geography, which combines economic and geographic factors, such as market size, transportation costs, agglomeration advantages and strategic location choices.

§ 2.9 New Economic Geography

As mentioned earlier, China is one of the most dynamic and changing countries at the moment, reshaping its economic environment constantly. Yet there are large regional disparities in nominal wages, living standards, GDP per capita and attracted amount of FDI, which seriously concerns the Chinese Communist Party (CCP). It seems justified, that the CCP announced a program to support the lagging interior and Western provinces, however many examples proved that regional policy were fruitless attempts to equalize economic and social conditions within countries.

Regional policy needs a theory that explains the location of production and consumption. Since the early nineties economists and geographers have such a theory at their disposal; the New Economic Geography (NEG). Initiated by contributions of Krugman (1991), Fujita Krugman and Venables (1999), it unites insights from Ricardo's international trade theory, Heckscher and Ohlins factor endowment theories and Myrdall and Peroux's regional economic development with spatial economics (Brakman et al., 2005). New Economic Geography is developed as a theory that explains the emergence of a heterogeneous economic space.

The key contribution of the NEG is a framework in which standard building blocks of mainstream economics (especially rational decision-making and simple general equilibrium models) are used to model the trade-off between dispersal and agglomeration, or centrifugal and centripetal forces (Neary, 2000) Firms as well as workers have to deal with these two kind of forces. The owner of a firm must choose a location for his plant. If he or she chooses a core region (for instance the city of Shanghai), i.e. a region with a large market size, then he or she saves on trade and transport costs. Fewer goods will have to be 'exported' to other regions. Consequently this firm can set lower prices and capture a larger market share. Note the similarities with Krugman's theory on scale economies.

Right now one step further is achieved by incurring the role of transport costs. When the transport costs are high, the firm will choose to locate near a large market and accept the higher costs for locating in the core region. If the firm chooses a peripheral region, or in this

case an interior Chinese province, it can expect a smaller market, with less competition from other local firms. Moreover, urban costs, such as congestion and relative high land prices, are avoided. This decision is supported when the transportation costs are relatively low and the firm is able to transport goods and services in an inexpensive way, in order to stay competitive.

Similarly, a worker must choose a location where to live and work. If a person chooses to settle in a core region this person receives a higher real wage, but pays higher rents. If this person chooses a peripheral region, he or she avoids these urban costs, but is likely to get paid less. However the probability of getting a better job, or another job in case of unemployment, is higher in the core region. These countervailing forces however, disable full agglomeration in the core region and leave peripheral regions with empty hands. Nevertheless, agglomerations nowadays seem to attract more and more human capital and recourses, with a growing percentage of people living in urban regions.

The role of transport costs is mentioned shortly nevertheless they play an important role in the localization of economic activities. When transport costs are high industries are evenly distributed among a region with every firm producing goods and services for its regional market. Competition is relatively low because the different firms do not interfere with each other due to high transport costs. In the case of declining transport costs, concentration arise and competition emerge. Firms are positioning them selves in regions with growth potential, in proximity of a large consumer market, eager to enjoy the benefits of economies of scale. If economic actors such as suppliers, distributors, vendors and sellers are locating in a geographical proximity in order to save transaction and transportation costs as well, this can be called transaction agglomeration. When many industries concentrate in the same region, there is production agglomeration (Wen 2001).

To sum, the NEG theory tries to explain why agglomeration of economic actors occurs and for that, it combines various elements from an economic and geographic point of view. Key words comprising this theory are transportation costs, economies of scale, agglomeration advantages, urban costs, market size and spread effects. All combined they provide useful information which could be of influence in the decision making process of (re)locating companies. However it proved difficult to test this theory empirically, but it is widely recognized as an important enlargement of the understanding in spatial economics.

§ 2.10 Conclusions

In this chapter an overview of theories is given to push the knowledge further in basically two ways. First of all, insights on the matter of international trade are gathered and special attention is given to various explanations for it. Over the years, famous economic and geographic scholars developed widely recognized theories. The comparative advantage and economies of scale theory are only two theories among many others, which have helped to understand what critical factors stimulate international trade and why companies are seeking to expand internationally. In most theories, factors such as transport costs, availability of recourses, production costs of manufactured goods and scalability play significant roles. In many articles regional differences in these mentioned factors was and still is the central theme. Obviously, governments are trying to diminish regional disparities, however, in many cases it has proven tremendously hard to converge the core and peripheral regions to one another. There is still large debate what the best approach would be if a country is struggling with scientists emphasizing converging forces whereas others state that the disparities will grow due to diverging forces.

Particularly Heckser and Ohlin's factor endowment theory together with Samualson's contributions to it, made economics believe that regions converge after time, only when there is a situation of complete factor mobility and no trade restrictions. This dynamic theory is frequently used by economics and politicians to illustrate what kind of positive forces would occur if all restraints trade barriers are vanished. Even so, this is basically the reason why institutions such as the WTO, Uruguay rounds of negotiations and other economic integration policies are developed. On the contrary, other scholars like Myrdal describe regional diverging forces. Basically they assume that a growing region gain critical advantages, such as externalities and agglomeration advantages which enables them to grow even further, leaving the weaker regions behind. The gap will grow larger and larger despite spread effects and de-concentration processes. These traditional theories of trade and regional economic development explain specialization and concentration, but have little to say about agglomeration.

The new economic geography framework stresses the importance of economies of scale, market size, transportation costs and production costs. Krugman (1991,), Fujita, Krugman and Venables (1999) were seen as the founders of this framework combining several consistent theories together. Where other theories fail to explain emerging agglomerations at certain locations, this theory shapes a tool which explains why agglomeration of companies, institutions and other economic actors happen. For the sake of choosing the most favorable location MNE's should take this explaining framework in mind.

In the next chapter a closer look at the situation in China is carried out. Are the disparities between Chinese provinces getting smaller or is the gap between regional economic developments growing. Furthermore, what is the Chinese central government doing about this and does this influence the distribution of FDI in China? To finish, the insights and theories made it clear why international trade happens, why regional economic differences exists and how different locational circumstances influence a firm's choice to locate somewhere.

3 China's regional economic policy and its implications for FDI.

§ 3.1 Introduction

International trade models, regional converging and diverging economic growth theories and the new economic geography theory, as discussed in the previous chapter, provides a useful framework to understand why China copes with large regional economic differences. Especially the amount and distribution of FDI, broadly seen as an engine for economic development, varies extremely. Besides, these theories are also helpful to understand the evolution of the spatial pattern of FDI in China, as it widens its openness since 1978. In 2000, the Chinese Communist Party (CCP) launched the program: *Open Up the West*. It has decided to shift attention from coastal provinces to peripheral provinces situated in the western part. The rationale is to stimulate regional developments and sustainable economic growth, to diminish the disparities. Ironically, these giant differences in wealth, prosperity, income level and many other socio-economic indicators, principally is the outcome of former economic policy by the Chinese Communist Party. It is interesting to observe, whether the 'new' policy offers any signs of more evenly distributed economic growth already. On the contrary, it could be true that this policy will lead to a waste of (financial) resources and disappointing results, just as it happened in southern regions of Italy and eastern parts of Germany.

To understand the sharp contrast in policy, an overview of the Chinese policy with regard to the process of gradual openness is provided in § 3.2. This is significant, since this has greatly affected the distribution of wealth in general and flows of FDI in particular. The following paragraph discusses the current Chinese regional economic policy which emphasizes the potential strength of Western provinces, up till 2000 treated as China's most peripheral region. The subject of regional economic inequalities is far from new and many articles have been written concerning. However, it is justified to see how and to what extent this situation has altered, since regional economic developments within China are changing so rapidly. In § 3.4 a review is given of this specific literature which learns various ways to deal with inequalities and moreover it provides statistical means to cope and measure them. To be able to uncover the spatial distribution of FDI and trends in provincial GDP, first a geographical distinction, handled in § 3.5, must be made. In essence the same geographical units, provinces, municipalities and autonomous regions, as used in China's Statistical Yearbooks will be used for this statistical analysis. Paragraph 3.6 handles the FDI dynamics per province over a time period of fifteen years. The same is done in § 3.7 for GDP per

provinces, again over a time period of fifteen years. These two paragraphs provide a better insight in absolute differences per province, however, they do not provide comparable ratios indicating which province is attracting relatively more FDI than others. This is done in § 3.8 when the share of attracted FDI per province is divided by its share of provincial GDP. The Theil index proofs a useful tool to measure whether relative differences between but also within groups of provinces have grown or declined over time. In addition, this makes it possible to uncover the dynamics of FDI flows per region (coastal, central western) or province. This chapter is concluded with § 3.9 in which the future direction of inward FDI flows is headed for. Will Western provinces attract more of it or will it remain a backward Chinese region? For certain, the Chinese government will be and have been playing a crucial role.

§ 3.2 China's precedent regional economic policy

It is fair to say, that the Chinese government has been the driving force behind China's economic reform, since 1978. In contrast to European transition economies, the Chinese Communist Party (CCP) succeeded in reducing poverty on a reasonably large scale and subsequently stimulated regional economic development. The announcement of a campaign to "*Open Up the West*", by the leaders of the CCP during the second half of 1999 indicated a substantial change in the regional development policy of the People's Republic of China (PRC), nevertheless this is not a 'new' phenomenon. The stated goal was the development of the interior and western regions of the PRC, in distinct contrast to the emphasis of regional development since 1978 that had favored its eastern and southern parts (Goodman, 2004). Its focus is to diminish the disparities within China and equalize the rising wealth in combination with strong nation building effects. Special emphasis is put on the last factor, because some signs of civil upheaval in China's hinterland were heard, because they felt treated as second class. Unity between different regions in China has always been subject to discussion and this vast hinterland, seems to have preoccupied all Chinese leaders in the 20th century, though with different means. Sun Yat-Sen, in 1922, published *The International Development of China*, where he tried to attract the post-war foreign powers to invest in the country's western regions in order to create the huge Chinese market they had been striving for (Holbig, 2004). In the 1960s, Mao Zedong formulated the *"Third Front"* strategy which started out as a program for economic and social development of China's interior provinces but was then redesigned as a strategy for national defense. Not surprisingly, the programmatic roots of the Open Up the West policy go back much further than Jiang Zemin's 1999 appeal (*ibid.*). Deng Xiaoping had already reasoned about regional development in China in the latter half of the 1980s. Obviously with the aim of justifying his uneven policy of coastal development, he formulated a strategy of "two overall situations" with two stages of

regional development. The coastal provinces were first to be given central support; once they had reached a sufficient level of development, the interior provinces in turn would receive such support. With this strategy, Deng Xiaoping made it clear that the central government had a fundamental task in coordinating regional economic development throughout China (*ibid.*). It is shown, that the latest Open Up to the West program is certainly not original, however, as a result of ongoing economic growth, regional circumstances have altered and new opportunities may rise, which could result in a successful outcome.

On the surface, the latest attempt seems serious and the implications suggest nothing less than a major state project. Despite its fair intentions, the processes and implications are highly complex, intensified by the vast socio-economic, cultural and political regional differences, caused by former regional policy. Therefore, it is extremely uncertain if national policy, which works fine for instance in the province of Sichuan would work in Shaanxi as well. This implies that there is also a need for more provincial-level and local perspectives. In map 3.1 below, all Chinese provinces are displayed. Before China's Open Up to the West policy and its implications is treated, first the different stages in the gradual regional openness which came along with Deng Xiaoping's uneven regional policy will be outlined. In principle, this policy opened the door for FDI, which had a huge impact on the speed of economic development and subsequently the degree of distinct differences along provinces.

Figure 4 The provinces of China

Source: Transformed by the author.

Note: For the sake of simplicity, Taiwan, Macao and Hong Kong are ignored.

In the first stage of opening (1979 – 1983), only a few locations, mainly the four Special Economic Zones (SEZs) were opened to attract foreign investment. These four SEZs were all located in the Southeastern provinces of Guangdong and Fujian, which are colored in darker blue (map 3.1). Economic incentives, such as tax benefits and relative smooth customs, were attracting FDI from all over the world. In other words, transaction costs to operate declined and accordingly, there were prohibitively high transaction costs to invest in other regions in China (Taube & Ögütçü, 2002). As a result, FDI 'naturally' concentrated in these pioneer regions, creating relative beneficial circumstances to attract additional FDI. This thought is strengthened by the fact that, due to new impulses, all kinds of institutions, social groups and hybrid forms of public-private organizations emerge, which in turn lowers the transaction costs even more. This is true, because they are smoothing the contact, contract and control facets of each transaction. Keep in mind however, that attracted amount of FDI was constant and only modest and constitutes a tenth of a fraction of what is flowing into China nowadays.

In the second stage (1984 – 1991), the opening was first extended to 14 other coastal cities and then to a major part of the coastal area, given a lighter blue color in map 3.1. The geographical borders were Beijing and Tianjing in the North to the province of Hainan in the South. This implies that the transaction costs for foreign investors to invest in other coastal areas were significantly reduced. Thus, foreign firms not only had more choices of location but also an incentive to spread out from the pioneer regions. Note the equivalent with Myrdal's cumulative growth theory which explained emerging spread effects due to risen locational costs such as congestion problems and relative high rents.

During this stage, although the interior provinces were not yet officially opened, the transaction costs in them also started to diminish little by little. Most of the interior provinces had begun to host some amount of FDI since 1986, but its scale was only a fraction of that hosted by coastal provinces. Because the coastal provinces had better (geographical) access to international markets due to international airports, deep sea ports and huge urban agglomerations with supporting infrastructure, they maintained major advantages in attracting foreign investments.

In the third stage, 1992 – 2000, the openness was officially extended to the interior provinces. The year 1992 witnessed the most important 'enlargement' of China's opening. Ten major cities along the Yangtze River and all the capital cities of inland provinces are declared open to foreign investors. Also a great number of coastal cities were designated as "bonded areas" or "Economic and Technological Development Zones". This implies that the

investment costs not only diminished in the interior regions but also continued to decrease in the coastal provinces. From then period, the location choice for foreign investments widened and three factors are of influence. Firstly, the great reduction of investment costs in the interior provinces induces FDI to spread out into the interior provinces. Secondly, the regional wage differentials, urban congestion and higher rents in the core provinces also constitute a dispersion force that pushes some foreign firms to move out from the coastal regions. However, there must be the availability of at least basic conditions if a firm is willing to move to peripheral regions. Besides, fiscal or other incentives must make up for the relative higher transaction costs in peripheral regions. Thirdly, the agglomeration economies in the coastal provinces (core) have become stronger since these regions have already accumulated a considerable amount of FDI in the past years. This encourages foreign firms to locate in the core. In short, the evolution of the spatial pattern of FDI will depend on the relative strength of these factors. If the first two factors dominate, the distribution of FDI shall become more dispersed. If the third factor (agglomeration forces) dominates, the FDI will become more concentrated (Chen, 2002).

§ 3.3 China's current regional economic policy

As part of the result of the official openness of the interior provinces, both Jiang Zemin (the then PRC president and CCP General Secretary) and Zhu Rongji (then Premier of the State Council) announced that the campaign to Open Up to the West would start at the beginning of 2000. Basically, this could be seen as the fourth stage, with ultimate goals to reduce social and economic discrepancies between eastern and Western provinces. In the previous 20 years, they were treated unacceptably disadvantaged by the growth strategy under Deng Xiaoping's leadership. Despite empirical evidence of costly failures, such as in Germany, between the eastern and Western *Bundes Länder* and between the prosperous North and the poorer South in Italy, the Chinese government has launched this program with considerable attention.

The long and multifaceted debate on regional development principally ended op dividing two main arguments. On the one hand, there were scholars and Chinese policy makers who talked about a "ladder-step theory" and on the other hand were those who opposed to it. The "ladder-step theory", confirms that China, as a large developing country, should concentrate its scarce resources in the coastal provinces, owing to comparative factor endowments. In other words, scarce energy resources or industry supplies like oil, electricity or steel should be allocated to high value adding industries located in the East instead of poor performing State Owned Enterprises (SOEs) in the West. The coastal provinces are suited best to move quickly up the ladder of technological and economic progress (Holbig, 2004). New

technologies and subsequently new forms of knowledge adapted by the coastal provinces will diffuse and spread out over other interior provinces. Hence this theory predicts converging regional developments as mentioned in the second chapter. Furthermore, this theory is clearly in line with Deng Xiaoping's strategy (stage one and two) of unbalanced growth, explicitly justifying why coastal areas should be allowed to "get rich first." It were theorists of mainly Western provinces, who were arguing this point of view. In their "anti-ladder-step theory" they pose that the former was misconceived in its application to Chinese territory because the alleged regional differences in fact were mainly based on disparities created by the conditions of maritime trade which naturally favored the coastal provinces. It is obvious that Western provinces lack supply of access by sea, but they are relatively rich in natural resources.

To begin closing the gap in economic performance with the provinces of the eastern seaboard, there would need to be not only major state projects but also a massive concentration of resources (Ricardo, Heckscher & Ohlin), if indeed it is possible at all. An illustrative example learns that during the 1990s, in the province of Guizhou, GDP per capita was only a one twelfth fraction of that of Shanghai, China's richest province at that time (Goodman, 2004). Therefore large infrastructural investments are carried out mainly for two reasons. First of all, Western provinces' accessibility is being improved, which is a decisive factor for foreign companies. Secondly, in line with the cumulative growth theory, it creates employment, which in turn attracts new migrants stimulating the local market and business environment even more.

For certain, the Chinese government on various geographical levels will deploy marketing programs in order to attract a higher level of FDI. The lessons concerning FDI, learned from 1991 onwards, tell that new capital, technologies and job creating activities could be welcomed. Nevertheless, the last fifteen years, interior provinces were only modestly capable of attracting FDI in comparison to the coastal area. Supported by the national CCP, local mainland governments are more than willing to address the fact that wage costs in municipalities like Shanghai, Tianjin have risen dramatically, in combination with huge congestion and ecological troubles. As mentioned earlier, they are eager to present their regions as one with abundant resources such as cheap but relatively skilled labor and large quantities of raw materials. These comparative advantages must convince foreign MNEs to start investing more in Central and Western provinces as well. Again this is perfectly in line with the New Economic Geography framework presented in § 2.9 in the previous chapter. However, it remains unclear whether this strategy is successful or not. What remains certain is the fact that China has still a long way to go in reducing the immense inequalities. Before

proceeding to the statistical analysis, a swift scan of recent literature concerning this subject is presented in the next paragraph. It provides various ways to cope with regional inequalities, which is useful for the following statistical analysis.

§ 3.4 Recent literature on China's regional inequality

China's regional inequality has been an important subject not only for policy makers but also for researchers, consultants, and scholars from different scientific disciplines. Several studies have explored the regional inequalities in China, and indeed different approaches and time periods have been employed. Yao (1997), for one, followed the procedures devised by Yao and Liu (1996) and calculated and decomposed the inter-provincial per capita income Gini coefficient for just rural China during the 1986 - 1992 period. The primary finding of Yao's paper was that income distribution in rural China had become more skewed as a result of economic reforms. The uneven development of enterprises in both townships and villages had seemingly been a major factor in the increased inequality in regional income (Huang et al. 2003).

Kanbur and Zhang (1999) made use of a decomposition analysis, to determine the relative contributions or rural-urban and inland-coastal inequalities to ascertain regional inequalities in China during the 1980s and 1990s. Their primary finding was that, in terms of levels, the contribution of the former was much higher than that of the latter. Employing the decomposition method introduced by Tsui (1993), Lee (2000) later examined whether the major sources of China's regional inequality with regard to both per capita gross value of industrial and agricultural output and per capita consumption were different in 1982 and 1994. The major finding of this decomposition analysis was that the determinant source of the overall inequality in output had shifted from intra-provincial to inter-provincial inequality, from rural-urban to intra-rural inequality, and also from disparity within the coastal regions to the widening of the gap between the coastal and interior regions.

To analyze the evolution of China's regional inequality during the 1978-98 reform period, Lu et al. (2004) and Wang et al. (2002) have used per capita GDP, per capita consumption, and per capita income to calculate three indices: the coefficient of variance, the Gini coefficient, and the Theil entropy index. Their results indicated that inter-provincial and regional inequalities declined between 1978 and 1990, but steadily widened after 1990. On the question, *'Does the degree of inequality between provinces within a given region or between two regions decline or widen?'* Zhang et al. (2000) have responded by calculating the Gini coefficient for China and its three trans-provincial regions, namely the Eastern, Central and Western regions from 1952 to 1997. They have found that, in general, income disparity in

China clearly increased over the period 1952 – 1997, especially after the initiation of economic reforms.

In addition, Chen (2002) explored the geographical distribution of FDI and GDP in China. He used the Theil index to measure the disparities between groups of provinces, such as the coastal versus mainland provinces, but also the disparities within groups of provinces. He assembled data over the period 1986 – 2000 and concluded that China witnessed a significant decrease of the geographical concentration of FDI. Furthermore, almost all of this decrease took place before 1994, which illustrates the dispersing effect of the widening of openness (by reducing the transaction costs) whereas the stability of the concentration degree during 1994 – 2000 highlights the impacts of agglomeration economies on the FDI location (Chen, 2002). This is one of the few studies that have shed light on issues concerning the regional inequalities in economic development as represented by regional FDI/GDP concentration ratios. Further, none of the previous studies discussed the contribution of between-group and within-group inequality at the same time.

With Chen's contribution, it is the idea to expand the time frame from 2000 to 2004, four years after the CCP launched its ambitious program *Open Up the West*. Perhaps it is too early, but there might be statistical evidence which proofs the success or failure of the program. The statistical analysis starts with a geographical demarcation, presented in the next paragraph.

§ 3.5 Methodology and geographical demarcation

To be able to analyze how Chinese provinces and regions have performed economically over time, specific statistical data is necessary. In this thesis the geographical unit of a 'province' or 'municipal' is used. Undisputedly, large differences within a province exists, however three arguments are supporting this decision. First of all, in the Statistical Yearbook of China, data is widely available at this geographical level. This means that over time, data becomes comparable. Secondly, research at provincial or municipal level, enables to discover patterns of flows between groups of provinces in the East, Central or Western parts of China. Thirdly, differences in specific factors between and within these region's can be calculated with appropriate statistical methods, such as Gini coefficients or the Theil-index.

China consists of four municipalities, Beijing, Tianjin, Shanghai and Chongqing[1], and 27 provinces. In table 8, the three sub regions are compiled by their natural geographical settings.

Table 8 Chinese provinces and municipalities selected by region

Eastern provinces	*Central provinces*	*Western provinces*
Beijing	Shanxi	Inner Mongolia
Tianjin	Jilin	Guangxi
Hebei	Heilongjiang	Chongqing *
Liaoning	Anhui	Sichuan
Shanghai	Jiangxi	Guizhou
Jiangsu	Henan	Yunnan
Zhejiang	Hubei	Tibet
Fujian	Hunan	Shaanxi
Guangdong		Gansu
Hainan		Qinghai
Shandong		Ningxia
		Xinjiang

Source: author's own selection

To measure economic development per province, GDP figures per province gives a fair indication to what extent the province is contributing to China's overall GDP. When GDP figures are collected over a series of years, a dynamic analysis is possible, indicating which provinces becomes stronger in economic sense and which provinces loose their position. The same is done for FDI on a provincial level. FDI is regarded as being a fair factor measuring a region's attractiveness to foreign investors. These two determinants are used to examine the development of, and the disparities between these regions and provinces. Each year, the Statistical Yearbook of China provides detailed statistical data on national but also provincial level. Therefore relative reliable and consistent information is available. Normally, the larger the provinces are, the higher the GDP and the amount of received FDI is. Hence, it is not a suitable way to calculate concentration ratios and measure disparities between provinces. However it provides a demarcation, to what extent Chinese regions differ from each other based on only one factor.

Only when FDI is compared to the province's GDP, then it is possible to calculate the relative figures instead of only absolute figures. The latter is useful to get an impression which provinces are attracting more FDI instead of other provinces which are only attracting modest

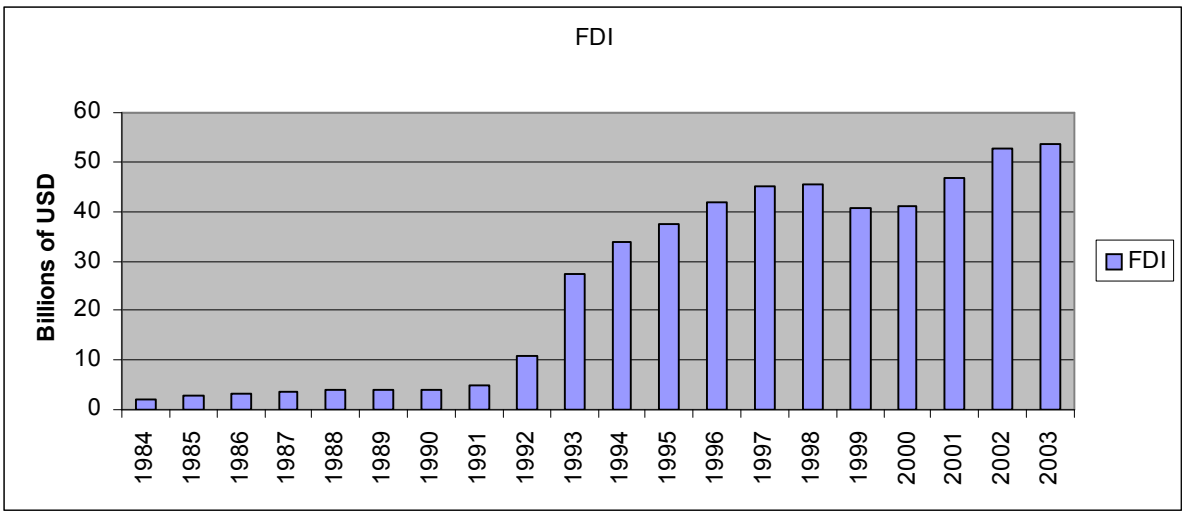
[1] * Chongqing received the status of a municipality in 1996 and from then on separated from the province Sichuan.

amounts of FDI, compared to their GDP. If a province scores higher on the ratio FDI/GDP, compared to other provinces, it can be perceived as a more *'popular place'* to invest FDI

§ 3.6 Absolute measurement of FDI

Before proceeding to the statistical analysis in order to outline the evolution of the FDI concentrations and measure ratios concerning FDI and GDP, it would be useful to take a rapid overview on the regional and provincial development of inward FDI and GDP in China during the last two decades. Figure 5 shows the amount of FDI actually invested in China for the period 1984 – 2003. After 1991, with Deng Xioapeng's open door policy until 1998, a sharp increase of FDI was noticeable, suffering a slight decline during the Asia crisis, again followed by a strong recovery. To a certain extent, this continuous growth of FDI reflects the continuous deepening of China's openness. It is worthy to note that the most significant increase of FDI took place in the early nineties, during which the annual growth rate exceeded 100%. From a transaction costs point of view, such increase of FDI suggests that the transaction costs of investing in China have fallen sharply during these two years. It is around this period that the first pioneering MNEs were expanding their activities into mainland China, made possible by the expansion of open provinces. There is still a rising trend, however not as impressive as in the early 1990s. With nearly 55 billion US$ in 2003, China was the world largest net receiver of utilized FDI in the world, leaving the US second.

Figure 5 Amount of utilized FDI in China 1984 - 2003



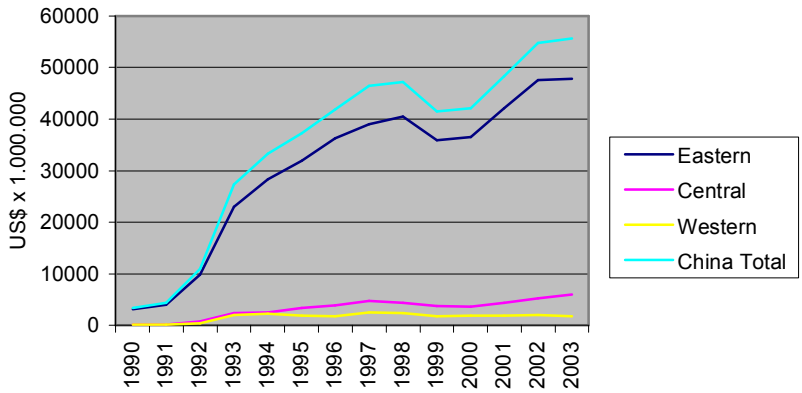
source: China's statistical yearbook 1990 - 2005

Recently, the Chinese government is trying to slow down the Chinese economy, due to overheating signals. Truckloads of emigrant workers from rural areas are utilized in order to keep the raise in wage costs in urban areas under control. Exports of steel are partly

abolished in favor of the rising domestic needs. In addition demand for energy sources like electricity is enormous and capacity expansion is required. Obviously, when demand surpasses supply the danger of inflation will emerge and China's export position and investment climate, due to higher prices could deteriorate fast.

When the total amount of FDI is regionally divided, as presented in figure 6, one immediately notices the extraordinary contribution of Eastern provinces to the total amount of FDI china as a whole is receiving. At the same time, the flat yellow line and the slowly improving purple line, indicates that in absolute measurement, the total amount of invested FDI in the Central and Western provinces is not improving, yet it remains stable at a magnitude of nearly 2,5 billion US$.

Figure 6 FDI per region in China 1990 - 2002



Source: Statistical yearbooks China 1990 - 2005

Table 9 portrays the FDI share of each province, but it does not give a summary of the overall concentration degree of FDI in China. The figures are calculated as follows:

$$XT = \sum_{i=1}^{n} Xi; \qquad X_i = \frac{\sum(x_1,..x_n)/n_i}{\sum(y_1,..y_n)/n_i} \qquad (i = 1,2,...n)$$

Where X*T* is the sum of X_i, which equals each provincial amount of FDI, denoted as a percentage of total FDI in China. This is calculated by summing each amount of FDI in each singular year, x_1, x_2, x_n divided by the number of those years n_i, with the mean as a result. The same is done for the total amount of FDI in China in each year y_1, y_2, y_n, with an absolute percentage is the result. Two different time periods 1990 – 1995 and 2001 – 2003 are chosen, in order to show any differences in the provincial percentage of FDI. When the provincial shares are summed, a regional share of total FDI is measured. Not surprisingly In absolute measure the Eastern provinces exceptionally high.

Table 9 Provincial percentage of total FDI

FDI	*1990 – 1995*	*2001 – 2003*	*FDI*	*1990 – 1995*	*2001 - 2003*	*FDI*	*1990 - 1995*	*2001 - 2003*
Beijing	0,04383	0,03584	Shanxi	0,00210	0,00418	Inner Mongolia	0,00164	0,00235
Tianjin	0,02406	0,03356	Jilin	0,00790	0,00496	Guangxi	0,01828	0,00770
Hebei	0,01349	0,01606	Heilongjiang	0,00873	0,00645	Chongqing	0,00000	0,00455
Liaoning	0,05534	0,05507	Anhui	0,00747	0,00686	Sichuan	0,01645	0,00987
Shanghai	0,06599	0,08842	Jiangxi	0,00648	0,01899	Guizhou	0,00218	0,00070
Jiangsu	0,09635	0,17312	Henan	0,00873	0,00885	Yunnan	0,00228	0,00163
Zhejiang	0,02715	0,06386	Hubei	0,01548	0,03062	Tibet	0,00000	0,00000
Fujian	0,10906	0,06599	Hunan	0,01025	0,01718	Shaanxi	0,00826	0,00661
Shandong	0,06861	0,08961				Gansu	0,00104	0,00103
Guangdong	0,34540	0,23567				Qinghai	0,00005	0,00069
Hainan	0,03217	0,00887				Ningxia	0,00015	0,00035
						Xinjiang	0,00108	0,00035
Total Eastern	0,88145	0,86607	Total Central	0,06714	0,09810	Total Western	0,05141	0,03583

Source: China's statistical yearbooks 1990 - 2005; Authors own calculations

Over the period 1990 – 1995 the Eastern provinces collectively account for 88,1% of all FDI invested in China. Amazingly, the province of Quangdong attracted more than a third of all inflowing FDI, three times as much as all Central and Western provinces combined. Already at this stage the provinces of Fujian, and Jiangsu, a province south of Shanghai are doing relatively well. They are generating both around 10% of all FDI invested in China, where Fujian is gradually but steadily loosing its strong position and FDI rate dropped to 6,6%. The opposite is true for Jiangsu, this province is gaining a stronger position every year and attracts 17,3% of the national amount of FDI during 2001 – 2003. Note that Shanghai and Shangdong are also improving their percentage from 6,6% and 6,8% in the early nineties to 8,8% respectively 8,9%. in the early years of 2000

On the other hand, the 12 Western provinces combined are accountable for only 5,1% of total FDI during 1990 – 1995. This backward position has even been intensified due to the fact that the percentage has dropped to nearly 3,6% during the years 2001 - 2003. The Central provinces show an increase of attracted FDI when the nineties are compared to the last couple of years. Still, more than 86% of all FDI is invested in the eastern seaboard provinces. Evidently, these vast regional inequalities were subject for large debate.

To be able to show the pattern of distribution of FDI between provinces, the numbers in table 9, are displayed in two maps of China. This will make it possible to create a dynamic analysis of the distribution process of FDI in China. Note, that the time series are adjusted in order to present the most updated trends.

Figure 7 Percentage of total Chinese FDI *per province '95 – '00*

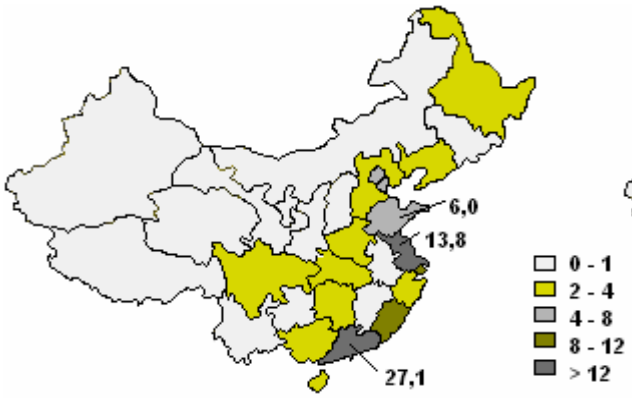
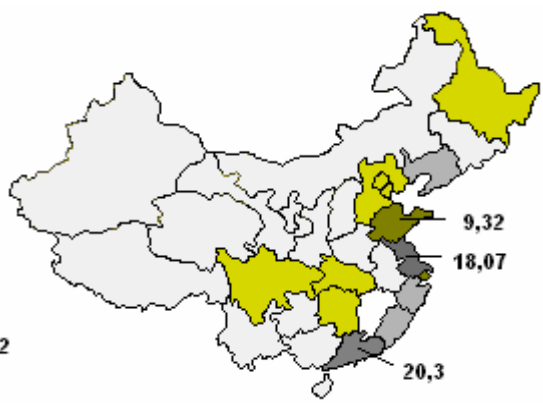


Figure 8 FDI percentage of total Chinese FDI *per province '00 –'03*



Source: China statistical yearbooks, author composed both figures

Figures 7 and 8 highlight the absolute concentration of FDI as a percentage of the whole amount of FDI, spent in China. The Southeast province of Guangdong, which was opened from the start in 1979, has been playing a significant role in the process of attracting FDI. However, the province is loosing its ultimate position, mainly to the coastal provinces of Jiangsu and Shandong, to the North, which is displayed by numbers in both maps. It is worth to mention that in preliminary figures of 2004, Jiangsu has taken the leading position in attracting the most FDI of all provinces, leaving Quangdong second. Interesting as well, is the fact that also surrounding provinces around Quangdong are loosing its former strong position. The island of Hainan and the upper province of Fujian have received 44% respectively 28% less utilized FDI in the period '01 – '03 than in the period '95 – '00. It seems that there is a movement of invested FDI along coastal provinces, instead of a direction from the (South) East to the West. Furthermore, the absolute percentage in interior provinces has dropped in 8 cases, 2 cases showed a growth and the province of Hunan stayed almost the same. This suggests a further concentration of FDI in the three interior provinces of Hubei, Hunan and Jiangxsi and a diverging process takes place, in which other interior provinces are lagging behind more and more.

Table 10 presents an overview of the province's ranks with regard to the amount of attracted FDI in 1990 and in 2003. This comparison illustrates which provinces gained a better position versus provinces whose rank deteriorated.

Table 10 Provinces ranked by attracted amount of utilized FDI 1990 - 2003

FDI Eastern	*Rank 1990*	*Rank 2003*	*1990 - 2003 Shift*	*FDI Interior*	*Rank 1990*	*Rank 2003*	*1990 - 2003 Shift*
Guangdong	1	2	-1	Shaanxi	10	19	-9
Fujian	2	7	-5	Guangxi	13	16	-3
Beijing	3	8	-5	Hubei	14	9	5
Liaoning	4	6	-2	Heilongjiang	15	20	-5
Shandong	5	3	2	Sichuan	16	17	-1
Shanghai	6	4	2	Jilin	17	23	-6
Jiangsu	7	1	6	Hunan	18	13	5
Hainan	8	15	-7	Anhui	19	18	1
Zhejiang	9	5	4	Henan	20	14	6
Hebei	11	12	-1	Inner Mongolia	21	24	-3
Tianjin	12	11	1	Guizhou	22	26	-4
				Jiangxi	23	10	13
				Yunnan	24	25	-1
				Xinjiang	25	30	-5
				Shanxi	26	22	4
				Gansu	27	28	-1
				Ningxia	28	29	-1
				Tibet	30	31	-1
				Qinghai	30	27	3
				Chongqing		21	N/a

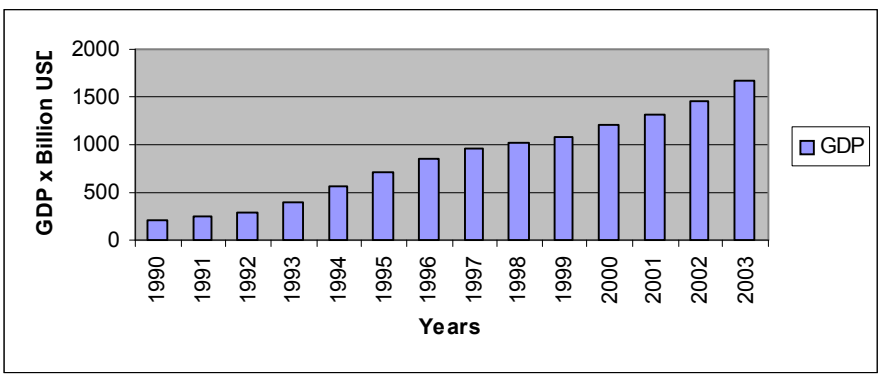
Source: China statistical yearbook 1990 – 2004, China online Bureau of Statistics

In particular, the provinces of Fujian and Hainan and the municipal of Beijing saw its position deteriorating during the period 1990 – 2003.

§ 3.7 Absolute measurement of GDP

In figure 9 an overview of China's national GDP is given which provides an insight in the development over time. Before 1990 China's GDP was stable at 200 billion USD, however after 1991 China achieved a remarkable and sustainable growth in GDP. Particular in the period 1991 – 1997 and 2001 – 2004 double digit growth rates were more ordinary instead of rare.

Figure 9 Development of GDP in China in the period 1984 – 2004

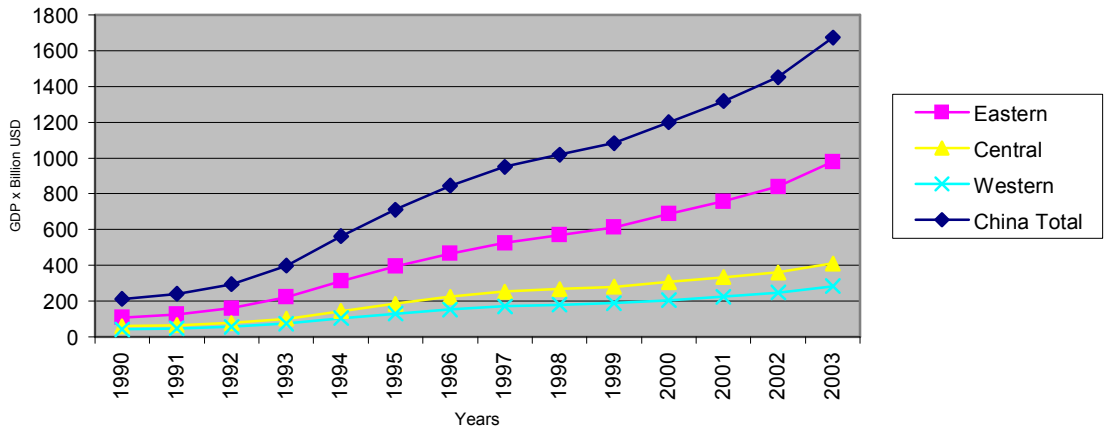


Source: Global insight; 2005

The Asian financial and economic crises in 1997 hit most of the Southeast Asian countries hard and it affected China as well. Was the amount of FDI invested in China decreasing (see figure 5), figure 9 demonstrates that the growth of GDP only slowed down after 1997. The following years after 2001, China's national GDP recovered strongly and particularly the export market was held responsible for that. However, large differences exist between geographical areas and provinces in particular.

It is interesting to see to what extent geographical areas are contributing to China's national GDP. In addition, this uncovers the spatial pattern of Chinese regions share, regarding China's national GDP during different time series. Not surprisingly, figure 10 depicts that the Eastern provinces are responsible for the main part of total GDP, however the differences are not as large as in comparison to the FDI figures.

Figure 10 Regional and national GDP in China 1990 - 2003



Source: China Statistical Yearbook 1990 – 2005

After Deng Xiaoping's famous proclamation *"To get rich is Glorious"* in 1992 (Chan 2005), national GDP comprised just above 200 Billion US Dollars and regional differences in GDP were modest but starting to grow. Until 1997, GDP level grew with astonish figures and Eastern provinces contributed practically 55% to China's national GDP, where Central and Western provinces accounted for 25% respectively 20%. The regional share of Eastern provinces is rising in 2001 – 2003, at the expense of Central and Western provinces. Relevant is the fact that Eastern provinces in 2003 are collectively responsible for 60% of China's national GDP while figure 6 shows that they receive nearly 90% of all attracted FDI (Galbraith & Wang, 2002). Obviously, on the basis of their GDP the provinces together attract "too much" FDI in order to speak of a fair distribution. In the next paragraph a closer look on provincial concentration figures is presented.

Table 3.4 Provincial percentage of total GDP

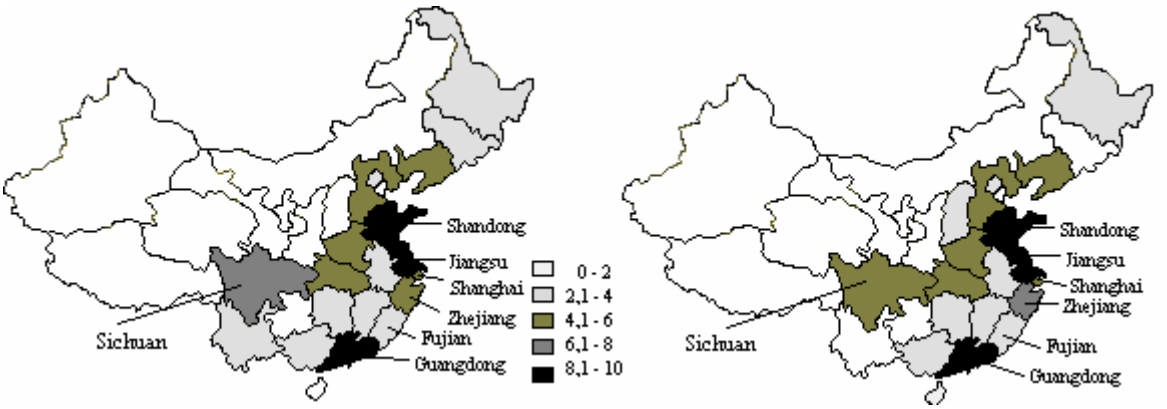
GDP	1990-1995	2000-2003	GDP	1990-1995	2000-2003	GDP	1990-1995	2000-2003
Beijing	0,026	0,027	Shanxi	0,020	0,017	Inner Mongolia	0,015	0,015
Tianjin	0,017	0,018	Jilin	0,021	0,019	Guangxi	0,026	0,021
Hebei	0,049	0,052	Heilongjiang	0,035	0,033	Chongqing		0,017
Liaoning	0,054	0,045	Anhui	0,033	0,030	Sichuan	0,062	0,041
Shanghai	0,044	0,046	Jiangxi	0,022	0,021	Guizhou	0,012	0,010
Jiangsu	0,085	0,091	Henan	0,050	0,052	Yunnan	0,021	0,019
Zhejiang	0,056	0,067	Hubei	0,042	0,041	Tibet	0,001	0,001
Fujian	0,034	0,039	Hunan	0,038	0,035	Shaanxi	0,019	0,018
Shandong	0,084	0,090				Gansu	0,011	0,010
Guangdong	0,094	0,100				Qinghai	0,003	0,003
Hainan	0,006	0,005				Ningxia	0,003	0,003
						Xinjiang	0,015	0,014
Total Eastern provinces	**0,548**	**0,580**	**Total Central provinces**	**0,262**	**0,249**	**Total Western provinces**	**0,190**	**0,171**

Source China Statistical Yearbook, 2005

In figure 11 and 12, the provincial share of GDP as a percentage of national or total GDP for the periods '95 – '00 and '00 – '03 of the 27 Chinese provinces and 4 municipalities are graphically exhibited.

Figure 11 Percentage of total Chinese GDP per province '95 – '00

Figure 12 Percentage of total Chinese GDP per province '00 –'03



Source China Statistical yearbook, 1995 – 2005, revised by author

In particular, the provinces of Guangdong, Jiangsu and Shandong are characterized as highly productive provinces with shares between 8% and 10% of China's national GDP. The western province Sichuan, with a highly dense population saw its provincial share declining, however, this was caused by the separation of Chongqing in 1996, which became a new municipality with political jurisdiction and local governments. Among other Western provinces, Sichuan still remains the best performing Western province of China in terms of

GDP. What becomes obvious is the fact that Central provinces perform better regarding GDP figures in comparison to the FDI counterparts. In other words, on behalf of their GDP figures the Central provinces receive "too little" inward FDI. The three most important Central provinces in terms of GDP are Henan, Hubei and Hunan. Moreover, table 11, which depicts all ranks calculated in 1990 and 2003 enlighten that the two Central provinces Henan and Hubei outperform the coastal provinces Fujian, Beijing Tianjin and Hainan.

Table 11 Provincial ranks GDP share in 1990 and 2003, including corresponding shift

GDP East	Rank 1990	Rank 2003	Shift in ranks	GDP Interior	Rank 1990	Rank 2003	Shift in ranks
Guangdong *	1	1	0	Sichuan	4	10	-6
Jiangsu *	2	2	0	Henan	7	5	2
Shandong *	3	3	0	Hubei	10	9	1
Zhejiang *	5	4	1	Hunan	11	12	-1
Liaoning *	6	8	-2	Heilongjiang	12	13	-1
Hebei *	8	6	2	Anhui	14	14	0
Shanghai *	9	7	2	Guangxi	16	17	-1
Fujian *	13	11	2	Jiangxi	17	16	1
Beijing *	15	15	0	Yunnan	18	19	-1
Tianjin *	22	21	1	Jilin	19	18	1
Hainan *	27	28	-1	Shanxi	20	22	-2
				Shaanxi	21	20	1
				Inner Mongolia	23	24	-1
				Xinjiang	24	25	-1
				Guizhou	25	26	-1
				Gansu	26	27	-1
				Qinghai	28	29	-1
				Ningxia	29	30	-1
				Tibet	30	31	-1
				Chongqing	n/a	23	n/a

Source China Statistical yearbook

A remarkable conclusion is the fact that with exception of Sichuan[2], the shift in ranks remains limited to a maximum of 2 positions up or down. It seems fair to say that over a period of 13 years the spatial contribution to national GDP among Chinese provinces remain relatively unchanged.

Table 12 indicates that the position of coastal provinces in general has improved, indicated by the decrease in the total sum.

[2] Chongqong received the status of a municipality in 1996 and was since, separated from the province Sichuan.

Table 12 The GDP and FDI rank of coastal provinces 1990 and 2003

Coastal Provinces	Rank 1990 GDP	Rank 1990 FDI	Rank 2003 GDP	Rank 2003 FDI
Guangdong *	1	1	1	2
Jiangsu *	2	7	2	1
Shandong *	3	5	3	3
Zhejiang *	5	9	4	5
Liaoning *	6	4	8	6
Hebei *	8	11	6	12
Shanghai *	9	6	7	4
Fujian *	13	2	11	7
Beijing *	15	3	15	8
Tianjin *	22	12	21	11
Hainan *	27	8	28	15
Total coastal provinces	111	68	106	66

Somewhat paradoxically, a lower sum means higher overall positions. Basically two conclusions can be drawn. First of all, the province Jiangsu has been particularly successful in attracting FDI, resulting in the number one position in 2003 leaving Guangdong behind. Secondly, the provinces of Fujian, Beijing, Tianjin and Hainan receive far too much FDI according their GDP rank. Possible explanations could be the fact that these provinces were open for FDI relatively early and these provinces border China's most vibrant and economically advanced regions, therefore benefiting spill over effects.

§ 3.8 FDI & GDP per province

The Theil index is one of many appropriate tools to measure disparities and like the Gini coefficient, it is widely used in analyzing income inequality. However, it is seldom been used in analyzing the spatial distribution of economic activities, whereas the use of Gini coefficient as a measure of geographical concentration is more common. The Theil index has an important advantage; it allows for a perfect decomposition of inequality into a between-group component and a within-group component. This feature appears particularly useful in this study, since there exist vast differences among Chinese provinces (Cheng, 2002). Such analysis will not only show the evolution of the overall inequality of the FDI distribution in China, but also demonstrate simultaneously the evolution of the between-group inequality and the within group inequality.

As mentioned earlier, the geographical unit in this study is a "province" or a "municipal" in China. There are significant differences among these administrative regions in their economic size (as measured by their GDP). Therefore, there are two kinds of concentration measures: when all the regions are considered as identical units, we get a measure of

"absolute" concentration, as showed above; when the economic size of each region is taken into account, a "relative" concentration is measured. All other factors being equal, a bigger region would naturally attract more FDI. So it seems more appropriate to measure the FDI in a relative manner. That is, the share of FDI in comparison to the share of GDP in each province. When the share of FDI is completely equal to its GDP share, then the distribution is considered perfectly "even" in relative terms. When, for instance in the province of Hainan, the share of FDI is greater than its GDP share, then a concentration of FDI exists in Hainan.

When the economic size of each province or city is taken into account, the Theil index is calculated as follows: suppose the GDP for each region is $P_1, P_2, ...P_n$, and the FDI for each region is $X_1, X_2, ...X_n$. *PT* and *XT* denote the total of these two variables. Small letters are used to denote the share of each region in the total:

$$PT = \sum_{i=1}^{n} Pi \;, \quad XT = \sum_{i=1}^{n} Xi \;; \quad p_i = P_i / PT \;, \quad x_i = X_i / XT \quad (i = 1,2,...n)$$

Then the Theil index is: $$T = \sum_{i=1}^{n} x_i \ln \frac{x_i}{p_i} \qquad (1)$$

The ratio $s_i = x_i / p_i$ is called as the "relative concentration ratio" of an individual region, which measures the FDI density in the region i. This ratio can also be considered as an indicator of the relative attractiveness for FDI of one region. In table 13 a numerical example is provided of the Theil index.

Table 13 Example of a calculation of the Theil – index for 1999

n regions	Total FDI 1999	Total GDP 1999	Percentage FDI	Percentage GDP	Ratio FDI/GDP	LN FDI/GDP	FDI x LN(FDI/GDP)
Beijing *	$Xi = 1975{,}25$	$Pi = 2174{,}4$	0,0476502	0,02480246	1,9211910	0,652945326	0,031113021
Tianjin *	1763,99	1450,06	0,0425539	0,01653976	2,5728238	0,945004065	0,040213613
Hebei *	1042,02	4569,19	0,0251373	0,05211738	0,4823216	-0,7291441	-0,018328745
Liaoning *	1061,73	4171,69	0,0256128	0,04758339	0,5382722	-0,61939087	-0,015864346
Shanghai *	2836,65	4034,96	0,0684303	0,04602381	1,4868474	0,396658101	0,027143471
…	…	…	…	…		…	…
Shaanxi	241,97	1487,61	0,0058372	0,01696807	0,3440110	-1,06708162	-0,006228772
Gansu	41,04	931,98	0,0009900	0,01063040	0,0931323	-2,37373344	-0,00235008
Qinghai	4,59	238,39	0,0001107	0,00271913	0,0407215	-3,20099725	-0,000354439
Ningxia	51,34	241,49	0,0012385	0,00275449	0,4496313	-0,79932718	-0,000989974
Xinjiang	24,04	1168,55	0,0005799	0,01332878	0,0435097	-3,13476912	-0,001817956
China Total	$XT = 41453{,}07$	$PT = 87671{,}1$					*T* = 0,4145562

Source: China Statistical Yearbook, Authors own calculations

If the n regions are divided into m groups: $G_1, G_2, ...G_m$, the Theil index can be decomposed into two components. One component measuring the between-group disparity $T_{between}$ and

another component measuring the within-group disparity T_{within}. The decomposition procedure is as follows:

First of all, the sub-total of GDP and FDI of each group is denoted by $PG_1, PG_2 ... PG_m$ and $XG_1, XG_2 ... XG_m$. Smaller letters are used to denote the share of one region in its group pr_i and xr_i together with the share of one group in the national total pg_k and xg_k. That is:

$$PG_k = \sum_{i \in Gk} Pi, \quad XG_k = \sum_{i \in Gk} Xi; \quad pg_k = PG_k / PT, \quad xg_k = XG_k / XT \quad (k = 1,2...m)$$

and $pr_i = P_i / PG_k (i \in G_k), \quad xr_i = Xi / XG_k (i \in G_k)$

The within-group disparity of each group T_{within} and the between-group $T_{between}$ are calculated as follows:

$$T_{within,k} = \sum_{i \in Gk} xr_i \ln \frac{xr_i}{pr_i} \qquad (k = 1,2,..m) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

$$T_{between} = \sum_{k=1}^{m} xg_k \ln \frac{xg_k}{pg_k} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

Note that the formulas (2) and (3) take the same form as formula (1). In fact, the only difference is that in formula (2), each group is considered as a whole, whereas in the formula (3), each group is considered as a "region", for example the coastal region and the interior region.

$$T = T_{between} + T_{within} = T_{between} + \sum_{k=1}^{m} xg_k \cdot T_{within,k} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$

The second component is a weighted average of the disparities within each group. The decomposition of the Theil index shows whether the disparity of the FDI is mainly due to the between-group disparity or the within-group disparity. The contribution of each component in the overall disparity is its share in the Theil index. Basically the percentages are calculated and that is described as:

$$C_{between} = T_{between} / T; \quad C_{within} = T_{within} / T; \quad \text{and} \quad C_{within,,k} = xg_k * T_{within,,k} / T$$

Like the Gini coefficient, the Theil index is always non-negative and increasing with the disparity. In this study, a higher Theil index indicates a greater concentration degree. Theoretically, a Theil index of 0, suggests perfectly equal distribution proportionate to the

distribution of GDP. In table 14, a correspondence between some Theil indices and the p_a value:

Table 14 The corresponding p_a value for various Theil indices

Theil Index	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
p_a value	98.0%	95.1%	90.5%	86.1%	81.9%	77.9%	74.1%	70.5%	67.0%
Theil index	0.50	0.60	0.70	0.80	0.90	1.00	1.05	1.20	1,40
p_a value	60.7%	54.9%	49.7%	44.9%	40.7%	36.8%	35.0%	30.1%	24.7%

Figure 13 and 14 demonstrates the relation between Theil indices and its corresponding p_a values. For example a Theil index of 0.90 is equivalent to p_a value of 40,7% and a Theil index of 0.30 corresponds to a value of 74.1%

Figure 13 Theil index 0,90 and corresponding *p* value

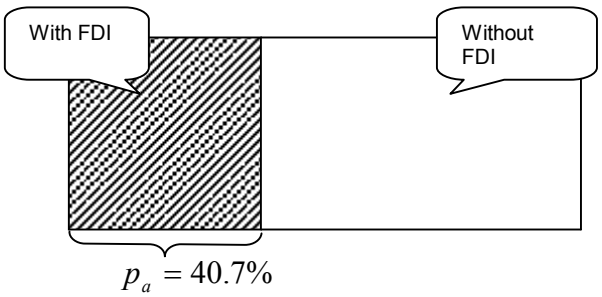
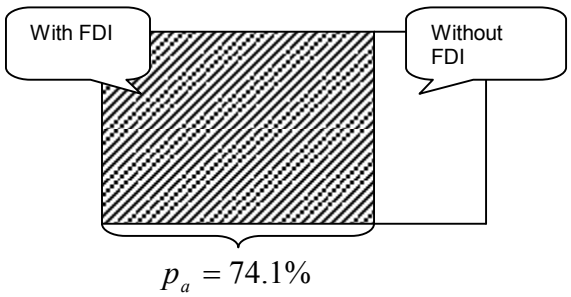
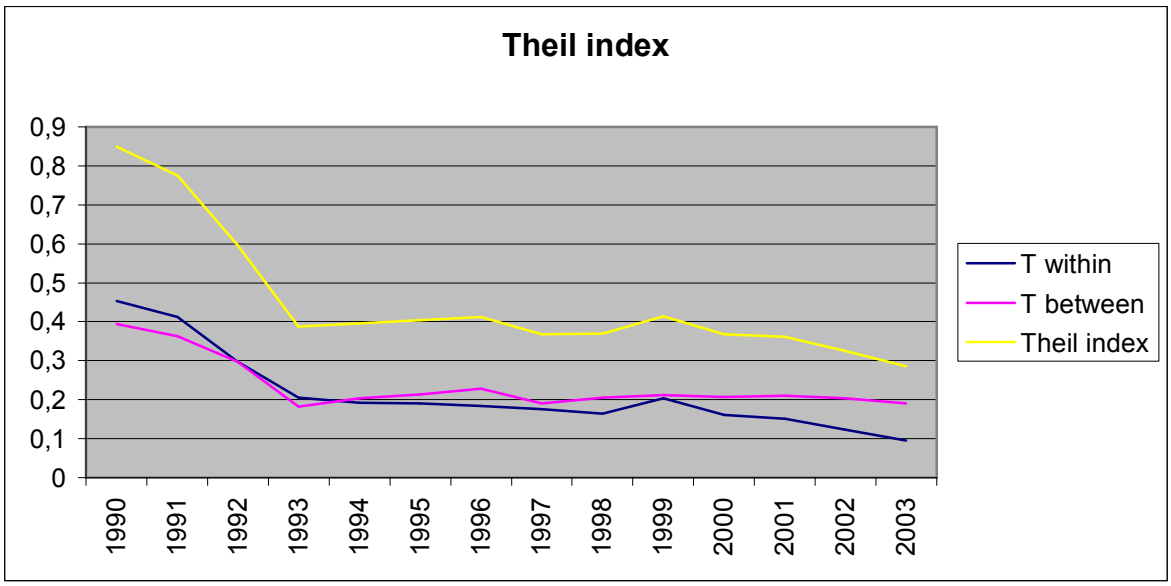


Figure 14 Theil index 0,30 and corresponding *p* value



The smaller the Theil index is, the better the geographical distribution is. A theoretical Theil index of 0 suggests a perfect distribution, hence a $p_a = 100\%$. The Theil index is not particular useful if there is only data for one year. It does not tell if disparities are growing or declining and therefore this index has to be calculated over a series of years. In figure 15 this is done for China over the period 1990 – 2003. Doing so, this enables the possibility to examine the evolution of the provincial distribution of FDI in China through decomposition analysis of the Theil index.

Figure 15 Development of the Theil index between East vs. West China during the period 1990 – 2003.



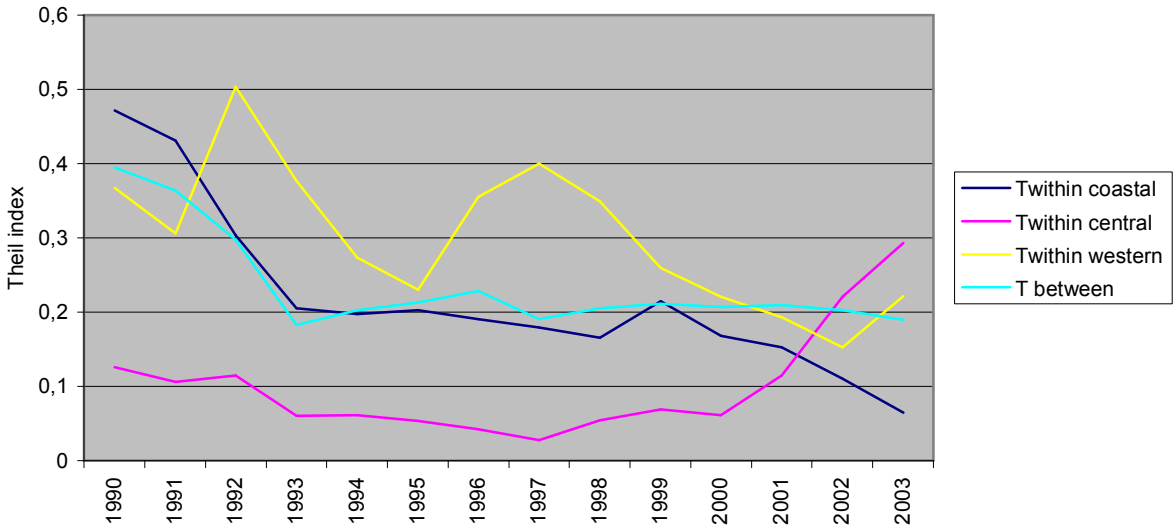
Source: Statistical Yearbooks China, Authors own calculations

Figure 15 presents the results of the decomposition analysis between coastal and interior provinces. There is a sharp decrease during the period, which means the inter-provincial FDI distribution has become more dispersed. Starting from 1990 with a Theil index of 0.85 (p = 0.428 or 42.8%) the Theil index has dropped to 0.28 in 2003, meaning that the FDI is spread out over 76,4% of China's economic area.

The evolution of the overall Theil index can be divided into three distinct stages. Until 1993 this index has seen a sharp and continuous decrease, whereas after 1993, it has been moderately stable. This period of stability lasted until 1999 – 2000 and started to decrease again after 2000 until 2003. The most spectacular decrease, however, took place in the period 1991 – 1993, which are precisely the two years that have witnessed the most important enlargement of China's openness. Moreover, the second period of a decreasing Theil index, starting after 2000 took place precisely at the moment when the CCP announced the *"Open up the West"* program. However, it might be too premature to address the decreased Theil index to the new economic policy, especially when the two elements *T-between* and *T-within* are analyzed. During the first period 1990 – 1993, both elements caused the overall Theil index to decrease. China's openness resulted in a shift of FDI flows between coastal provinces and interior provinces as well as within coastal and interior provinces. Undisputedly, not the *T-between* element, but the extent to which the T-within has decreased is very close to that of the overall declined Theil index. In other words, throughout

the last ten years, the skewed distribution of FDI *between* coastal on the one hand and central and western on the other, has not improved.

Figure 16 Theil-within composition by Chinese regions 1990 - 2003



Source: Statistical Yearbooks China, Authors own calculations

Figure 16 shows that the Theil between has not fluctuated since 1993, however the Theil index between the three macro regions show strong variations. A decrease means that the FDI is more equally distributed within a region. This is true for the coastal region, yet the Theil within for the central and western region show a sharp increase since 2000, indicating that FDI is concentrating in a smaller region. In particular the Central provinces of Hunan, Henan and Hubei seem to benefit of this trend. Due to the fact that the coastal region is strongly influencing the overall Theil index, the decrease in the Theil within element outweighs the increase in the Theil within element for Central and Western China.

§ 3.9 Conclusions

In this chapter, a macro economic overview of the spatial distribution of FDI, in combination with gross domestic product (GDP) figures was presented. In general, an effort was made to find out to what extent regions and provinces are contributing to China's national GDP and inward FDI flows. Moreover, this chapter uncovered the dynamic process of the spatial distribution of FDI in China and revealed the provincial's attractiveness to FDI.

First of all, the regional inequalities in China are huge, resulting in regionally unbalanced economic circumstances. For instance;

- In 2003, Eeastern China contributes to nearly 60% to China's national income and receives 88% of all FDI.
- In 2003, Central China contributes to nearly 25% to China's national income and receives 9% of all FDI.
- In 2003, Western China contributes to over 15% to China's national income and receives 3% of all FDI.

When the eastern part of China is analyzed more thoroughly, one can discover a hierarchy of provinces, attracting the largest amounts of FDI in 2003. These provinces and municipals are Guangdong, Jiangsu, Shanghai, Zhejiang and Shandong. Undoubtedly, these provinces have improved their position, with Jiangsu taking over Guangdong's leading position. Provinces like Hainan, Fujian and the municipal of Beijing, saw their position, regarding FDI, deteriorating. In the central region, three provinces, Henan, Hunan and Hubei are performing relative well. They function as a transport hub linking Northeastern China to the southeastern regions as well as eastern to western regions. The most densely populated Western province is Sichuan with its former capitol Chongqing. Accordingly, compared to all other Western provinces, Sichuan and Chongqing attracts the largest amounts of FDI.

To be able to analyze the evolution of the spatial distribution of FDI in China, the Theil index is very appropriate. A straightforward advantage of this statistical approach is the fact that, not only the distribution of FDI between, but also within groups of regions, can be measured. If the FDI share is equal to the GDP share of all provinces, than the Theil index equals zero, indicating a perfect distribution. However, a Theil index higher than zero, per definition, means not all regions benefit to the same extent and there are locations where FDI is concentrated.

Starting from 1990 with a Theil index of 0.85 (p = 0.428 or 42.8%) the Theil index has decreased to 0.40 in 1993, meaning that the FDI is spread out over 67,0% of China's economic area. During this period, the Theil index between as well as the Theil index within caused the overall Theil index to fall. After 1993, the overall Theil index remained stable until 1999, indicating that FDI concentration remains unchanged. Basically, since the CCP announced its new economic policy, the Theil index decreased again form 0,41 to 0,28, however not caused by reasons, the CCP had hoped for. The Theil index decline is totally

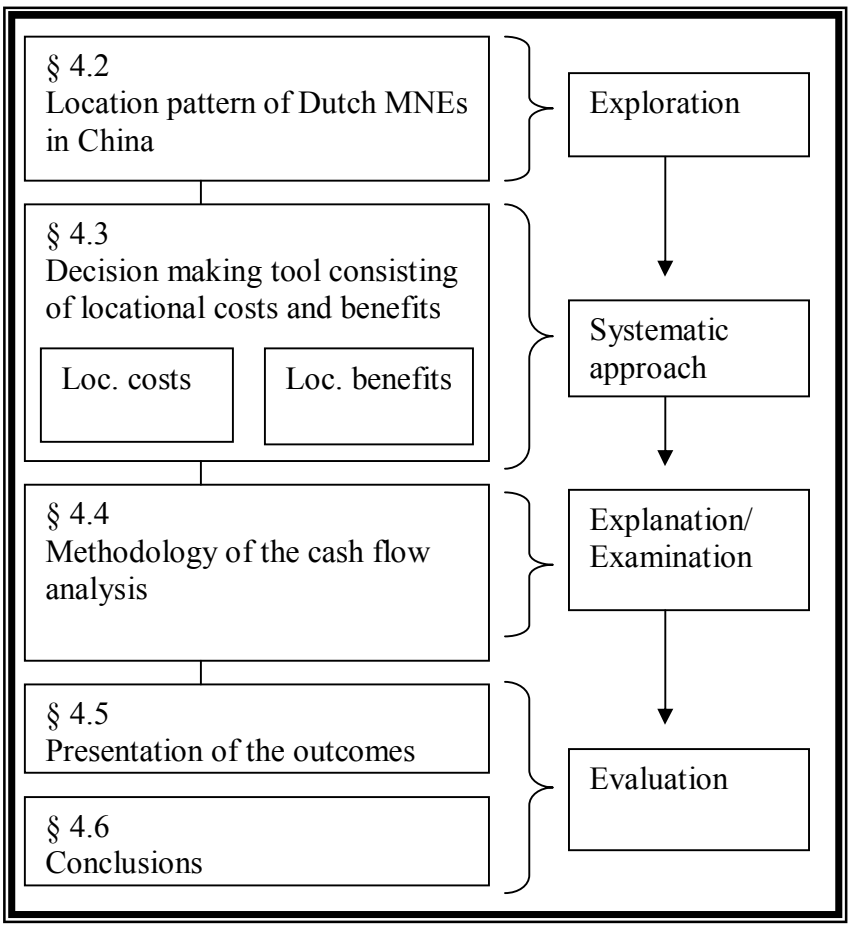
caused by a further decrease of the Theil within element of the Eastern provinces, with the Theil between eastern and interior provinces remained unchanged. In other words, there is a better geographical distribution of FDI in the Eastern provinces, whereas the uneven distribution between eastern and interior provinces still exists. Moreover, the Theil within element in the Central and Western provinces increased during 2000 - 2005, indicating that FDI is getting more concentrated within these regions. The overall Theil index decreased, because the Theil within element of the Eastern provinces outweighed the within element of the Central and Western provinces combined.

According to Myrdal's accumulative growth theory, the existence of FDI will lead to locational agglomeration advantages. Thus it can be expected that MNEs will move in to these provinces. However, the expected agglomeration gains need to be corrected by increasing costs. How MNEs deal with this decision will be analyzed in the next chapter.

4. Regional diversity and location decision of FDI

§ 4.1 Introduction

In the previous chapter, a macro economic overview of the distribution of FDI in China was discussed. In a quantitative way, the Theil index provided insights into what extent FDI was spatially distributed among Chinese provinces. Furthermore, it exposed which provinces, according to their GDP, received a relative high amount of FDI and thus could be considered as an attractive region for FDI. Basically, this section is the beginning of a micro economic approach, to discover regional diversities and decompose location decisions of FDI. The overall meaning is to combine economic geography with financial economics in order to enhance the location decision making process regarding FDI. Special emphasis will be put on the locational costs of a specific location, which partly determines the fit between a particular business activity and a specific investment location. Below, there is a schematic presentation of the content of this chapter.



As mentioned before, China has surpassed the United States as being the most attractive country in the world for foreign investments. In order to get a clearer picture about the Dutch response to the attractiveness of China and its unique opportunities, § 4.2 starts with an

overview of the geographical distribution of AEX stock listed companies in China[3]. This will serve as an exploratory starting point to benchmark the investment climate of three specific Chinese locations, in following paragraphs. The question now is, is the geographical distribution of Dutch MNEs equivalent to the location pattern of all Foreign Invested Enterprises (FIE), or is the selected companies to some extent more entrepreneurial and pioneering? It is important to notice that, this exploration does not contain an answer to the question why these MNEs have opted for their location.

To be able to analyze this question, a location decision tool will be introduced in paragraph 4.3. Herein two elements, locational benefits as well as locational costs, are incorporated, since they mutually determine the attractiveness of a particular location. Clearly, MNEs are screening and benchmarking locations to find out which location offers outstanding location factors, such as proximity to clients, the availability of an international airport, quality and availability of labor, etc. against the lowest locational costs. Generally speaking, locations which offer excellent location factors are relative more costly to locate in, than locations which are less endowed with geographical and economic benefits. The reason why these "hot" locations are more costly is because they will suffer scarcity of production factors, since the demand for labor, land and capital is relatively high. In turn, locations which lack key location factors can compensate their peripheral status by granting various financial incentives and costs minimizing benefits (MacCarthy, B.; Atthirawong, W., 2003). Therefore, MNEs who are in the process of strategic location decision must make a tradeoff between the locational benefits against locational costs at all times.

As a strategic location is becoming increasingly important, the location decision tool deserves attention as an efficient way to avoid unnecessary high costs and enjoy locational advantages at the same time. However, in the spatial economic and geographic literature, much more emphasis is put on the benefit side discussing which key location factors are crucial. Although this is certainly of great importance, locational costs are equally important. Therefore, in the remaining of this chapter, special emphasis is put on the cost side of this decision tool.

One way to do so is to make use of a cash flow model which incorporates locational costs of doing business. The objective is to forecast the accumulated cash flows of three hypothetical

[3] The Dutch Chamber of Commerce in China provided substantial data concerning this issue, which can be used as an appropriate tool to see which kind of activities are located at which locations.

investments[4] in three distinct Chinese locations, which are the cities of Changsa (Province Hunan), Guangzhou (Province Guangdong) and Shanghai. On the basis of annual sales, number of employees, utilization of gas, water and electricity, the hypothetical investments represents a distribution center, an electronics plant and a pharmaceutical plant. Due to the fact that these investments differ considerably and adding up the fact that locational costs differ among all three locations, hence it becomes obvious why this cost analysis is so important. To give an indication of the objective to compare three different investments in three distinct Chinese locations, the analysis can be best described schematically:

Table 15 Overview of the cash flows of hypothetical investments in three selected locations

	Distribution Center	*Electronics Plant*	*Pharmaceutical Plant*
Location Changsa	Cash Flow 1: Distribution center Changsa	Cash Flow 4: Electronics Plant Changsa	Cash Flow 7: Pharmaceutical Plant Changsa
Location Guangzhou	Cash Flow 2: Distribution center Guangzhou	Cash Flow 5: Electronics Plant Guangzhou	Cash Flow 8: Pharmaceutical Plant Guangzhou
Location Shanghai	Cash Flow 3: Distribution center Shanghai	Cash Flow 6: Electronics Plant Shanghai	Cash Flow 9: Pharmaceutical Plant Shanghai

The profitability of the investments will function as a selection mechanism, pointing out the optimum location. Note that the optimum location selection hereby is solely based upon the costs side of the decision making tool, excluding the location benefits. The exact methodology of this cash flow method, together with background information on the three investment locations are provided in § 4.4. This chapter will be concluded with the financial outcomes of the cash flow analysis, which are presented and evaluated in § 4.5.

§ 4.2 Location pattern of Dutch MNEs in China

China is rapidly changing its economic environment, making it challenging for MNEs to find a suitable location that fits their business activity. Even without asking why companies choose their particular location, it is worthwhile to explore the location pattern of Dutch AEX stock listed MNEs in China, because it provides a concrete overview of the number of subsidiaries per region, which can be compared to the location pattern of all Foreign Invested Enterprises (FIE). The questions now is, are Dutch MNEs behaving as pioneers, exploring more western parts of China or are they behaving conservatively and locate in the exact same locations as all other FIEs are located.

[4] Plant Location International is part of IBM – Global Business Solutions, assessing the competitive position of the Netherlands against five other EU members, concerning three investment scenarios.

In map 4.1, it shows that the vast majority of subsidiaries are located in the coastal provinces[5]. The number behind a region refers to the number of subsidiaries within that province. Mainly, the urban regions of Beijing (17), Shanghai (26) and the densely populated province of Guangdong (20) with Guangzhou as its capitol, accommodate many Dutch subsidiaries. In particular production companies, such as Philips, Akzo Nobel and DSM are, to a large extent, responsible for the scattered location pattern as presented in figure 17. These MNEs follow a complex network structure, in which production sites throughout all of China are responsible for a cost efficient production method.

Figure 17 Location pattern of Dutch AEX stock listed MNEs in China 2005, number of subsidiaries denoted behind each region.

Source: Dutch Chamber of Commerce in China.

In addition, the Western provinces of Yunnan, Sichuan, Shaanxi and the municipal of Chongqing seem to benefit the most of that. Obviously, in these more peripheral regions, cost benefits are in reach. Hence, these local authorities are granting huge tax incentives and other financial advantages and strive fiercely to attract large MNEs. In their perception, foreign enterprises are necessary to develop regionally and prosper economically[6]. Since 2000, these regions are supported by the Chinese national government, which is actively

[5] A detailed list of Dutch AEX-stock listed MNEs located in China was provided by the Dutch Chamber of Commerce in China.

[6] For a complete overview of regional economic growth theories, see § 2.6 in which Myrdal and Perroux's growth theories are described.

promoting these regions to foreign investors, in order to diminish the giant gap in economic development between east and west.

Considering their GDP and geographical location, bordering China's most developed and industrious provinces or municipalities, Hainan, Fujian and Tianjing show relative poor results with two, five and respectively four subsidiaries. Note, however, that this statement is only based on the relative amount of subsidiaries, excluding the amount of turnover and number of employees of these companies. Therefore, this statement is questionable, since one subsidiary in Fujian can be as large as four subsidiaries in Sichuan.

Higher costs force firms to look elsewhere

Shanghai: The high land and labor costs of China's key cities are forcing multinational companies (MNCs) to move their industrial facilities to second-tier areas. Shanghai, Beijing and Guangzhou should rethink their role, said Jones Lang LaSalle, the world's leading real estate consulting firm. In Shanghai, the company released its New China Industrial Guide that validates the movement of industrial sites to second tier cities. The guide gives executives in the property market an oversight to the rapidly changing industrial market in China.

"Our clients have noted the increasing cost of labor and land in Beijing, Shanghai and to some extent, Guangzhou. This means that industrial investment will be pushed further inland. In the Yangtze River Delta area, this means going beyond Suzhou to Hefei, Nanjing and Wuxi," noted Hart, head of research at Jones Lang LaSalle China. "This is true for the other key areas as well, we see a potential trend among MNCs to consolidate their industrial resources in China, which represents both opportunities and challenges for China's young yet vibrant industrial real estate (market)," he said.

In addition to providing a thorough overview of China's industrial property landscape, the industrial guide also focuses on six major economic regions, namely the Greater Bohai Bay, The Greater Yangtze River Delta, Southern China, Western China, North-eastern China and Central China. Among the six major economic regions, the Greater Bohai Bay area, the Greater Yangtze River Delta and Southern China are the industrial hubs that continue to power China's robust economic growth. Together, these three regions contribute more than half of the national GDP with only 34 percent of the population and 10 percent of China's land total.

However, cost of doing business in these regions is relatively high. The recent more favorable investment policies, adapted by the central and local governments pertaining to investing in northeastern and Western China, have resulted in attracting significant foreign investments. The level of overseas investment in China has grown dramatically in recent years. A significant component of this investment has been in the establishment of factories warehouses and research & development (R&D) centers.

Kenny Ho, Senior Manager at Jones Lang LaSalle China said the industrial land price in key cities is 30 – 40 percent more than that of second tier cities in China. It is difficult to find good quality industrial space close to Shanghai due to supply constraints and high land, utility and labor costs. As with other areas, the central government's tightening of industrial land supply in 2004 has added to the supply constraints, the guide said.

As the industrial facilities move inland, the leading cities need to develop and grow into strong bases for MNCs' regional headquarters and provide centers for R&D facilities, Ho said. The major industrial cities including Beijing, Shanghai and Guangzhou will still be the choice destinations for more sophisticated manufacturing, including some aerospace and pharmaceutical operations.

According to Ho "whilst MNCs are finding locations for industrial facilities outside the main cities in China, second tier cities are also facing competition from foreign cities, such as those in Brazil and India

Source: www.dailychina.com.cn, comments on the industrial guide 2005 of Jones Lang LaSalle.

When the location pattern of Dutch MNEs is compared to all Foreign Invested Enterprises (FIEs) to China, it is possible to make some general remarks, whether to what extent both patterns are alike. Furthermore it reveals to some degree, if Dutch MNEs are predominantly conservative (followers) or entrepreneurial (pioneers) by locating in core, respectively peripheral parts of China. Note, that only AEX-stock listed companies are taken into account, ignoring Dutch small and medium sized companies active in China, for the simple reason that this data is not yet available[7]

Figure 18 Geographical distribution of Dutch MNEs by region in China

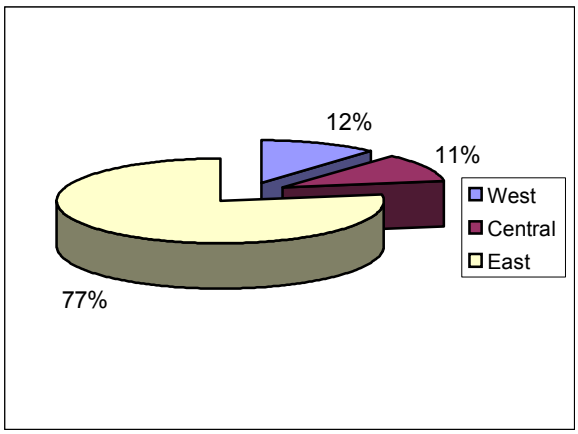
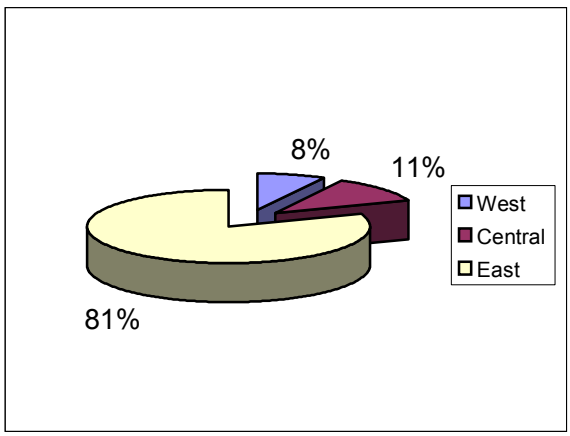


Figure 19 Geographical distribution of FIEs by region in China



Source: the Dutch Chamber of Commerce in China, China's statistical yearbooks

First of all, coastal regions are by far the favorite location to set up or to invest in plant sites, offices or warehouses. In table 18 it becomes clear that 77% of all subsidiaries[8] are situated in a coastal province. However, this number is less then the amount of FIE (81%) located in the Eastern provinces within China, as shown in figure 19. Secondly, the distribution of Dutch MNEs and the total amount of FIEs located in Central provinces in China is exactly equal.

[7] The Dutch Chamber of Commerce is currently trying to list all Dutch companies in China, however at this moment only information of the largest Dutch MNEs is available.
[8] Total of all subsidiaries and affiliates in China: $N = 137$

However, there is a minor difference in the amount of Dutch companies located in Western provinces in China. Specifically in the province of Sichuan and the municipal Chongqing, the amount of Dutch companies is relative high. Only 8% of all FIEs are located in Western China, compared to 12% of Dutch MNEs. Nevertheless, this difference is too small to conclude the Dutch MNEs are behaving differently and thus could be characterized as entrepreneurial. In fact, both location patterns show great resemblance, indicating that Dutch MNEs follow the same location trend as all other Foreign Invested Enterprise do, suggesting a more conservative entering strategy.

Finally, a rough examination seems to learn, that MNEs with capital intensive activities, such as ABN-Amro and Fortis, show more conservative behavior by locating their regional headquarters in Shanghai, Guangzhou and Beijing[9]. Hence, they are searching for locations which are able to provide highly educated labor, first class offices in financial districts, and close proximity to international airports. The cost aspect, which comes along with a top location, is of less importance as long as the location offers unique location factors. In contrast, MNEs like Philips, Akzo Nobel and DSM, are focusing on large production sites with smooth access to a pool of skilled and unskilled labor. In addition, they are relative sensitive for locational costs and incentives, and show relative modest attention to location factors. These general remarks need further investigation, in order to be able to understand why companies opt for location A instead of B. Therefore, a systematic location decision tool is being presented in the next paragraph.

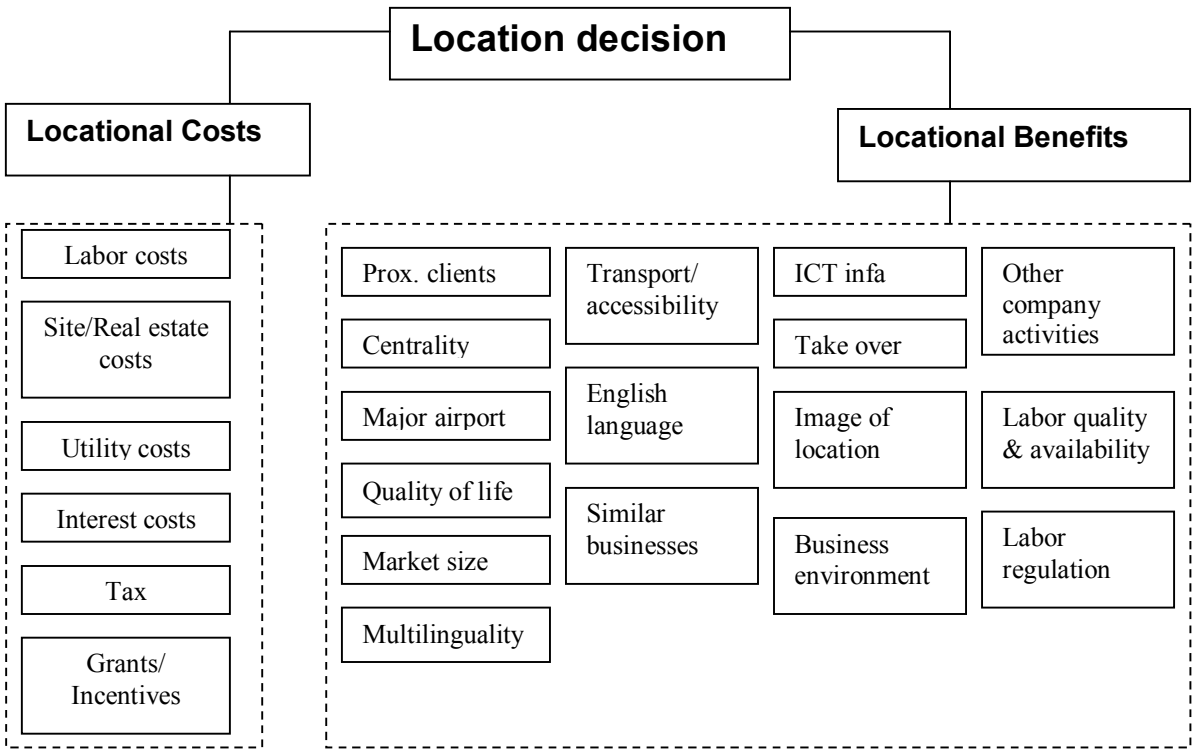
§ 4.3 Location decision tool

In the former paragraph an exploration was conducted towards the location pattern of Dutch MNEs in China. After comparing the location pattern of Dutch MNEs with the location pattern of all FIEs, one cannot characterize the location decisions of the former, as pioneering or entrepreneurial. Furthermore, one can not distract any information to the question why they have chosen for their particular location. A location decision tool provides an approach which clarifies and supports a location decision in general. It is a tradeoff between locational benefits and locational costs. Locational benefits are factors which are smoothing the business process, which can lead to sustainable advantages. For instance, multilingualism leads to a better mutual understanding in general and thus decreases the risks of miscommunication and inaccuracies. In addition, proximity to an international airport, contributes significantly to the infrastructure, making it possible to rapidly visit the office or plant whenever necessary.

[9] A comprehensive data sheet with names, locations and activities of Dutch MNEs in China is added to the appendices

As a counterpart, locational costs can be regarded as the cost of doing business in a particular location. Any activity requires means of production factors labor or capital. Because of the fact that both production factors are only moderately mobile, per definition, regional differences in rewards for the production factors exist. Therefore, labor intensive activities should be placed in locations were labor is relatively abundant and reward (salary costs) is relative low. Subsequently industrial sites, which require a vast amount of square meters, should be placed in locations with relative low costs for land, and expanding possibilities in reach. Thus, the type of activity is of great importance in making a suitable location decision. Figure 20 shows the location decision tree in detail.

Figure 20 Location decision tree



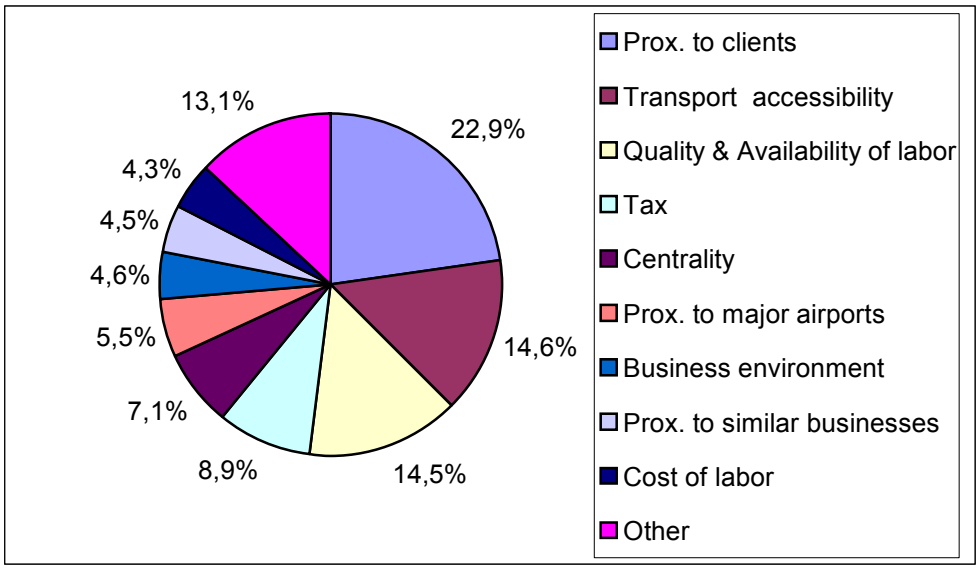
Source: Ernst & Young's European Headquarters report 2005: Location decisions and establishing sequential company activities.

Based on objective sources and a survey, held by Ernst & Young, the figure above shows the key location factors as part of the locational costs and benefits. Although these are key location factors which are considered as most important in a location decision for an European Headquarter (EHQ), here it is assumed that these location factors are also important to location decisions for factories, warehouses and offices. Moreover, these location factors are often mentioned in the spatial economics and geography literature, as

being relevant location factors, regardless the type of accommodation (plant, office, warehouse).

Since the survey is particularly relevant for the remaining of this Thesis, the methodology and outcomes will be shortly discussed. During the company interviews, the respondents were asked to point out "which factors would be considered in a present location decision for the EHQ. The Respondents were free to choose factors, basically no steering was done through standard predefined EHQ location criteria. Through this approach the actual perception of the CEO/CFO was measured (van den Berghe 2005). In the questions about location factors, respondents had to assign a total of 100 points to present factors to be able to compare the importance of these factors. Of the 98 participating EHQs 95 respondents gave sufficient information to determine. Therefore, present location factors were given a total of 9500 points.

Figure 21 Important Location factors in locating a regional headquarter.



Source: Ernst & Young's final report on European Headquarters: Location decisions and establishing sequential company activities, 2005.

Figure 21 shows the segmentation of present location factors. The top three location factors are: proximity to customers (22,9%), Transport & accessibility (14,6%) and the Quality and Availability of labor (14,5%). On average these three location factors together account for more than half of the weight when companies establish an EHQ. According to the respondents the importance of tax regime, business environment and the centrality of the location have a weight of respectively 8,9%, 7,1% and 5,5%. Factors which did not account

for more than 4% were taken aggregated in the category *'Other'*. These are the remaining location factors which can be found in the location decision tool[10] (van den Berghe, 2005).

Location factors are often presented as static factors, creating or deteriorating the attractiveness of a location. However, the importance of location factors may vary over time and each business activity, asks for a different set of location factors. This means that for every type of company considering a relocation decision, the location factors must be given a weight, representing their current degree of significance. In addition, the location decision tree entails fairly general and intangible location factors such as the quality of life and the image of the location. These general factors need to be further analyzed in order to quantify them. For instance, the number of leisure centers, city parks and theaters could be a tangible measurement, representing the city's quality of life.

Much more tangible are the locational costs. By consultancy firms, the locational costs are recognized as being equally important as the locational benefits, however, they seem somewhat neglected in the literature. For some reason, regional economic research is not often combined with financial accounting analysis. In the next section, an effort is made to so, by measuring the costs of doing business for three Chinese locations.

§ 4.4 Methodology and case studies

In the following section, a cost model for three types of businesses across three types of geographic locations is presented. Three hypothetical investments, which incorporate among other factors, the number of employees, transport costs, utility costs, and machinery and financing costs, represent a distribution center, a electronics plant and a pharmaceutical plant. The model uses a manifold of sources to collect the current business investment and operating cost data for each location. By combining this information for each operation and location, this model produces estimates of annual costs and the cash flows for a new business facility in each location (KPMG, 2002). Outputs from the model include standard financial and project evaluation reports including:

- Ten year cash flow statements
- Net present value of cash flows
- Corporate income tax calculations

These reports form the basis of the cost comparisons contained in the remaining of this chapter[11]. The result is a ten year snapshot of business costs in each location, scaled

[10] Note that the methodology and outcomes are exactly reproduced of the original report.

relative to the significance of each cost item during the establishment to full operation phase. Important to note is the fact that all investment are considered to be Greenfield investments, hence setting up an electronics plant or distribution center from scrap. This section begins with an overview of the three key locations.

Key geographical locations

Below, one can find the three locations which are the locations of Shanghai, Changsa and Guangzhou. Since the last decennium, Shanghai has experienced a huge inward foreign investment flow. All major MNE seems to have at least one regional headquarter or subsidiary within the boundaries of Shanghai. The impact on the city is huge, and all key economic variables, such as GDP per capita, showed a rapid raise. Basically the same holds for Guangzhou. Since the Chinese Communist Party in 1991, allowed foreign companies to invest in Guangzhou it has experienced an amazing growth period. The comparative advantage of being the first to welcome foreign enterprises caused Guangzhou to become a major center for FDI. Changsa is currently experiencing rapid growth as more and more foreign investments are done in second tier cities, wherein locational costs are relatively lower compared to both coastal cities, Shanghai and Guangzhou. Figure 22 shows the exact location chosen for this study.

Figure 22 Three investment location in China.

Before proceeding to the financial analysis, each investment location is shortly introduced and background information regarding geographical notions, key industries is provided.

[11] KPMG conducted a major research called Competitive Alternatives. Benchmarking business costs in North America, Europe and Japan.

Location 1. Changsa

Changsa is the capital of the province Hunan, which is a fertile and densely populated inland province. The city of Changsa is considered as being among the top 20 economically most advanced cities in China. Its key industries include manufacturing, construction, wholesale, retail trade & catering, agriculture and transport, post and telecommunications (KPMG, Investment Environment Study 2005). In 2003, the service sector represented roughly half of Changsa's GDP (48%) up 45% since 2000. This sector is expected to drive the city's economic development. Manufacturing and construction continues to be a pillar of the local economy, with production reaching USD 12.2 billion in 2004, an annual average growth of 13% from 2000 (*ibid.)*.

Its geographical location enables Changsa to function as a transport hub between flows of goods and services between northern and southern regions, as well as eastern and western regions of China. Albeit transport over water is more costly and time consuming. In contrast with cities as Shanghai, Beijing and Guangzhou, Changsa's land and utility costs are only rising very slowly. In addition, land and labor is still widely available and therefore available at relative low-cost, which will become a major locational advantage in the long run.

Location 2. Guangzhou

As the heart of the Pearl River Delta, Guangzhou has a significant export-oriented industrial base across a wide spectrum of manufacturing sectors. Key industries in Guangzhou include automobile, IT, telecommunications, pharmaceutical, petrochemical and fast moving consumer goods (FMCG) and electronics. High value added industrial activities in Guangzhou represents a much higher GDP per capita for the city when comparing to the overall figure for Southern China.

Labor costs are on the rise in Guangzhou, however the market still provides the necessary skill to meet the requirements of multinational manufacturers. The recent broadening of administrative boundaries will see an improving coordination of the region in terms of city and resources management, as well as overall town planning. This will improve the city's competitiveness in the long rum and is positive for long term sustainable development.

Location 3. Shanghai

As the largest city in China and the mainland's largest container port, Shanghai has developed a strong industrial base. Key industries include automobile, chemical production and consumer goods manufacturing. Recently a broad range of research and development centers related to the aforementioned industries as well as telecommunications,

pharmaceuticals and biotechnology have been established in Shanghai (Jones LangLaSalle, China industrial guide 2005). Rising land and labor costs mean Shanghai is not the best choice for every manufacturer, however the creation of the Yangshan deep water port and the expansion of the Pudong International Airport will assist Shanghai in remaining a key area for the production and distribution of products (*ibid.)*.

Because of rising locational costs in coastal urban areas, China shows a dynamic industrial location process. Within China, relocations of any kind of real estate to mainland cities are occurring in order to benefit from lower regional wages. In order to have better insights in the locational costs, the next session handles a cash flow method of a Distribution center investment in Changsa. In a consistent way, the cash flows of the other two investments (electronics plant and pharmaceutical plant) in the other two locations (Guangzhou and Shanghai), are estimated.

Key locational costs

This study combines different locational cost components to point out the locational differences, however maintain the consistency. The quality of the study is to a large extent determined by the accuracy and quality of the sources. To ensure this, the study compared local and regional data with federal or national data to check for inconsistencies. Furthermore, locational investment studies are conducted by established and well known consultancy firms improving the quality of the data.

Table 16 Location sensitive costs components used as input for the cash flow analysis

Location sensitive costs components	

Labor costs
• Salaries and wages
• For 48 job positions
 	
Facility costs
• Industrial land
• Industrial construction
  • Distribution center
  • Office
  • Factory
 	
Transportation costs
• Sea freight
	Utility costs
	• Gas in Nm^3
	• Water in m^3
	• Power in KWhr.
	• Telephone / Internet
	
	Financing costs
	• Interest on external loan
	• Interest on working capital
	
	Taxes other than income
	• Property
	
	Corporate income tax
	• National
	• Local
	• Incentives

Source KPMG comparing business costs in North America, Europe and Japan, 2002

Each of the cash flows of the three investments (or business operations) is defined according to a number of standard investment and operating specifications, including:

- Land and building requirements
- Machinery and equipment requirements
- Financing and working capital requirements
- Annual sales revenues
- Workforce requirements
- Material inputs
- Electricity, water and gas expenditures
- Transport costs
- Costs of capital

Cash flow model assumptions

For the sake of simplicity, additional costs that a new business would encounter have been held constant or are ignored. These include:

- Major cost items such as machinery and materials, used in production are held constant among the three locations. These costs are generally subject to global market pricing and are relatively location-insensitive.
- Working capital and costs of capital are held constant, since this is predominantly location insensitive and nationally determined
- 10 percent of the total annual sales is used as working capital, of which 10 percent is cash available to the (imaginary) company.
- 25 percent of the total investment costs, is cash available, the lump sump of 75 percent has to be borrowed against an interest rate which is held constant at 7%.
- (Raw) material inputs are held constant at 40% of annual sales. The Distribution center is excluded of any material costs since there are no inputs in the production process.
- The sales revenues are held constant for all locations.
- Depreciation of buildings is 20 years
- Depreciation of equipment is 10 years
- Investment is made in year 0 and there is no growth over the next ten years.
- The initial investment is partly financed with debt. Debt servicing costs are treated as expenses in the year incurred.
- During the first two years of operating, there are no repayments of principals of commercial loans.
- No cash flows are re-invested into the company

- The firm is a start-up, stand alone enterprise, and operates as a limited liability company under the name Foreign Invested Enterprise (FIE)
- Costs items such as advertising and insurances, since they are hugely varying for each type of business activity.

The investment example below stems from a regional benchmark study conducted by Plant Location International (PLI), by request of the Dutch government. In this study three types of investments are projected at six European countries. These investments are reproduced for the sake of this benchmark at three Chinese locations.

Distribution center investment[12]

- Site: 6 ha
- Buildings: (normal standing buildings)
  - Warehouse: 2,400 m²
  - Office: 200 m²
- Equipment: $ 600.000
  - Fork lift trucks
  - Office equipment
- Working capital: 10 % of annual sales $ 210.000
- Estimated annual sales: $ 2.100.000

• *Unskilled*	*-*
• *Semi-skilled labor*	*6*
• *Skilled labor*	*4*
• *Maintenance*	*2*
• *Administration*	*6*
• *Staff & management*	*3*

- Transport is done by 40 ft containers for the large volumes and 20 ft containers for the small volumes.
- Utilities
  - Power
    - Installed capacity (KVA): 100
    - Peak load (KW): 70
    - Monthly consumption: 8,500
    - Yearly consumption: 102,000
  - Water (only sanitary water)
    - Monthly consumption (m³): 25
    - Yearly consumption (m³): 300
  - Heating (central heating)
    - Monthly consumption (Gcal): 7
    - Yearly consumption (Gkal): 42

[12] This investment is exactly reproduced out of Plant Location International's report on European investment locations.

Numerous national, regional and local sources[13], locational investment reports and websites have provided all necessary data to sort out the locational costs. Hence, data on locational costs together with all required investment information are at hand, providing the input which is needed to extract a cash flow. Below, in table 17, an example of the cash flow of the set up of a distribution center in Changsa is being presented. The other cash flows, regarding the electronics and pharmaceutical plant in Guangzhou and Shanghai, are calculated in a similar way.

Table 17 Cash flow of a distribution center located in Changsa.

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION CHANGSHA, DISTRIBUTION PLANT

Changsa	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	2700000										
Building	165165										
Equipment	600000										
Investment	3465165										
Working capital 10% Annual sales	210000	210000	210000	210000	210000	210000	210000	210000	210000	210000	210000
Company funds	887291										
25 % of initial investment	866291										
10 % of working capital	21000										
External funds	2787874										
commercial loan	2598874										
working capital	189000										
Net cash investment	3675165										
Annual sales		2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000
Less operating costs											
Material costs		0	0	0	0	0	0	0	0	0	0
Transport costs		489000	489000	489000	489000	489000	489000	489000	489000	489000	489000
Labor costs		124154	124154	124154	124154	124154	124154	124154	124154	124154	124154
Power		7140	7140	7140	7140	7140	7140	7140	7140	7140	7140
Water		56	56	56	56	56	56	56	56	56	56
Gas		1002	1002	1002	1002	1002	1002	1002	1002	1002	1002
Telephone / Internet 512 kb/s		843	843	843	843	843	843	843	843	843	843
Gross Operating Income		1477805	1477805	1477805	1477805	1477805	1477805	1477805	1477805	1477805	1477805
Less Depreciation											
Depreciation building 5%		8258	8258	8258	8258	8258	8258	8258	8258	8258	8258
Depreciation equipment 10%		60000	60000	60000	60000	60000	60000	60000	60000	60000	60000
Net operating income		1409547	1409547	1409547	1409547	1409547	1409547	1409547	1409547	1409547	1409547
Less Interest charge											
Commercial loan 7%		181921	181921	181921	159181	136441	113701	90961	68220	45480	22740
Working capital 8%		15120	15120	15120	15120	15120	15120	15120	15120	15120	15120
Net income before taxes		1212506	1212506	1212506	1235246	1257986	1280726	1303466	1326206	1348947	1371687
Income tax 30%		363752	363752	363752	370574	377396	384218	391040	397862	404684	411506
Local surtax 3%		36375	36375	36375	37057	37740	38422	39104	39786	40468	41151
Net profit		812379	812379	812379	827615	842851	858086	873322	888558	903794	919030
Cash flow to all investors		1077678	1077678	1077678	1070174	1062670	1055165	1047661	1040157	1032653	1025148
Repayment of principals commercial loans		0	0	324859	324859	324859	324859	324859	324859	324859	324859
Cash flow to Equity investors		880637	880637	555778	571014	586250	601486	616721	631957	647193	662429
Profitability Index to equity	7,4768										
Present value PI (7,00%)	5,3432										
Accumulated cash flow year 0 - 10	-887291	-6654	873983	1429761	2000774	2587024	3188509	3805231	4437188	5084381	5746810
Profitability Index to Net Cash Investment	2,8752										
Present value PI (7,00%)	2,0260										
Accumulated cash flow year 0 - 10	-3675165	-2597487	-1519808	-442130	628044	1690713	2745879	3793540	4833697	5866350	6891498

Note that this is only one, of a total of nine cash flows, which are necessary to benchmark three investments in three locations[14]. As the cash flow shows, this distribution center has an annual sales of US$ 2.100.000 and after deduction of the operating costs, a gross operating income of US$1.477.805 remains. The depreciation costs are calculated as follows: buildings

[13] An extensive list with all used sources is provided in the appendices.

[14] For a schematic overview, see the introduction of this chapter. All nine cash flows are included in the appendices.

are depreciated in 20 years (equals 0,05 % annually) and equipment are depreciated in 10 years (equals 0,10 % annually). A net operating income of US$ 1.409.547 is the remainder, when depreciation costs are subtracted from the gross operating income. However, the net operating income is not taxable yet, since interest costs are tax deductible. Thus, net income before taxes is calculated, when the costs of capital (interest charges on debt and working capital) is subtracted from net operating income. In general, a taxable income rate of 30% is charged in China, while local income tax is computed on a taxable income rate at 3%, if there is no applicable tax preferential treatment. As for a distribution center, no such tax preferences are applicable. The cash flow show for a distribution center in Changsa shows a net profit of US$ 812.379, however both cash flows, to equity as well as to all investors, are higher in year one. This is the result of the fact that depreciation costs are no expenses. In other words, no money is flowing out of the company, when buildings are getting older. In the long run however, the building is worthless, so any company must incorporate the decrease in value over all the years the building is in use and makes production possible.

§ 4.5 Outcomes of the locational costs analysis.

Two main indexes are being used to measure the profitability of the three investments. The first one is called the profitability index to equity. The profitability index (PI) to equity is a ratio which determines the investments' profitability, made by the company. The cash flow above, shows that this is the amount of US$ 887.291 which is equal to the invested equity or "company funds". When, over a period of 10 years, the cash flows to equity is combined, a total sum of US $6.634.102 is attained. The profitability index to equity is equivalent to the accumulated cash flow over a period of 10 years divided by the invested company funds. In practice, this means ($6.634.102 / $ 887.291) a PI to equity of 7,4768. The Net Present Value (NPV) of the PI is based on a discount rate of 7%, which causes the index to drop to 5,34. Each cash flow must be made constant, which means that cash flow in year 1 (US$ 880.637 / 1,07) has a present value of US$ 823.025. When all cash flows are adjusted to the current value an accumulated US$ 4.740.938 is the result. This means that the present value of the profitability index to equity is equal to US$ 4.740.938 / US$ 880.637 = 5,34.

Basically, the profitability index to all investors is calculated nearly in the same way. However, this index uses the whole initial investment, including the external loan granted by external capital providers, instead of just the company's funds. As a consequence, the interest charges on debt and working capital plus repayments of principals, will flow back to the providers of this loan. Therefore, the cash flow to all investors is equal to the cash flow to equity plus the cost of capital (interest charges) and repayment of principals. A simple calculation shows that the accumulated cash flow to all investors is equal to US$ 10.566.663

and the total initial investment equals US$ 3.675.165. The profitability index is equivalent to the accumulated cash flow to all investors divided by the whole initial investment (US$ 10.566.663 / 3.675.165), totaling the amount of 2,875. The calculation of the net present value (NPV) of the profitability index (PI) to all investors is similar to the calculation of the NPV of the PI to equity, leaving a figure of 2,026.

Facing a higher risk on return to investment is the reason behind the fact that the PI to equity is higher than the PI to all investors. External capital providers, such as banks and other financial institutes, charge prearranged interest rates as a fee for their capital, hence facing a relative low risk in receiving returns on investments. On the whole, these ratios indicate which type of investment has the highest profitability figures for each location.

Figure 23 Profitability index to net cash investment
Distribution center

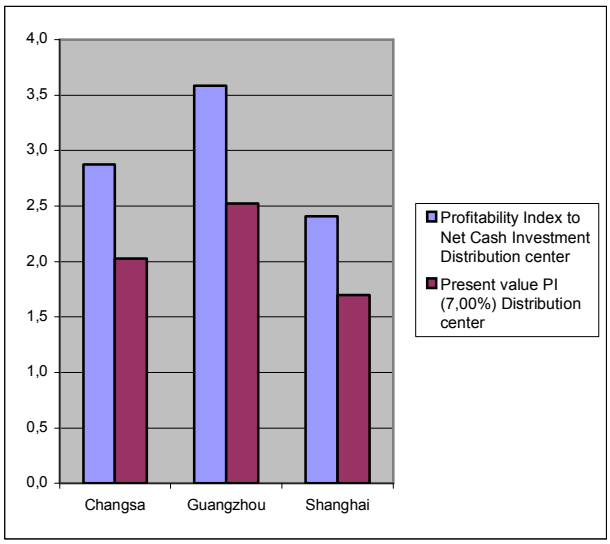
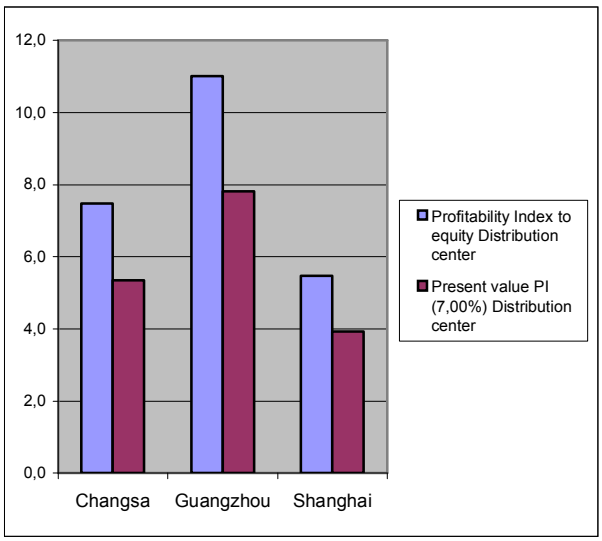


Figure 24 Profitability index to equity
Distribution center



Source: Authors own calculations

Due to the geographical position, Guangzhou and Shanghai, enjoy relative low transport costs. As both cities provide access to deep seaport facilities, they both offer good distribution channels against relative low costs. Changsa, lack deep sea harbor facilities and container transport must be shipped by national water ways, which accommodates higher costs. Since the distribution center is relatively a low skilled, labor intensive activity, wage costs are to a large extent determining the overall profit figures. Therefore, the fact that Shanghai has experienced a sharp increase in labor costs, these kinds of activities are becoming too costly to locate here. On the basis of this cost analysis, Guangzhou would be the best location to locate the distribution center.

The electronics plant requires a whole different set of necessities regarding the number of employees, the amount of land and utilization of gas water and power, which has been calculated for all three locations[15].

Figure 25 Profitability index to net cash investment Electronics plant

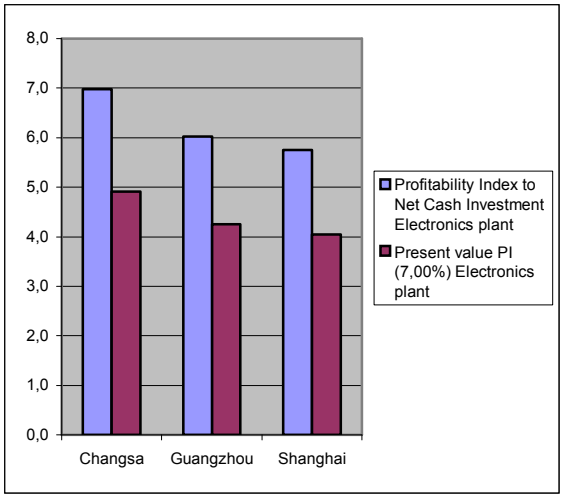
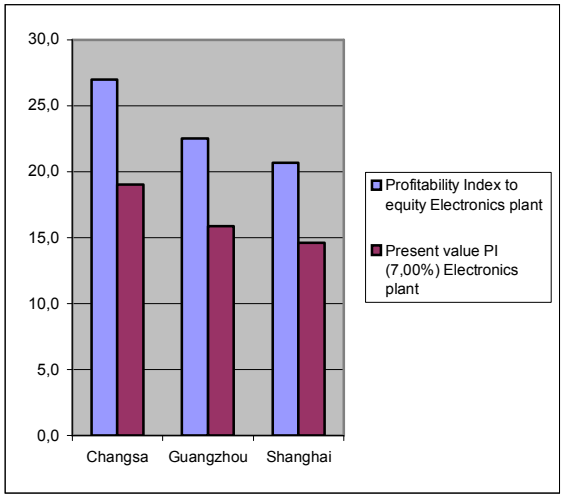


Figure 26 Profitability index to equity Electronics plant



Source: Authors own calculations

On the basis of this locational cost analysis and presented in figure 25 and 26, Changsa, with a profitability index to all investors and equity of 7,0 and respectively 26,98 would be the first location for this particular investment. The two coastal cities Guangzhou and Shanghai are both relative more costly, with Shanghai again being the most costly. In this case, the land costs are determining the profitability to a large extent, because (high technology) electronics plants are often located in special industrial sites, with smooth access to all kinds of infrastructures and facilities. Shanghai offers such sites for this kind of investment, however they experience an occupancy rate of 90% - 100%, causing high square meter prices (*JonesLangLaSalle, 2005*). Also the city of Guangzhou experiences a rising land price, due to the fact that land is getting scarce, though not to the extent of Shanghai. Changsa must anticipate to these circumstances and create a locational advantage by offering sufficient land against moderate costs.

The last investment is a pharmaceutical plant. Typical for this kind of investment is the vast amount of utilities used and the large amount of employees needed. In addition, it requires a relative large initial investment and subsequently the cost of capital is high.

[15] The exact requirements of this investment are included in the appendices.

Figure 27 Profitability index to net cash investment Pharmaceutical plant

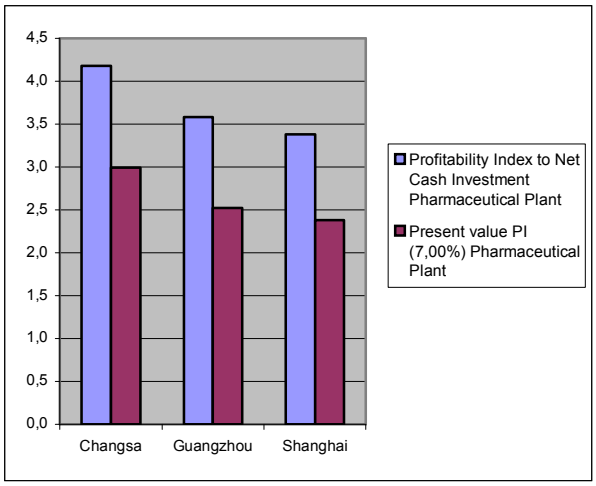
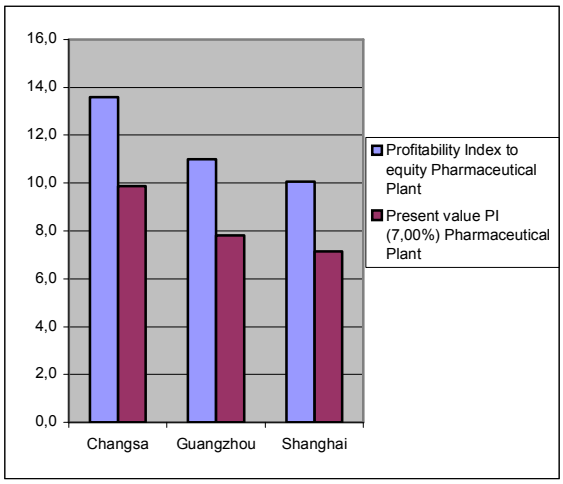


Figure 28 Profitability index to equity Pharmaceutical plant



Source: Authors own calculations

Figures 27 and 28 show that the highest profitability index (PI) to all investors as well as to equity for a pharmaceutical plant is found in Changsa. Not surprisingly, Shanghai shows the highest locational costs for this type of investment too. A straightforward reason is the fact that in general labor, land and utility costs in Shanghai are higher in comparison to other locations in China. Reality shows, however, that these kind of high value adding industries, despite the higher locational costs, choose to locate near China's most costly central cities. Therefore, one must conclude that the cost aspect of the location decision is important, though not as important as the accompanying locational benefits.

It remains precarious, though, to draw general conclusions since only three cases were studied. In addition, a manifold of cash flow assumptions are necessary in order to maintain the consistency and compare the locational fit of the investments. What is particularly relevant is the fact that the cash flow method is a systematic approach to partly determine the location decision. However, practice shows that despite higher locational costs, still many types of foreign companies decide to locate in Shanghai. This suggests that the locational benefits, which are often intangible, outweigh the extra locational costs. Thus, by all means, both sides of the location decision tool are equally important.

§ 4.6 Conclusions

This chapter dealt with the location decision making regarding FDI. In an exploratory way, a manner is sought to reveal the location pattern of Dutch MNEs in China. Basically, this served as an introduction to a systematical approach, determining the most suitable location for any business activity. In short the location pattern of Dutch MNEs, only differs marginally of the location pattern of all foreign invested enterprises (FIEs), with the exception that the

manufacturing companies Philips, Akzo Nobel and DSM located relatively more subsidiaries in the Western province of Sichuan. However, the Eastern provinces attracted the bulk of the subsidiaries, namely 77%.

The location decision tool is regarded as an appropriate tool to find the most suitable location for each type of activity. Principally, this tool consists of two factors, the locational costs and the locational benefits. Since the bulk of all spatial economic literature, deals with these locational benefits, this chapter has focused on the locational cost side. The cash flows of three hypothetical investments in three distinct Chinese locations are estimated and the profitability in relation to the investment is the ratio used to determine where any type of activity should be located according to the cost side. Note, however, that this exercise only deals with the cost side of the location decision tool, ignoring locational benefits, such as access to sufficiently qualified labor, universities, international air- and seaports. Thus, for example, a location with higher cost of doing business, can still be more attractive to MNEs due to the locational benefits. By all means, both sides of the location decision tool has to be incorporated in the final location decision. Below are the outcomes of the profitability indexes for all three types of investment per location.

Table 18 Summary of the profitability indexes to net investment at all three investment locations.

		Changsa	Guangzhou	Shanghai
Profit Index to Net Investment	Distribution center	2,875	3,413	2,406
Net Present value (7% discount rate)	Distribution center	2,026	2,403	1,697
Profit Index to Net Investment	Electronics Plant	6,977	6,016	5,751
Net Present value (7% discount rate)	Electronics Plant	4,906	4,250	4,045
Profit Index to Net Investment	Pharmaceutical Plant	4,181	3,583	3,380
Net Present value (7% discount rate)	Pharmaceutical Plant	2,997	2,523	2,380

Source: Authors own calculations

More figures, such as profitability indexes to equity, are presented in chapter four. In addition, the methodology is discussed in great detail, according one concrete example.

Summarized, the locational costs for labor, power, water and gas are deteriorating the comparative advantages of key Chinese cities such as Shanghai and to a lesser extent Guangzhou. Clearly second tier cities such as Changsa, can benefit from this position, where large supplies of skilled and unskilled labor is still available, and competition is relative low. However, not all kind of activities are putting emphasis on these cost considerations to the same extent. Low value adding activities, showing small mark ups are more likely to consider these cost advantages in contrast to high value adding activities. These kinds of activities,

such as pharmaceuticals, R&D centers and high technology plants, require at least large consuming markets, the proximity of specialized suppliers and highly educated personnel.

Until now, these location factors can only be found in the coastal Chinese agglomerations, where dense populations are found, all top universities are located and GDP per capita is high enough to sell these kinds of products. Clearly, when the cost advantages grow, more and more sophisticating industries will abandon first tier cities and relocate within China to second tier cities in the eastern and Central provinces. In general, the Western provinces are still lacking a fundamental level of facilities, which will have a negative impact on the location decision of MNEs in the short run. Although, there is not yet scientific proof, relocations within China from eastern cities to Central Chinese cities are expected for the low and medium value adding activities, creating new knowledge, technology and opportunities. However, Central Chinese cities will remain there strong position when it comes to financial services, R&D, and high tech industries. The reasons are manifold, however, the available infrastructure, legislation, institutions, proximity of specialized suppliers and agglomeration advantages are the most important ones.

5. Conclusions and further research

§ 5.1 Conclusions and hypotheses

Since 1979, China is undergoing rapid economic developments. However, not all of China's 31 provinces are benefiting in the same proportions. Population density, cultural habits, language, legal and fiscal aspects and ease of doing business differ from one province to another. In comparison, the average size of a Chinese province is as large as Germany or France. In this perspective it is fair to state that the Chinese economy is highly fragmented.

In the first part of this thesis, an effort was made to put the economic growth of China in the right perspective. A way to avoid oversimplified statements and explore the Chinese economic growth more in detail, is to shift the level of analysis to a provincial or regional scope. The latter consist of a group of provinces in the same geographical region, separating China in an eastern, central and western region. Two variables, provincial FDI and GDP share, are used to show how provinces or regions have developed over time. The data which is used in the analyses are collected from the Chinese Statistical Yearbooks. This source of statistical data is being supervised by the state and therefore to some extent erratic. However, in all cases the presented data is consistent and suitable for statistical means.

The second part of this thesis relates the provincial diversity with the strategic location decision process of MNE's. Which types of location factors are important for which type of corporate activities? Does the location pattern of labour intensive industries show similarities or dissimilarities with the location pattern of capital intensive industries? Three theoretical investments were hypothetically invested in three distinct Chinese locations, with the locational costs of doing business incorporated into a cash flow analysis. This provides a better way of understanding the different location patterns of labour -, capital - and knowledge intensive industries in China.

To be able to respond to the main question, four hypotheses were formed, dealing with both parts of this thesis. The first two hypothetical questions are primarily focused on the provincial distribution of FDI and the dynamic process herein. The third and fourth hypotheses are dealing with the location decision process of multinational enterprises.

H1: Chinese inward FDI follows the pattern of provincial comparative advantages, which are determined by the locational cost of doing business.

In general, foreign direct investments occur when cost advantages are expected or foreign markets can be entered more easily. MNE's investing in China during the period 1979 – 1983 were particularly focusing on cost reductions. Although the pioneers were struggling with bureaucratic rules and a limited choice of settlement, the number of FDI projects increased. Only in the province of Guangdong and Fujian, four Special Economic Zones were developed and only there, foreign companies were allowed to settle. As a consequence all FDI was distributed towards these two provinces. In the following years, the locations in which a company is allowed to invest in increased to 14 and all to be found in coastal provinces. Central and Western provinces could not benefit form the rise in FDI by the simple fact that foreign investments were prohibited there. Until then, FDI flows did not follow the comparative advantages offered by the provinces but were allocated by the Chinese government.

1992 is broadly seen as the starting point for the impressive economic growth, with the enlargement of the interior provinces. As a result, the location choice for foreign investments widened and three factors were considered to be of influence. Firstly, the great reduction of investment costs in the interior provinces induces FDI to spread out into the interior provinces. Secondly, the regional wage differentials, urban congestion and higher rents in the core provinces also constitute a dispersion force that pushes some foreign firms to move out from the coastal regions. Thirdly, the agglomeration advantages in the coastal provinces have become stronger compared to Central and Western provinces because these regions have already accumulated a considerable amount of FDI since 1979.

Figures show that in the first years after the enlargement (1992 – 1994) the distribution of FDI indeed improved and the Central and Western provinces began attracting FDI as well. The share of Central and Western provinces together increased form insignificant to 10% of China's total inward FDI. However, this share is only improving marginally over time, and remains relatively low at 12% nowadays. This implies that the first factor (reduction of the investment costs) caused a temporary incentive to invest in Central and Western provinces in the short run. However, the comparative advantages, captured by the second factor, have played an insignificant role, given the fact that the relative amount of FDI has only increased by 2%. In fact the third factor has played an important role in the provincial concentration of FDI in China. Although concentration of FDI has led to a rise in locational costs, the ease of doing business, the various institutes, specialized suppliers and the quality of life are factors which seem to be of more value. Companies are willing to pay higher wages and extra rents if the quality of products is secured, the logistical process efficient and employment turnover is minimized. Thus, supported by statistical evidence, inward FDI does not follow a pattern of

comparative advantages, but remains focused on the coastal provinces instead of higher locational costs.

H2: After 2000, the geographical distribution of FDI in China is converging, thus following the economic policy and development program of the Chinese government.

To be able to provide statistical evidence verifying improving circumstances in the distribution of FDI, the Theil index was used. This index is a quantitative approach and it allows for a perfect decomposition of inequality into a *between-group* component and a *within-group* component. This feature appears particularly useful in this study, while there are vast differences among Chinese provinces By using a time frame of thirteen years, a trend becomes apparent if and to what extent the disparities are declining. In this perspective a better geographical distribution of FDI means less concentration in only a number of provinces. During the period 1990 – 1993, in which the amount of FDI grew spectacular from $5 to $27billion, the Theil index decreased steeply from *T=0,85* to *T=0,40*, with a decrease in the *Theil-within* as well as the *Theil-between* component. The first component implies a better geographical distribution within groups of provinces. The latter implies a better geographical distribution of FDI between eastern and interior provinces, thus lower concentration degree in coastal provinces. The enlargement and further opening of China to foreign investors in the early nineties clearly had a positive effect on the geographical distribution. From 1993 – 1998 the Theil index has not changed and remained constant at *T= 0,40.* The amount of FDI grew further from $28 to $46 billion, highlighting the structural attractiveness of China in general and the coastal provinces in particular.

By the end of 1997 and 1998 the financial crisis hit most of the countries in Southeast Asia quite severe. Also China had to cope with downward economic developments, although GDP still showed a minor increase. Inward FDI amounts, however, declined for the first time since the economic openness in 1991, from $46 in 1998 to $41 billion in 1999. The highly uneven share of FDI between eastern (89%) and interior provinces (11%) remained unchanged.

In 2000 the Chinese Communist Party (CCP) proclaimed the new program *Open Up the West* in order to reduce the giant disparities between the thriving coastal provinces and the peripheral interior provinces. The question now is if there is any evidence supporting the second hypothesis. According to the overall Theil index one might claim that the program is already successful because the index decreased from *T= 0,41* (2000) to *T = 0,29* (2003). Nevertheless, the Theil index decreased because the *Theil-within* component dropped, however, not the *Theil-between* component. In other words, the overall Theil index

decreased because of the fact that the geographical distribution within a group of provinces (mainly coastal) improved. There is still no evidence supporting the second hypothesis, and it is far too early for the Chinese Communist Party (CCP) to claim success. Although 5 years seems a long period, in this perspective a period of 15 – 20 years needs to be taken into account before any statements can be made. Local circumstances do not improve over time, but needs time. Also the people living in these remote rural areas need to adjust to the new settings and keep working there instead of migrating to coastal cities. Large infrastructural projects built from scrap, take at least 5 to 10 years before they sort any effect. According the Chinese police, an increased number of 87.000 mainland protests (56.000 in 2003) is a sign of growing social upheaval, which is worrying the CCP. As a consequence supportive funds for interior provinces increased 14%, equaling a total amount of $42 billion. It is fair to say that the CCP is hoping for foreign direct investments, by facilitating with internal support. If, provincial circumstances are being improved it is more than likely that the three Central provinces, Henan, Hunan and Hubei will benefit the most. These provinces are relatively proximate to coastal provinces, function as strategic locations for distributing goods within China, show great progress in infrastructure and still provide relative low locational costs.

H3: The location decision making process of Dutch MNEs in China can be characterized as entrepreneurial, by locating relatively more subsidiaries in central and western Chinese regions.

The Dutch are known for their international focus and generally good sense for trade. But how did they respond to the Chinese opportunities, offered after 1979? The striking outcome is that it is still very much unclear. At the moment of writing this Thesis, the Dutch Chamber of Commerce has started to collect all necessary data of Dutch companies active in China. In this process an dafter request, this institute handed over a list of all 24 AEX stock listed companies located in China. In total these companies located 137 headquarters, subsidiaries, offices, plants and warehouses in China. The location pattern of Dutch companies is compared to the location pattern of all foreign invested enterprises (FIE's) to see whether both location patterns resemble or differ. Also in this context, the coastal provinces are by far the favorite location to start up a business. In 77% of all new settlements, a Dutch Enterprise decides to locate in a coastal province, compared to 81% of FIE's. Likewise, both Dutch and FIE's locate 11% of their companies in Central provinces. The remaining 12% for Dutch and respectively 8% for FIE's are invested in Western provinces, predominantly in Sichuan and Chongqing. Especially, large producing MNE's like Philips, Akzo Nobel and DSM are exploring more and more into interior China. These type of MNE's can hold responsible for the higher percentage of companies locating in Western

provinces. Financials, like ABN-Amro and Fortis still locate their offices at financial districts in Shanghai, Beijing and Guangzhou. Thus, mainly because of the relative high share of manufacturing and cost reducing oriented MNE's the Dutch location behaviour in China may be characterized as slightly entrepreneurial.

H4: The responsiveness of corporate activities comprising low added value, follows a relocation from first tier cities to second tier cities.

Rising living and utility costs, a shortage of skilled labour and managerial expertise, huge competitiveness and rivalry, high employee turnover, these are some of the factors deteriorating the investment climate in China's main coastal cities. On the other hand, coastal cities offer superb infrastructural facilities, by land, air and sea, high living standards, less bureaucracy and corruption, a developing capital market and a more developed legal system. Not all businesses will give the same weight to different location factors. To give an example, ABN-Amro needs to be located in a province with a developed capital market in order to secure business. A distribution company, distributing exporting goods preferably needs to be located in the vicinity of a deep sea port. Due to small margins, manufacturing plants are producing goods in large quantities, thus enabling economies of scale. As a consequence, these plants require large facilities and high amounts of utilities and blue collar workers. Instead of local quality factors, the locational cost of doing business is determining the location behaviour of this type of corporate activity. According to leading real estate companies there is a trend of MNE's relocating their industrial facilities to second tier cities. There is a trade off between locational costs and benefits.

If the costs are structurally rising, the incentive to move (parts of) the company to less costly locations is evident. By investing three hypothetical investments at three Chinese locations, of which one is a central province city, an attempt was made to measure the costs differences for three types of corporate activities. The most important outcome of this locational benchmark was the fact that the location is directly influencing the MNE's profit and loss account in such a way that the strategic location decision should be made at boardroom level. Clearly, different types of corporate activities ask for different kind of local factors. However, next to corporate activities, the corporate strategy and experience with doing business in China is influencing the location too. MNE's trying to enter the Chinese market

In which way and to what extent is the provincial concentration of foreign direct investments in China evolving over time and subsequently, how does this dynamic process affect the international location strategy of multinational enterprises?

China is widely considered as being the workshop of the world, but in reality, western MNEs must be held largely responsible for this. Via FDI they have realized manufacturing plants, distribution centers, regional headquarters and recently more and more knowledge and financial intensive parts of their organization are relocated into China. This process has happened in an impressive way during the past 25 years, putting China in first position with respect to direct inward foreign investments.

In 1979, the Chinese Communist Party (CCP) pointed out only two possible locations for FDI, thus basically started the process of uneven distribution of FDI, themselves. In later stages the array of locations was expended to other coastal provinces as well. Interior provinces, however, could not benefit from all these foreign investment simply because it was prohibited by the CCP. Currently, still 90% of all inward FDI is invested in coastal provinces, causing serious disparities between East and West China. These vast growing economic differences between coastal and interior provinces are again subject to discussion and this topic is placed high on the political agenda. The distribution of FDI among coastal provinces is being improved.

After informal contact with Mr. Bakker, one of the founders of the Dutch Chamber of Commerce in China, it became clear that poor international schools and a lack of qualified teachers in particular and quality of life (for expats) in general, is one of the main reasons why white collar office activities are still reluctant to relocate from coastal locations into interior provinces. Clearly, human capital is the main asset for high value added corporate activities. Therefore, considering relocating to the Chinese mainland due to cost saving reasons is not recommendable. When corporate activities consists of relatively low value added production, therefore less dependent upon highly skilled human resources, it might be a cost saving solution to relocate to interior provinces, but only when there is already abundant experience with producing in China. For a first entry into China, it is strongly recommendable for all companies to solely focus on the coastal provinces. Take the relative higher costs for granted but enjoy a better business environment with less corruption and bureaucracy, the proximity of specialized suppliers, the availability of highly educated personnel and a higher quality of life. However, for all corporate activities, it pays off to perform a strategic location assessment before choosing a final location, especially in a highly fragmentized country like China.

§ 5.2 Further research

One of the main issues during the start of this thesis was related to the appropriate level of research. Besides the fact that China is huge, it is also a highly diversified and fragmented country. To measure FDI flows in China and show geographical concentration degrees, the chosen level of research is a provincial one. This decentralized administrative unit offers a more comprehensive overview. However, it is arguable that this level is still too high, given the fact that a single province is as large as Germany or France. Regional or even local studies might offer a more thorough or in depth analysis. One major challenge is the fact that many statistics are available on a provincial level however missing on a municipal or city level.

A complete locational assessment clarifies why certain locations are more costly than others. Local data serves as input for software tools like Hiview, benchmarking locational costs versus benefits. Due to time pressures, locational advantages were ignored in this thesis, leaving an exercise for further research.

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Appendix 1 List of Dutch AEX-stock listed MNEs located in China

	Company	City	Province	Area	Activity
Hongkong===>**ABN AMRO Asset Management (Asia) Ltd**	ABN AMRO	Hong Kong	Hong Kong	Hong Kong	
hongkong===>**ABN AMRO Management Services (Hong Kong) Limited**	ABN AMRO	Hong Kong	Hong Kong	Hong Kong	
Shanghai===> **ABN AMRO Bank N.V.Shanghai Puxi Sub-Branch**	ABN AMRO	Shanghai	Shanghai	Eastern	Financial services
Shanghai===>**ABN AMRO Bank NV**	ABN AMRO	Shanghai	Shanghai	Eastern	Financial services
Nanjing===>**AEGON-CNOOC Life Insurance Company Ltd**	Aegon	Nanjing	Jiangsu	Eastern	Business services
Shanghai===>**AEGON-CNOOC Life Insurance Company Ltd**	Aegon	Shanghai	Shanghai	Eastern	Business services
Beijing===>**Akzo Nobel**	Akzo Nobel	Beijing	Beijing	Eastern	Business services
Beijing===>**Akzo Nobel Car Refinishes (Suzhou) Co., Ltd Beijing Office**	Akzo Nobel	Beijing	Beijing	Eastern	Assembly
Beijing===>**Akzo Nobel Chang Cheng Coatings (Beijing) Co., Ltd**	Akzo Nobel	Beijing	Beijing	Eastern	Chemicals
Beijing===>**Akzo Nobel Decorative Coatings (China) Ltd., (Beijing Office)**	Akzo Nobel	Beijing	Beijing	Eastern	Chemicals
Chongqing===>**Akzo Nobel China Chongqing Rep. Office**	Akzo Nobel	Chongqing	Chongqing	Western	Business services
Dongguan===>**Akzo Nobel Coatings Dongguan Co., Ltd - Non-Stick Coatings**	Akzo Nobel	Dongguan	Guangdong	Eastern	Chemicals
Guangzhou===> **Akzo Nobel China Guangzhou Rep. Office**	Akzo Nobel	Guangzhou	Guangdong	Eastern	Business services
Guangzhou===> **Akzo Nobel Coatings Dongguan Co., Ltd**	Akzo Nobel	GuangZhou	Guangdong	Eastern	Chemicals
Guangzhou===>**Akzo Nobel Car Refinishes (Suzhou) Co., Ltd Guangzhou Office**	Akzo Nobel	GuangZhou	Guangdong	Eastern	Assembly
Guangzhou===>**Akzo Nobel Decorative Coatings (China) Ltd., (Guangzhou Office)**	Akzo Nobel	GuangZhou	Guangdong	Eastern	Chemicals
Hong Kong===>**Akzo Nobel Car Refinishes (Hong Kong) Ltd**	Akzo Nobel	Hong Kong	Hong Kong	Hong Kong	
Hong Kong===>**Akzo Nobel Decorative Coatings (Hong kong) Ltd.**	Akzo Nobel	Hong Kong	Hong Kong	Hong Kong	
Jiaxing===>**Akzo Nobel Coatings Jiangxing Co., Ltd**	Akzo Nobel	Jiaxing	Zhejiang	Eastern	Chemicals
Ningbo===>**Akzo Nobel Chang Cheng Coatings (Ningbo) Co., Ltd**	Akzo Nobel	Ningbo	Zhejiang	Eastern	Manufacturing
Ningbo===>**Akzo Nobel Cross-linking Peroxides(Ningbo)Co,.Ltd**	Akzo Nobel	Ningbo	Zhejiang	Eastern	Chemicals
Qingdao===>**Akzo Nobel China Qingdao Rep. Office**	Akzo Nobel	Qingdao	Shandong	Eastern	Business services
Shanghai===>**Akzo Nobel (Shanghai) Ltd**	Akzo Nobel	Shanghai	Shanghai	Eastern	Chemicals
Shanghai===>**Akzo Nobel Car Refinishes (Suzhou) Co., Ltd Shanghai Office**	Akzo Nobel	Shanghai	Shanghai	Eastern	Assembly
Shanghai===>**Akzo Nobel Decorative Coatings (China) Ltd., (Head Office)**	Akzo Nobel	Shanghai	Shanghai	Eastern	Chemicals
Shanghai===>**Akzo Nobel Polymer Chemicals (Shanghai) Ltd**	Akzo Nobel	Shanghai	Shanghai	Eastern	Chemicals
Shanghai===>**Akzo Nobel Protective Coatings (Suzhou) Co., Ltd Shanghai Office**	Akzo Nobel	Shanghai	Shanghai	Eastern	Chemicals
Shanghai===>**Yixing Akzo Nobel Sanyuan Chemicals Co., Ltd Shanghai Rep. Office**	Akzo Nobel	Shanghai	Shanghai	Eastern	Chemicals
Shenzhen===>**Akzo Nobel Chang Cheng Coatings (Guangdong) Co., Ltd**	Akzo Nobel	Shenzhen	Guangdong	Eastern	Chemicals
Suzhou===>**Akzo Nobel Car Refinishes (Suzhou) Co., Ltd**	Akzo Nobel	Suzhou	Jiangsu	Eastern	Assembly
Suzhou===>**Akzo Nobel Chang Cheng Coatings (Suzhou) Co., Ltd**	Akzo Nobel	Suzhou	Jiangsu	Eastern	Chemicals
Suzhou===>**Akzo Nobel Resins (Suzhou) Co., Ltd**	Akzo Nobel	Suzhou	Jiangsu	Eastern	Chemicals

Taixing===>**Akzo Nobel Chemicals MCA (Taixing) Co., Ltd**	Akzo Nobel	Taixing	Jiangsu	Eastern	Chemicals
Tianjing===>**Akzo Nobel Coatings Tianjing Co., Ltd**	Akzo Nobel	Tianjin	Tianjin	Eastern	Chemicals
Tianjing===>**Tianjin Akzo Nobel Peroxides Co., Ltd**	Akzo Nobel	Tianjin	Tianjin	Eastern	Chemicals
Yixing===>**Yixing Akzo Nobel Chemicals Co., Ltd**	Akzo Nobel	Yixing	Jiangsu	Eastern	Chemicals
Beijing===>**DSM(China) Limited ,Beijing Office**	DSM	Beijing	Beijing	Eastern	Business services
Beijing===>**DSM(China) Limited,Beijing Office**	DSM	Beijing	Beijing	Eastern	Business services
Chengdu===>**DSM(China) Limited,Chengdu Office**	DSM	Chengdu	Sichuan	Western	Business services
Guangzhou===>**DSM(China) Limited,Guangzhou Office**	DSM	Guangzhou	Guangdong	Eastern	Business services
Jiangyin===>**DSM Engineering Plastics(Jiangsu) Co.,LTD**	DSM	Jiangyin	Jiangsu	Eastern	Manufacturing
Kunshan===>**DSM Eternal Resins(Kunshan) Co.,LTD**	DSM	Kunshan	Jiangsu	Eastern	Chemicals
Nanjing===>**DSM Nanjing Chemical Company Ltd**	DSM	Nanjing	Jiangsu	Eastern	Chemicals
Nanjing===>**Jinling DSM Resins Co.,LTD**	DSM	Nanjing	Jiangsu	Eastern	Chemicals
Shanghai===>**DSM Trading(Shanghai) Co.,LTD**	DSM	Shanghai	Shanghai	Eastern	Business services
Shanghai===>**DSM(China) Limited**	DSM	Shanghai	Shanghai	Eastern	Business services
Shanghai===>**DSM(China) Limited,Shanghai Office**	DSM	Shanghai	Shanghai	Eastern	Business services
Shenyang===>**DSM(China) Limited,Shenyang Office**	DSM	Shenyang	Liaoning	Eastern	Business services
Xinhui City,Guangdong Province===>**Xinhui Meida-DSM Nylon Chips Co.,LTD**	DSM	Xinhui	Guangdong	Eastern	Semi conductors
Zhangjiakou===>**ZJK DSM HAYAO Pharmacentical Co., Ltd.**	DSM	Zhangjiakou	Hebei	Eastern	Pharmaceutical
Beijing===>**Fortis Bank (in China)**	Fortis	Beijing	Beijing	Eastern	Financial services
Guangzhou===>**Fortis Bank (in China)**	Fortis	Guangzhou	Guangdong	Eastern	Financial services
hongkong===>**Fortis Bank**	Fortis	Hong Kong	Hong Kong	Hong Kong	
Shanghai===> **Fortis Haitong Investment Management**	Fortis	Shanghai	Shanghai	Eastern	Financial services
Shanghai===>**Fortis Bank (in China)**	Fortis	Shanghai	Shanghai	Eastern	Financial services
Beijing===>**Getronics (HK) Limited,Beijing Office**	Getronics	Beijing	Beijing	Eastern	Manufacturing
Guangzhou===>**Getronics (HK) Limited,Guangzhou Office**	Getronics	GuangZhou	Guangdong	Eastern	Manufacturing
Hong Kong===>**Getronics (HK) Limited**	Getronics	Hong Kong	Hong Kong	Hong Kong	
Hongkong===>**Getronics (HK) Ltd**	Getronics	Hong Kong	Hong Kong	Hong Kong	
Shanghai===>**Getronics (HK) Limited,Shanghai Office**	Getronics	Shanghai	Shanghai	Eastern	Manufacturing
Shenzhen===>**Getronics (HK) Limited,Shenzhen Office**	Getronics	Shenzhen	Guangdong	Eastern	Manufacturing
Guangzhou===>**Heineken Trading (Shanghai) Co., Ltd , Guangzhou Office**	Heineken	GuangZhou	Guangdong	Eastern	Manufacturing
hongkong===>**Heineken Hong Kong Ltd**	Heineken	Hong Kong	Hong Kong	Hong Kong	
Shanghai===>**Heineken Trading (Shanghai)Co.,Ltd**	Heineken	Shanghai	Shanghai	Eastern	Manufacturing

Shanghai===>**Numico,Kon**	Numico	Shanghai	Shanghai	Eastern	
Beijing===>**Philips (China) Investment Co., Ltd**	Philips	Beijing	Beijing	Eastern	
Beijing===>**Philips (China) Semiconductors Co., Ltd**	Philips	Beijing	Beijing	Eastern	
Beijing===>**Philips Car Lighting Co.,Ltd**	Philips	Beijing	Beijing	Eastern	
BeiJing===>**Philips, Kon Lighting Components**	Philips	Beijing	Beijing	Central	Assembly
Changsha===>**Philips Medical Systems**	Philips	Changsha	Hunan	Central	Medial supplies
Changsha===>**Philips, Kon Lighting Components**	Philips	Changsha	Hunan	Central	Assembly
Chengdu===>**Philips (China) Semiconductors Co., Ltd**	Philips	Chengdu	Sichuan	Western	Semi conductors
Chengdu===>**Philips Medical Systems**	Philips	Chengdu	Sichuan	Western	Medial supplies
Chengdu===>**Philips, Kon Lighting Components**	Philips	Chengdu	Sichuan	Western	Manufacturing
chongqing===>**Philips, Kon Lighting Components**	Philips	Chongqing	Chongqing	Western	Assembly
Fuzhou===>**Philips Medical Systems**	Philips	Fuzhou	Fujian	Eastern	
FuZhou===>**Philips, Kon Lighting Components**	Philips	Fuzhou	Fujian	Eastern	
GuangZhou===>**Philips Medical Systems**	Philips	GuangZhou	Guangdong	Eastern	
Guangzhou===>**Philips(China) Car Lighting Co., Ltd**	Philips	GuangZhou	Guangdong	Eastern	
GuangZhou===>**Philips, Kon Lighting Components**	Philips	GuangZhou	Guangdong	Eastern	
Guiyang===>**Philips, Kon Lighting Components**	Philips	Guiyang	Guizhou	Western	Assembly
HaErbin===>**Philips, Kon Lighting Components**	Philips	Haerbing	Heilongjiang	Central	Assembly
Haerbing===>**Philips Medical Systems**	Philips	Haerbing	Heilongjiang	Central	Medial supplies
Haikou===>**Philips, Kon Lighting Components**	Philips	Haikou	Hainan	Eastern	
Hangzhou:===>**Philips Medical Systems**	Philips	Hangzhou	Zhejiang	Eastern	Medial supplies
Hangzhou===>**Philips, Kon Lighting Components**	Philips	Hangzhou	Zhejiang	Eastern	Assembly
Hefei===>**Philips, Kon Lighting Components**	Philips	Hefei	Anhui	Central	Assembly
Hong Kong===>**Philips (China) Semiconductors Co., Ltd**	Philips	Hong Kong	Hong Kong	Hong Kong	
Hong kong===>**Philips Medical Systems, Regional Office Asia Pacific**	Philips	Hong Kong	Hong Kong	Hong Kong	
hongkong===>**LG.Philips Displays International Ltd.**	Philips	Hong Kong	Hong Kong	Hong Kong	
Hongkong===>**Philips Electronics HongKong Ltd**	Philips	Hong Kong	Hong Kong	Hong Kong	
Jinan===>**Philips, Kon**	Philips	Jinan	Shandong	Eastern	
Kunming===>**Philips, Kon**	Philips	Kunming	Yunnan	Western	Manufacturing
Kunming===>**Philips, Kon .Philips Medical Systems**	Philips	Kunming	Yunnan	Western	Medial supplies
Kunming===>**Philips, Kon Lighting Components**	Philips	Kunming	Yunnan	Western	Assembly
nanking===>**Philips, Kon Lighting Components**	Philips	Nanking	Jiangsu	Eastern	

Dalian===>**TNT Express Company Dalian Office**	TNT	Dalian			
Fuzhou===>**TNT Express Company,Fuzhou Office**	TNT	Fuzhou	Fujian	Eastern	
Guangzhou===>**TNT Express Guangzhou Office**	TNT	Guangzhou	Guangdong	Eastern	
Haikou===>**TNT Express Company, Haikou Office**	TNT	Haiku	Hainan	Eastern	
HangZhou===>**TNT Company Express,Hangzhou Office**	TNT	Hangzhou	Zhejiang	Eastern	Logistics
Hefei===>**TNT Express Company, Hefei Office**	TNT	Hefei	Anhui	Central	Logistics
hongkong===>**TNT Express Worldwide (HK) Ltd**	TNT	Hong Kong	Hong Kong	Hong Kong	
Ji-nan===>**TNT Express Company, Jinan Office**	TNT	Ji-nan	Shandong	Eastern	
Kunming===>**TNT Express Company, Kunming Office**	TNT	Kunming	Yunnan	Western	Logistics
Nanjing===>**TNT Express Company,Nanjing Office**	TNT	Nanjing	Jiangsu	Eastern	
Ningbo===>**TNT Express Company,Ningbo Office**	TNT	Ningbo	Zhejiang	Eastern	
Qingdao===>**TNT Express Company,Qingdao Office**	TNT	Qingdao	Shandong	Eastern	
Shanghai===>**TNT Express Company,Shanghai Office**	TNT	Shanghai	Shanghai	Eastern	
ShangHai===>**TNT Express Country Head Office**	TNT	Shanghai	Shanghai	Eastern	
Shenzhen===>**TNT Express Company ,Shenzhen Office**	TNT	Shenzhen	Guangdong	Eastern	
Suzhou===>**TNT Express Company,Suzhou Office**	TNT	Suzhou	Jiangsu	Eastern	
Tianjin===>**TNT Express Company ,Tianjin Office**	TNT	Tianjin	Tianjin	Eastern	
WuHan===>**TNT Express Company ,Wuhan Office**	TNT	Wuhan	Hubei	Central	Logistics
Wuxi===>**TNT Express Company,Wuxi Office**	TNT	Wuxi	Jiangsu	Eastern	
Xiamen===>**TNT Express Company,Xiamen Office**	TNT	Xiamen	Fujian	Eastern	
Xi-an===>**TNT Express Company,Xi-an Office**	TNT	Xi-an	Shaanxi	Western	Logistics
Zhengzhou===>**TNT Express Company**	TNT	Zhengzhou	Henan	Central	Logistics
Zhengzhou===>**TNT Express Company,Zhengzhou Office**	TNT	Zhengzhou	Henan	Central	Logistics
Zhuhai===>**TNT Express Company, Zhuhai Office**	TNT	Zhuhai			
Beijing===>**Unilever Foods (China)Co.,Ltd**	Unilever	Beijing	Beijing	Eastern	
Guangzhou===>**Unilever cert/ Unilever Foods (China)Co.,Ltd**	Unilever	Guangzhou	Guangdong	Eastern	
Shanghai===>**Unilever Foods (China)Co.,Ltd**	Unilever	Shanghai	Shanghai	Eastern	
Hong Kong===>**Vedior--Hughes-Castell(Hong Kong)**	Vedior	Hong Kong	Hong Kong	Hong Kong	
Shanghai===>**VNU Exhibitions (Asia)**	VNU	Shanghai	Shanghai	Eastern	
Hong Kong===>**Wolters Kluwer Hong Kong (Professional & Education)**	Wolters	Hong Kong	Hong Kong	Hong Kong	

Appendix 2 Overview of all nine cash flows

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION CHANGSHA, DISTRIBUTION PLANT

Changsa	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	2700000										
Building	165165										
Equipment	600000										
Investment	3465165										
Working capital 10% Annual sales	210000	210000	210000	210000	210000	210000	210000	210000	210000	210000	210000
Company funds	887291										
25 % of initial investment	866291										
10 % of working capital	21000										
External funds	2787874										
commercial loan	2598874										
working capital	189000										
Net cash investment	3675165										
Annual sales		2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000
Less operating costs											
Material costs		0	0	0	0	0	0	0	0	0	0
Transport costs		489000	489000	489000	489000	489000	489000	489000	489000	489000	489000
Labor costs		124154	124154	124154	124154	124154	124154	124154	124154	124154	124154
Power		7140	7140	7140	7140	7140	7140	7140	7140	7140	7140
Water		56	56	56	56	56	56	56	56	56	56
Gas		1002	1002	1002	1002	1002	1002	1002	1002	1002	1002
Telephone / Internet 512 kb/s		843	843	843	843	843	843	843	843	843	843
Gross Operating Income		1477805	1477805	1477805	1477805	1477805	1477805	1477805	1477805	1477805	1477805
Less Depreciation											
Depreciation building 5%		8258	8258	8258	8258	8258	8258	8258	8258	8258	8258
Depreciation equipment 10%		60000	60000	60000	60000	60000	60000	60000	60000	60000	60000
Net operating income		1409547	1409547	1409547	1409547	1409547	1409547	1409547	1409547	1409547	1409547
Less Interest charge											
Commercial lone 7%		181921	181921	181921	159181	136441	113701	90961	68220	45480	22740
Working capital 8%		15120	15120	15120	15120	15120	15120	15120	15120	15120	15120
Net income before taxes		1212506	1212506	1212506	1235246	1257986	1280726	1303466	1326206	1348947	1371687
Income tax 30%		363752	363752	363752	370574	377396	384218	391040	397862	404684	411506
Local surtax 3%		36375	36375	36375	37057	37740	38422	39104	39786	40468	41151
Net profit		812379	812379	812379	827615	842851	858086	873322	888558	903794	919030
Cash flow to all investors		1077678	1077678	1077678	1070174	1062670	1055165	1047661	1040157	1032653	1025148
Repayment of principals commercial loans		0	0	324859	324859	324859	324859	324859	324859	324859	324859
Cash flow to Equity investors		880637	880637	555778	571014	586250	601486	616721	631957	647193	662429
Profitability Index to equity	7,4768										
Present value PI (7,00%)	5,3432										
Accumulated cash flow year 0 - 10	-887291	-6654	873983	1429761	2000774	2587024	3188509	3805231	4437188	5084381	5746810
Profitability Index to Net Cash Investment	2,8752										
Present value PI (7,00%)	2,0260										
Accumulated cash flow year 0 - 10	-3675165	-2597487	-1519808	-442130	628044	1690713	2745879	3793540	4833697	5866350	6891498

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION CHANGSHA, ELECTRONICS PLANT

Changsa	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	2750000										
Building	1065986										
Equipment	2500000										
Investment	6315986										
Working capital 10% of Annual sales	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000
Company funds	1718997										
25 % of initial investment	1578997										
10 % of working capital	140000										
External funds	5996990										
commercial loan	4424490										
working capital	1260000										
Net cash investment	7715986										
Annual sales		14000000	14000000	14000000	14000000	14000000	14000000	14000000	14000000	14000000	14000000
Less operating costs											
Material costs		5600000	5600000	5600000	5600000	5600000	5600000	5600000	5600000	5600000	5600000
Transport costs		0	0	0	0	0	0	0	0	0	0
Labor costs		618849	618849	618849	618849	618849	618849	618849	618849	618849	618849
Power		29400	29400	29400	29400	29400	29400	29400	29400	29400	29400
Water		337	337	337	337	337	337	337	337	337	337
Gas		13360	13360	13360	13360	13360	13360	13360	13360	13360	13360
Telephone / Internet 2Mb/s		1446	1446	1446	1446	1446	1446	1446	1446	1446	1446
Gross Operating Income		7736609	7736609	7736609	7736609	7736609	7736609	7736609	7736609	7736609	7736609
Less Depreciation											
Depreciation building 5%		53299	53299	53299	53299	53299	53299	53299	53299	53299	53299
Depreciation equipment 10%		250000	250000	250000	250000	250000	250000	250000	250000	250000	250000
Net operating income		7433309	7433309	7433309	7433309	7433309	7433309	7433309	7433309	7433309	7433309
Less Interest charge											
Commercial lone 7%		309714	309714	309714	271000	232286	193571	154857	116143	77429	38714
Working capital 8%		100800	100800	100800	100800	100800	100800	100800	100800	100800	100800
Net income before taxes		7022795	7022795	7022795	7061509	7100224	7138938	7177652	7216366	7255081	7293795
Tax 30%		2106839	2106839	2106839	2118453	2130067	2141681	2153296	2164910	2176524	2188139
Local Tax 3%		210684	210684	210684	211845	213007	214168	215330	216491	217652	218814
Total tax burden		2317522	2317522	2317522	2330298	2343074	2355850	2368625	2381401	2394177	2406952
Net profit		4705273	4705273	4705273	4731211	4757150	4783088	4809027	4834966	4860904	4886843
Cash flow to all investors		5419086	5419086	5419086	5406311	5393535	5380759	5367983	5355208	5342432	5329656
Repayment of principals commercial loans		0	0	553061	553061	553061	553061	553061	553061	553061	553061
Cash flow to Equity investors		5008572	5008572	4455511	4481449	4507388	4533326	4559265	4585204	4611142	4637081
Profitability Index to equity	26,9852										
Present value PI (7,00%)	19,03393										
Accumulated cash flow year 0 - 10	-1718997	3289575	8298147	12753658	17235108	21742496	26275822	30835087	35420291	40031433	44668514
Profitability Index to Net Cash Investment	6,9768										
Present value PI (7,00%)	4,9056										
Accumulated cash flow year 0 - 10	-7715986	-2296900	3122186	8541273	13947583	19341118	24721877	30089861	35445068	40787500	46117156

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION CHANGSHA, PHARMACEUTICAL

Changsa	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	3840000										
Building	3298352										
Equipment	20000000										
Investment	27138352										
Working capital 10% of Annual sales	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000
Company funds	7184588										
25 % of initial investment	6784588										
10 % of working capital	400000										
External funds	23953764										
commercial loan	20353764										
working capital	3600000										
Net cash investment	31138352										
Annual sales		40000000	40000000	40000000	40000000	40000000	40000000	40000000	40000000	40000000	40000000
Less operating costs											
Material costs		16000000	16000000	16000000	16000000	16000000	16000000	16000000	16000000	16000000	16000000
Transport costs (Fixed amount)		2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000
Labor costs		652920	652920	652920	652920	652920	652920	652920	652920	652920	652920
Power		816400	816400	816400	816400	816400	816400	816400	816400	816400	816400
Water		9692	9692	9692	9692	9692	9692	9692	9692	9692	9692
Gas		5110000	5110000	5110000	5110000	5110000	5110000	5110000	5110000	5110000	5110000
Telephone / Internet 2 Mb/s		1446	1446	1446	1446	1446	1446	1446	1446	1446	1446
Gross Operating Income		15409542	15409542	15409542	15409542	15409542	15409542	15409542	15409542	15409542	15409542
Less Depreciation											
Depreciation building 5%		164918	164918	164918	164918	164918	164918	164918	164918	164918	164918
Depreciation equipment 10%		2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000
Net operating income		13244624	13244624	13244624	13244624	13244624	13244624	13244624	13244624	13244624	13244624
Less Interest charge											
Commercial lone 7%		1424763	1424763	1424763	1246668	1068573	890477	712382	534286	356191	178095
Working capital 8%		288000	288000	288000	288000	288000	288000	288000	288000	288000	288000
Net income before taxes		11531860	11531860	11531860	11709956	11888051	12066147	12244242	12422338	12600433	12778528
Tax incentive years 1 - 2 full exemption		0	0	3459558	3512987	3566415	3619844	3673273	3726701	3780130	3833559
Icentive reduction 50% years 3 - 5		0	0	1729779	1756493	1783208	0	0	0	0	0
Total tax burden		0	0	1729779	1756493	1783208	3619844	3673273	3726701	3780130	3833559
Net profit		11531860	11531860	9802081	9953463	10104844	8446303	8570970	8695636	8820303	8944970
Cash flow to all investors		15409542	15409542	13679762	13653048	13626334	11789697	11736269	11682840	11629412	11575983
Repayment of principals commercial loans		0	0	2544220	2544220	2544220	2544220	2544220	2544220	2544220	2544220
Cash flow to Equity investors		13696778	13696778	9422778	9574160	9725541	8067000	8191667	8316333	8441000	8565667
Profitability Index to equity	13,5982										
Present value PI (7,00%)	9,8762										
Accumulated cash flow year 0 - 10	-7184588	6512190	20208968	29631747	39205906	48931447	56998447	65190113	73506447	81947447	90513114
Profitability Index to Net Cash Investment	4,18110										
Present value PI (7,00%)	2,9974										
Accumulated cash flow year 0 - 10	-31138352	-15728810	-319269	13360494	27013542	40639876	52429573	64165842	75848682	87478094	99054077

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION Guangzhou, DISTRIBUTION PLANT											
Guangzhou	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	2222222										
3% Deed Tax	66667										
Building	215565										
Equipment	600000										
Investment	3104454										
Working capital 10% Annual sales	210000	210000	210000	210000	210000	210000	210000	210000	210000	210000	210000
Company funds	797113										
25 % of initial investment	776113										
10 % of working capital	21000										
External funds	2517340										
commercial loan	2328340										
working capital	189000										
Net cash investment	3314454										
Annual sales		2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000
Less operating costs											
Material costs		0	0	0	0	0	0	0	0	0	0
Transport costs		267000	267000	267000	267000	267000	267000	267000	267000	267000	267000
Labor costs		201099	201099	201099	201099	201099	201099	201099	201099	201099	201099
Power		9721	9721	9721	9721	9721	9721	9721	9721	9721	9721
Water		56	56	56	56	56	56	56	56	56	56
Gas		1002	1002	1002	1002	1002	1002	1002	1002	1002	1002
Telephone / Internet 512 kb/s		843	843	843	843	843	843	843	843	843	843
Gross Operating Income		1620278,8	1620278,8	1620278,8	1620278,8	1620278,8	1620278,8	1620278,8	1620278,8	1620278,8	1620278,8
Less Depreciation											
Depreciation building 5%		10778,241	10778,241	10778,241	10778,241	10778,241	10778,241	10778,241	10778,241	10778,241	10778,241
Depreciation equipment 10%		6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Net operating income		1603500,6	1603500,6	1603500,6	1603500,6	1603500,6	1603500,6	1603500,6	1603500,6	1603500,6	1603500,6
Less Interest charge											
Commercial lone 7%		162983,82	162983,82	162983,82	142611	122238	101865	81492	61119	40746	20373
Working capital 8%		15120	15120	15120	15120	15120	15120	15120	15120	15120	15120
Net income before taxes		1425397	1425397	1425397	1445770	1466143	1486516	1506889	1527262	1547635	1568008
Income tax 30%		427619,02	427619,02	427619,02	433730,92	439842,81	445954,7	452066,6	458178,49	464290,38	470402,28
Local surtax 3%		42761,902	42761,902	42761,902	43373,092	43984,281	44595,47	45206,66	45817,849	46429,038	47040,228
Net profit		955016	955016	955016	968666	982316	995966	1009615	1023265	1036915	1050565
Cash flow to all investors		1149897,9	1149897,9	1149897,9	1143174,8	1136451,7	1129728,6	1123005,5	1116282,5	1109559,4	1102836,3
Repayment of principals commercial loans		0	0	291042,53	291042,53	291042,53	291042,53	291042,53	291042,53	291042,53	291042,53
Cash flow to Equity investors		971794,06	971794,06	680751,52	694401,42	708051,31	721701,21	735351,1	749001	762650,89	776300,79
Profitability Index to equity	9,74993										
Present value PI (7,00%)	6,9395										
Accumulated cash flow year 0 - 10	-797113	174681	1146475	1827226	2521628	3229679	3951380	4686731	5435732	6198383	6974684
Profitability Index to Net Cash Investment	3,41255										
Present value PI (7,00%)	2,40343										
Accumulated cash flow year 0 - 10	-3314454	-2164556	-1014658	135240	1278415	2414866	3544595	4667601	5783883	6893442	7996279

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION Guangzhou, electronics plant

Guangzhou	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	3580247										
3% Deed Tax	107407										
Building	1065986										
Equipment	2500000										
Investment	7253640										
Working capital 10% Annual sales	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000
Company funds	1953410										
25 % of initial investment	1813410										
10 % of working capital	140000										
External funds	6700230										
commercial loan	5440230										
working capital	1260000										
Net cash investment	8653640										
Annual sales		14000000	14000000	14000000	14000000	14000000	14000000	14000000	14000000	14000000	14000000
Less operating costs											
Material costs		5600000	5600000	5600000	5600000	5600000	5600000	5600000	5600000	5600000	5600000
Transport costs		0	0	0	0	0	0	0	0	0	0
Labor costs		771879	771879	771879	771879	771879	771879	771879	771879	771879	771879
Power		40030	40030	40030	40030	40030	40030	40030	40030	40030	40030
Water		644	644	644	644	644	644	644	644	644	644
Gas		12692	12692	12692	12692	12692	12692	12692	12692	12692	12692
Telephone / Internet 2 Mb		1446	1446	1446	1446	1446	1446	1446	1446	1446	1446
Gross Operating Income		7573308,5	7573308,5	7573308,5	7573308,5	7573308,5	7573308,5	7573308,5	7573308,5	7573308,5	7573308,5
Less Depreciation											
Depreciation building 5%		53299,306	53299,306	53299,306	53299,306	53299,306	53299,306	53299,306	53299,306	53299,306	53299,306
Depreciation equipment 10%		250000	250000	250000	250000	250000	250000	250000	250000	250000	250000
Net operating income		7270009,2	7270009,2	7270009,2	7270009,2	7270009,2	7270009,2	7270009,2	7270009,2	7270009,2	7270009,2
Less Interest charge											
Commercial lone 7%		380816,12	380816,12	380816,12	333214	285612	238010	190408	142806	95204	47602
Working capital 8%		100800	100800	100800	100800	100800	100800	100800	100800	100800	100800
Net income before taxes		6788393	6788393	6788393	6835995	6883597	6931199	6978801	7026403	7074005	7121607
Income tax 30%		2036517,9	2036517,9	2036517,9	2050798,5	2065079,1	2079359,7	2093640,3	2107920,9	2122201,6	2136482,2
Local tax 3%		203651,79	203651,79	203651,79	205079,85	206507,91	207935,97	209364,03	210792,09	212220,16	213648,22
Net profit		4548223	4548223	4548223	4580117	4612010	4643903	4675797	4707690	4739583	4771477
Cash flow to all investors		5333138,8	5333138,8	5333138,8	5317430,1	5301721,5	5286012,8	5270304,1	5254595,5	5238886,8	5223178,1
Repayment of principals commercial loans		0	0	680028,79	680028,79	680028,79	680028,79	680028,79	680028,79	680028,79	680028,79
Cash flow to Equity investors		4851522,7	4851522,7	4171493,9	4203387,2	4235280,6	4267173,9	4299067,3	4330960,6	4362854	4394747,3
Profitability Index to equity	22,50834										
Present value PI (7,00%)	15,8962										
Accumulated cash flow year 0 - 10	-1953410	2898113	7749635	11921129	16124516	20359797	24626971	28926038	33256999	37619853	42014600
Profitability Index to Net Cash Investment	6,01633										
Present value PI (7,00%)	4,25010										
Accumulated cash flow year 0 - 10	-8653640	-3320502	2012637	7345776	12663206	17964928	23250940	28521244	33775840	39014727	44237905

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION Guangzhou, pharmaceutical plant											
Guangzhou	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	3703704										
3% Deed Tax	111111										
Building	3350972										
Equipment	20000000										
Investment	27165787										
Working capital 10% Annual sales	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000
Company funds	7191447										
25 % of initial investment	6791447										
10 % of working capital	400000										
External funds	23974340										
commercial loan	20374340										
working capital	3600000										
Net cash investment	31165787										
Annual sales		40000000	40000000	40000000	40000000	40000000	40000000	40000000	40000000	40000000	40000000
Less operating costs											
Material costs		16000000	16000000	16000000	16000000	16000000	16000000	16000000	16000000	16000000	16000000
Transport costs		2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000
Labor costs		1057570	1057570	1057570	1057570	1057570	1057570	1057570	1057570	1057570	1057570
Power		1072720	1072720	1072720	1072720	1072720	1072720	1072720	1072720	1072720	1072720
Water		12439	12439	12439	12439	12439	12439	12439	12439	12439	12439
Gas		4854500	4854500	4854500	4854500	4854500	4854500	4854500	4854500	4854500	4854500
Telephone / Internet 2 Mb		1446	1446	1446	1446	1446	1446	1446	1446	1446	1446
Gross Operating Income		15001325,2	15001325	15001325	15001325	15001325	15001325	15001325	15001325	15001325	15001325
Less Depreciation											
Depreciation building 5%		167548,611	167548,61	167548,61	167548,61	167548,61	167548,61	167548,61	167548,61	167548,61	167548,61
Depreciation equipment 10%		2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000
Net operating income		12833776,6	12833777	12833777	12833777	12833777	12833777	12833777	12833777	12833777	12833777
Less Interest charge											
Commercial lone 7%		1426203,82	1426203,8	1426203,8	1247928	1069653	891377	713102	534826	356551	178275
Working capital 8%		288000	288000	288000	288000	288000	288000	288000	288000	288000	288000
Net income before taxes		11119573	11119573	11119573	11297848	11476124	11654399	11832675	12010950	12189226	12367501
Incentive Income tax 30%		3335871,82	3335871,8	3335871,8	3389354,5	3442837,1	3496319,8	3549802,4	3603285	3656767,7	3710250,3
Local tax 3%		333587,182	333587,18	333587,18	338935,45	344283,71	349631,98	354980,24	360328,5	365676,77	371025,03
Net profit		7450114	7450114	7450114	7569558	7689003	7808447	7927892	8047337	8166781	8286226
Cash flow to all investors		11331866,2	11331866	11331866	11273035	11214204	11155373	11096543	11037712	10978881	10920050
Repayment of principals commercial loans		0	0	2546792,5	2546792,5	2546792,5	2546792,5	2546792,5	2546792,5	2546792,5	2546792,5
Cash flow to Equity investors		9617662,35	9617662,3	7070869,8	7190314,4	7309759	7429203,5	7548648,1	7668092,7	7787537,2	7906981,8
Profitability Index to equity	11,00568										
Present value PI (7,00%)	7,8187										
Accumulated cash flow year 0 - 10	-7191447	2426216	12043878	19114748	26305062	33614821	41044025	48592673	56260765	64048303	71955284
Profitability Index to Net Cash Investment	3,58314										
Present value PI (7,00%)	2,52279										
Accumulated cash flow year 0 - 10	-31165787	-19833921	-8502055	2829811	14102847	25317051	36472425	47568967	58606679	69585559	80505609

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION Shanghai, DISTRIBUTION PLANT											
Guangzhou	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	3600000										
3% Deed Tax	108000										
Building	215565										
Equipment	600000										
Investment	4523565										
Working capital 10% Annual sales	210000	210000	210000	210000	210000	210000	210000	210000	210000	210000	210000
Company funds	1151891										
25 % of initial investment	1130891										
10 % of working capital	21000										
External funds	3581674										
commercial loan	3392674										
working capital	189000										
Net cash investment	4733565										
Annual sales		2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000	2100000
Less operating costs											
Material costs		0	0	0	0	0	0	0	0	0	0
Transport costs		243000	243000	243000	243000	243000	243000	243000	243000	243000	243000
Labor costs		263942	263942	263942	263942	263942	263942	263942	263942	263942	263942
Power		9444	9444	9444	9444	9444	9444	9444	9444	9444	9444
Water		67	67	67	67	67	67	67	67	67	67
Gas		852	852	852	852	852	852	852	852	852	852
Telephone / Internet 512 kb/s		843	843	843	843	843	843	843	843	843	843
Gross Operating Income		1581852,3	1581852,3	1581852,3	1581852,3	1581852,3	1581852,3	1581852,3	1581852,3	1581852,3	1581852,3
Less Depreciation											
Depreciation building 5%		10778,241	10778,241	10778,241	10778,241	10778,241	10778,241	10778,241	10778,241	10778,241	10778,241
Depreciation equipment 10%		60000	60000	60000	60000	60000	60000	60000	60000	60000	60000
Net operating income		1511074	1511074	1511074	1511074	1511074	1511074	1511074	1511074	1511074	1511074
Less Interest charge											
Commercial lone 7%		237487,15	237487,15	237487,15	207801	178115	148429	118744	89058	59372	29686
Working capital 8%		15120	15120	15120	15120	15120	15120	15120	15120	15120	15120
Net income before taxes		1258467	1258467	1258467	1288153	1317839	1347525	1377210	1406896	1436582	1466268
Income tax 30%		377540,06	377540,06	377540,06	386445,83	395351,6	404257,36	413163,13	422068,9	430974,67	439880,44
Local surtax 3%		37754,006	37754,006	37754,006	38644,583	39535,16	40425,736	41316,313	42206,89	43097,467	43988,044
Net profit		843173	843173	843173	863062	882952	902841	922731	942621	962510	982400
Cash flow to all investors		1166558,2	1166558,2	1166558,2	1156761,8	1146965,5	1137169,2	1127372,8	1117576,5	1107780,1	1097983,8
Repayment of principals commercial loans		0	0	424084,2	424084,2	424084,2	424084,2	424084,2	424084,2	424084,2	424084,2
Cash flow to Equity investors		913951,04	913951,04	489866,84	509756,39	529645,94	549535,49	569425,03	589314,58	609204,13	629093,68
Profitability Index to equity	5,47252										
Present value PI (7,00%)	3,9359										
Accumulated cash flow year 0 - 10	-1151891	-237940	676011	1165878	1675634	2205280	2754816	3324241	3913555	4522759	5151853
Profitability Index to Net Cash Investment	2,40649										
Present value PI (7,00%)	1,69696										
Accumulated cash flow year 0 - 10	-4733565	-3567007	-2400448	-1233890	-77128	1069837	2207006	3334379	4451956	5559736	6657719

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION Shanghai, ELECTRONICS PLANT											
Shanghai	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	4500000										
3% Deed Tax	135000										
Building	1065986										
Equipment	2500000										
Investment	8200986										
Working capital 10% Annual sales	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000
Company funds	2190247										
25 % of initial investment	2050247										
10 % of working capital	140000										
External funds	7410740										
commercial loan	6150740										
working capital	1260000										
Net cash investment	9600986										
Annual sales		14000000	14000000	14000000	14000000	14000000	14000000	14000000	14000000	14000000	14000000
Less operating costs											
Material costs		5600000	5600000	5600000	5600000	5600000	5600000	5600000	5600000	5600000	5600000
Transport costs		243000	243000	243000	243000	243000	243000	243000	243000	243000	243000
Labor costs		201099	201099	201099	201099	201099	201099	201099	201099	201099	201099
Power		38889	38889	38889	38889	38889	38889	38889	38889	38889	38889
Water		400	400	400	400	400	400	400	400	400	400
Gas		11356	11356	11356	11356	11356	11356	11356	11356	11356	11356
Telephone / Internet 512 kb/s		843	843	843	843	843	843	843	843	843	843
Gross Operating Income		7904413,5	7904413,5	7904413,5	7904413,5	7904413,5	7904413,5	7904413,5	7904413,5	7904413,5	7904413,5
Less Depreciation											
Depreciation building 5%		53299,306	53299,306	53299,306	53299,306	53299,306	53299,306	53299,306	53299,306	53299,306	53299,306
Depreciation equipment 10%		250000	250000	250000	250000	250000	250000	250000	250000	250000	250000
Net operating income		7601114,2	7601114,2	7601114,2	7601114,2	7601114,2	7601114,2	7601114,2	7601114,2	7601114,2	7601114,2
Less Interest charge											
Commercial lone 7%		430551,77	430551,77	430551,77	376733	322914	269095	215276	161457	107638	53819
Working capital 8%		100800	100800	100800	100800	100800	100800	100800	100800	100800	100800
Net income before taxes		7069762	7069762	7069762	7123581	7177400	7231219	7285038	7338857	7392676	7446495
Income tax 30%		2120928,7	2120928,7	2120928,7	2137074,4	2153220,1	2169365,8	2185511,5	2201657,2	2217802,9	2233948,6
Local surtax 3%		212092,87	212092,87	212092,87	213707,44	215322,01	216936,58	218551,15	220165,72	221780,29	223394,86
Net profit		4736741	4736741	4736741	4772800	4808858	4844917	4880976	4917034	4953093	4989152
Cash flow to all investors		5571391,9	5571391,9	5571391,9	5553631,6	5535871,4	5518111,1	5500350,9	5482590,6	5464830,3	5447070,1
Repayment of principals commercial loans		0	0	768842,45	768842,45	768842,45	768842,45	768842,45	768842,45	768842,45	768842,45
Cash flow to Equity investors		5040040,1	5040040,1	4271197,7	4307256,4	4343315,1	4379373,8	4415432,5	4451491,2	4487549,9	4523608,7
Profitability Index to equity	20,66402										
Present value PI (7,00%)	14,6015										
Accumulated cash flow year 0 - 10	-2190247	2849794	7889834	12161031	16468288	20811603	25190977	29606409	34057900	38545450	43069059
Profitability Index to Net Cash Investment	5,75114										
Present value PI (7,00%)	4,04538										
Accumulated cash flow year 0 - 10	-9600986	-4029594	1541798	7113190	12666821	18202693	23720804	29221155	34703745	40168575	45615646

NET CASH INVESTMENT AND CASH FLOW CALCULATION - REGION Shanghai, Pharmaceutical PLANT

Shanghai	Year 0	Year 1	Year 2	year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Site	6000000										
3% Deed Tax	180000										
Building	3350972										
Equipment	20000000										
Investment	29530972										
Working capital 10% Annual sales	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000
Company funds	7782743										
25 % of initial investment	7382743										
10 % of working capital	400000										
External funds	25748229										
commercial loan	22148229										
working capital	3600000										
Net cash investment	33530972										
Annual sales		40000000	40000000	40000000	40000000	40000000	40000000	40000000	40000000	40000000	40000000
Less operating costs											
Material costs		16000000	16000000	16000000	16000000	16000000	16000000	16000000	16000000	16000000	16000000
Transport costs		2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000
Labor costs		1388060	1388060	1388060	1388060	1388060	1388060	1388060	1388060	1388060	1388060
Power		1046080	1046080	1046080	1046080	1046080	1046080	1046080	1046080	1046080	1046080
Water		11518	11518	11518	11518	11518	11518	11518	11518	11518	11518
Gas		4343500	4343500	4343500	4343500	4343500	4343500	4343500	4343500	4343500	4343500
Telephone / Internet 2 Mb/s		1446	1446	1446	1446	1446	1446	1446	1446	1446	1446
Gross Operating Income		15209396	15209396	15209396	15209396	15209396	15209396	15209396	15209396	15209396	15209396
Less Depreciation											
Depreciation building 5%		167548,61	167548,61	167548,61	167548,61	167548,61	167548,61	167548,61	167548,61	167548,61	167548,61
Depreciation equipment 10%		2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000
Net operating income		13041847	13041847	13041847	13041847	13041847	13041847	13041847	13041847	13041847	13041847
Less Interest charge											
Commercial lone 7%		1550376	1550376	1550376	1356579	1162782	968985	775188	581391	387594	193797
Working capital 8%		288000	288000	288000	288000	288000	288000	288000	288000	288000	288000
Net income before taxes		11203471	11203471	11203471	11397268	11591065	11784862	11978659	12172456	12366253	12560050
Income tax 30%		3361041,4	3361041,4	3361041,4	3419180,5	3477319,6	3535458,7	3593597,8	3651736,9	3709876	3768015,1
Local surtax 3%		336104,14	336104,14	336104,14	341918,05	347731,96	353545,87	359359,78	365173,69	370987,6	376801,51
Net profit		7506326	7506326	7506326	7636170	7766014	7895858	8025702	8155546	8285390	8415234
Cash flow to all investors		11512251	11512251	11512251	11448298	11384344	11320391	11256438	11192485	11128532	11064579
Repayment of principals commercial loans		0	0	2768528,6	2768528,6	2768528,6	2768528,6	2768528,6	2768528,6	2768528,6	2768528,6
Cash flow to Equity investors		9673874,5	9673874,5	6905345,8	7035189,8	7165033,8	7294877,8	7424721,8	7554565,8	7684409,8	7814253,8
Profitability Index to equity	10,05123										
Present value PI (7,00%)	7,1487										
Accumulated cash flow year 0 - 10	-7782743	1891131	11565006	18470352	25505542	32670575	39965453	47390175	54944741	62629151	70443404
Profitability Index to Net Cash Investment	3,37991										
Present value PI (7,00%)	2,38012										
Accumulated cash flow year 0 - 10	-33530972	-22018722	-10506471	1005779	12454077	23838421	35158813	46415251	57607737	68736269	79800849

Appendix 3 FDI & GDP per province and Theil index calculations

FDI	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Beijing *	278,95	244,95	349,85	666,94	1371,57	1079,99	1552,9	1592,86	2168	1975,25	1683,68	1768,18	1724,64	2191,26
Tianjin *	36,93	132,61	107,78	613,68	1014,99	1520,93	2152,73	2511,35	2113,61	1763,99	1166,01	2133,48	1581,95	1534,73
Hebei *	44,47	56,56	113,09	396,54	523,40	546,68	830,22	1103,08	1428,68	1042,02	682,94	676,83	787,61	1099,79
Liaoning *	257,31	362,39	516,42	1279,13	1440,14	1424,61	1737,82	2366,35	2406,24	1061,73	2044,46	2516,12	3411,68	2824,1
Shanghai *	174,01	145,19	493,61	3160,25	2473,09	2892,61	3940,94	4225,36	3667,74	2836,65	3160,14	4291,59	4272,29	5468,49
Jiangsu *	133,97	219,22	1463,24	2843,71	3763,15	5190,82	5210,09	5435,11	6631,79	6077,56	6425,5	6914,82	10189,6	10563,65
Zhejiang *	49,14	92,29	239,78	1031,75	1144,41	1258,06	1520,5	1503,45	1340,12	1232,62	1612,66	2211,62	3076,1	4980,55
Fujian *	319,89	471,16	1423,64	2874,44	3713,18	4043,9	4084,55	4197,1	4212,11	4024,03	3431,91	3918,04	3838,37	2599,03
Shandong *	185,7	216,39	1003,42	1874,13	2552,42	2688,98	2633,55	2775,56	2731	2465,47	3027,55	3520,93	4800,1	6016,17
Guangdong *	1582,31	1942,88	3701,11	7555,76	9463,43	10260,11	11754,07	12634,95	13031,6	12892,38	12834,94	13634,66	13311,32	10093,35
Hainan *	103,02	176,72	452,55	707,1	918,09	1062,07	789,08	705,54	717,15	484,49	430,8	466,91	511,96	421,25
Eastern	3165,7	4060,36	9864,49	23003,43	28377,87	31968,76	36206,45	39050,71	40448,04	35856,19	36500,59	42053,18	47505,62	47792,37
Eastern %	0,921293	0,917423	0,896444	0,84133	0,853167	0,859018	0,864534	0,842075	0,857105	0,864983	0,868155	0,870422	0,867849	0,85995
Shanxi	3,4	3,8	53,84	86,43	31,70	63,83	138,08	268,93	244,51	391,29	224,72	233,93	211,64	213,61
Jilin	17,6	31,64	75,34	275,27	241,92	408,02	451,55	402,27	409,17	301,2	337,01	337,66	244,68	190,59
Heilongjiang	28,36	20,85	72,17	232,32	347,59	516,86	566,91	734,85	526,39	318,28	300,86	341,14	355,11	321,8
Anhui	13,54	10,67	54,66	257,64	370,00	482,56	506,61	434,43	276,73	261,31	318,47	336,72	383,75	367,2
Jiangxi	7,51	19,49	99,72	208,17	261,68	288,88	301,26	481,03	464,96	320,8	227,24	395,75	1081,97	1612,02
Henan	11,36	37,99	53,16	304,91	386,73	478,55	523,56	692,04	616,54	521,35	564,03	457,29	404,63	539,03
Hubei	31,76	46,64	203,13	540,53	601,86	625,12	680,79	848,66	1036,49	989,14	1036,12	1424,25	1645,35	1796,58
Hunan	14,15	25,43	132,71	437,46	331,14	507,73	745,3	917,02	818,16	653,74	678,33	810,11	900,22	1018,35
Central	127,68	196,51	744,73	2342,73	2572,62	3371,55	3914,06	4779,23	4392,95	3757,11	3686,78	4336,85	5227,35	6059,18
Central %	0,037158	0,044401	0,067678	0,085683	0,077345	0,090595	0,09346	0,103058	0,093088	0,090635	0,087689	0,089765	0,095495	0,109026
Inner Mongolia	10,64	1,66	5,2	85,26	40,07	57,81	71,86	73,25	90,82	64,56	105,68	107,03	177,01	88,54
Guangxi	35,63	31,85	182,01	884,56	836,33	672,63	663,13	885,79	886,13	635,12	527,66	384,16	417,26	418,56
Chongqing	-	-	-	-	-	-	-	418,02	431,07	241,35	245,79	257,80	197,04	262,44
Sichuan	24,37	80,91	112,14	571,41	921,74	541,59	440,9	248,46	372,48	341,01	436,94	581,88	555,83	412,31
Guizhou	10,58	14,09	19,79	42,94	63,63	57,03	31,38	49,77	45,35	40,9	25,01	28,29	38,21	45,21
Yunnan	7,38	3,51	28,75	97,02	65,00	97,69	65,37	165,66	145,68	153,85	128,12	64,57	111,69	83,84
Tibet	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shaanxi	47,31	31,76	45,53	234,3	238,80	324,07	326,09	628,16	300,1	241,97	288,42	351,74	360,05	331,9
Gansu	1,24	4,78	0,35	11,95	87,76	63,92	90,02	41,44	38,64	41,04	62,35	74,39	61,21	23,42
Qinghai	-	-	0,68	3,24	2,41	1,64	1	2,47	-	4,59	-	36,49	47,26	25,22
Ningxia	0,25	0,18	0,35	11,9	7,27	3,9	5,55	6,71	18,56	51,34	17,41	16,80	22	17,43
Xinjiang	5,37	0,22	-	53	48,30	54,9	63,9	24,72	21,67	24,04	19,11	20,35	18,99	15,34
Western	142,77	168,96	394,8	1995,58	2311,31	1875,18	1759,2	2544,45	2350,5	1839,77	1856,49	1923,5	2006,55	1724,21
Western %	0,041549	0,038176	0,035878	0,072987	0,069488	0,050387	0,042006	0,054868	0,049808	0,044382	0,044156	0,039813	0,036656	0,031024
China Total	3436,15	4425,83	11004,02	27341,74	33261,8	37215,49	41879,71	46374,39	47191,49	41453,07	42043,86	48313,53	54739,52	55575,76

GDP	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Beijing	500,82	598,9	709,10	863,54	1084,03	1394,89	1615,73	1810,09	2011,31	2174,46	2478,76	2845,65	3212,71	3663,10
Tianjin	310,95	342,75	411,24	536,10	725,14	920,11	1102,40	1240,40	1336,38	1450,06	1639,36	1840,10	2051,16	2447,66
Hebei	836,14	959,57	1155,05	1690,84	2147,50	2849,52	3452,97	3953,78	4256,01	4569,19	5088,96	5577,78	6122,53	7098,56
Liaoning	965,72	1073,24	1297,65	1808,15	2584,20	2793,37	3157,69	3490,06	3881,73	4171,69	4669,06	5033,08	5265,66	6002,54
Shanghai	744,67	857,71	1114,32	1511,61	1971,92	2462,57	2902,20	3360,21	3688,20	4034,96	4551,15	4950,84	5408,76	6250,81
Jiangsu	1315,82	1471,05	1971,60	2754,49	4057,39	5155,25	6004,21	6680,34	7199,95	7697,82	8582,73	9511,91	10631,75	12460,83
Zhejiang	836,89	983,54	1220,69	1698,04	2666,90	3524,79	4146,06	4638,24	4987,50	5364,89	6036,34	6748,15	7796,00	9395,00
Fujian	459,48	547,42	694,70	1028,14	1685,30	2160,52	2583,83	3000,36	3286,56	3550,24	3920,07	4253,68	4682,01	5232,17
Shandong	1333,37	1596,88	1982,02	2702,49	3872,20	5002,34	5960,42	6650,02	7162,20	7662,10	8542,44	9438,31	10552,06	12435,93
Guangdong	1471,84	1780,56	2293,54	3225,30	4240,56	5381,72	6519,14	7315,51	7919,12	8464,31	9662,23	10647,71	11735,64	13625,87
Hainan	95,01	107,93	141,68	225,15	330,95	364,17	389,53	409,86	438,92	471,23	518,48	545,96	597,50	670,93
Sub Total Eastern PG1	8870,71	10319,55	12991,59	18043,85	25366,09	32009,25	37834,18	42548,87	46167,88	49610,95	55689,58	61393,17	68055,78	79283,4
Shanxi	399,86	431,55	519,80	704,70	853,77	1092,48	1308,01	1480,13	1486,08	1506,78	1643,81	1779,97	2017,54	2456,59
Jilin	393,97	424	514,58	671,95	968,80	1129,20	1337,16	1446,91	1557,78	1669,56	1821,19	2032,48	2246,12	2522,62
Heilongjiang	658,96	734,69	855,93	1076,94	1618,60	2014,53	2402,58	2708,46	2798,89	2897,41	3253,00	3561,00	3882,16	4430,00
Anhui	606,53	600,13	730,19	979,55	1488,50	2003,58	2339,25	2669,95	2805,45	2908,59	3038,24	3290,13	3553,56	3972,38
Jiangxi	419,54	465,1	559,52	701,91	1032,00	1205,11	1517,26	1715,18	1851,98	1962,98	2003,07	2175,68	2450,48	2830,46
Henan	895,74	993,08	1213,23	1583,12	2198,60	3002,74	3683,41	4079,26	4356,60	4576,10	5137,66	5640,11	6168,73	7048,59
Hubei	791,09	856,85	1001,37	1298,41	1878,70	2391,42	2970,20	3450,24	3704,21	3857,99	4276,32	4662,28	4830,98	5401,71
Hunan	702,64	785,83	920,13	1192,41	1694,40	2195,70	2647,16	2993,00	3118,09	3326,75	3691,88	3983,00	4140,94	4638,73
Sub total central PG2	4868,33	5291,23	6314,75	8208,99	11733,37	15034,76	18205,03	20543,13	21679,08	22706,16	24865,17	27124,65	29290,51	33301,08
Inner Mongolia	286,74	320,99	378,62	532,71	681,92	832,88	984,78	1094,52	1192,29	1268,20	1401,01	1545,79	1756,29	2150,41
Guangxi	392,83	453,04	572,30	788,05	1241,83	1606,15	1869,62	2015,20	1903,04	1953,27	2050,14	2231,19	2455,36	2735,13
Chongqing	-	-	-	-	-	-	1179,09	1350,01	1429,26	1479,71	1589,34	1749,77	1971,30	2250,56
Sichuan	1144,88	1281,1	1481,22	1958,69	2777,88	3534,00	2985,15	3320,11	3580,26	3711,61	4010,25	4421,76	4875,12	5456,32
Guizhou	254,87	289,76	331,67	408,47	521,17	630,07	713,70	792,98	841,88	911,86	993,53	1084,90	1185,04	1356,11
Yunnan	395,99	432,86	510,03	662,23	973,97	1206,68	1491,62	1644,23	1793,90	1855,74	1955,09	2074,71	2232,32	2465,29
Tibet	24,45	30,53	33,29	37,28	45,84	55,98	64,76	76,98	91,18	105,61	117,46	138,73	161,42	184,50
Shaanxi	374,05	427,9	492,64	614,51	846,70	1000,03	1175,38	1326,04	1381,53	1487,61	1660,92	1844,27	2101,60	2398,58
Gansu	234,04	255,45	301,64	358,33	451,66	553,35	714,18	781,34	869,75	931,98	983,36	1072,51	1161,43	1304,60
Qinghai	66,34	72,58	84,32	105,74	138,24	165,31	183,57	202,05	220,16	238,39	263,59	300,95	341,11	390,21
Ningxia	61,1	68,49	78,62	98,44	133,97	169,75	193,62	210,92	227,46	241,49	265,57	298,38	329,28	385,34
Xinjiang	251,88	311,72	382,26	481,94	673,68	825,11	912,15	1050,14	1116,67	1168,55	1364,36	1485,48	1598,28	1877,61
Sub Total Western PG3	3487,17	3944,42	4646,61	6046,39	8486,86	10579,31	12467,62	13864,52	14647,38	15354,02	16654,62	18248,44	20168,55	22954,66
China Total	17226,21	19555,2	23952,95	32299,23	45586,32	57623,32	68506,83	76956,52	82494,34	87671,13	97209,37	106766,3	117514,8	135539,1

xri LN(xri/pri)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Beijing	0,039226	0,002336	-0,01529	-0,014531	0,005948	-0,008601	0,000185	-0,001715	0,01111	0,012594	0,001646	-0,004099	-0,009534	-0,000352
Tianjin	-0,012835	-0,000549	-0,011622	-0,002873	0,008014	0,023971	0,042406	0,050881	0,030867	0,025615	0,002611	0,026701	0,003321	0,001265
Hebei	-0,026741	-0,026445	-0,023483	-0,029185	-0,028107	-0,028212	-0,031674	-0,033636	-0,033884	-0,033521	-0,029674	-0,027856	-0,02804	-0,031264
Liaoning	-0,023751	-0,013651	-0,033821	-0,03275	-0,035365	-0,02995	-0,026554	-0,018347	-0,02058	-0,030906	-0,022593	-0,018844	-0,005352	-0,014645
Shanghai	-0,023276	-0,03016	-0,026966	0,067954	0,009958	0,014678	0,038088	0,034072	0,011489	-0,00219	0,004996	0,024029	0,011117	0,042617
Jiangsu	-0,053078	-0,052418	-0,003387	-0,026079	-0,024861	0,001322	-0,014086	-0,016771	0,008209	0,014977	0,023411	0,009781	0,067995	0,07537
Zhejiang	-0,028013	-0,032582	-0,032866	-0,033238	-0,038643	-0,040493	-0,04028	-0,04007	-0,039159	-0,039397	-0,039651	-0,038769	-0,036939	-0,013389
Fujian	0,067527	0,090829	0,143288	0,098125	0,088682	0,079455	0,056622	0,045297	0,039612	0,050498	0,027217	0,027594	0,012992	-0,010524
Shandong	-0,055196	-0,056808	-0,041232	-0,049606	-0,047578	-0,052106	-0,056214	-0,056006	-0,056168	-0,055641	-0,050997	-0,050879	-0,043267	-0,027691
Guangdong	0,551188	0,488075	0,282859	0,199852	0,230282	0,207496	0,205638	0,20457	0,203091	0,268041	0,2484	0,202846	0,13603	0,04352
Hainan	0,036165	0,062058	0,06591	0,027713	0,02938	0,035601	0,016343	0,011363	0,01105	0,004762	0,0028	0,002464	0,002209	0,000359
Twithin coastal	0,471218	0,430685	0,303391	0,205382	0,19771	0,203161	0,190476	0,179637	0,165638	0,214832	0,168166	0,152968	0,110531	0,065267
Shanxi	-0,029994	-0,027832	-0,009384	-0,031157	-0,021882	-0,025463	-0,025093	-0,013909	-0,011594	0,046939	-0,00495	-0,010574	-0,021514	-0,02603
Jilin	0,073416	0,11235	0,02188	0,042474	0,01223	0,057731	0,052088	0,014998	0,024167	0,00693	0,020255	0,002984	-0,023107	-0,027646
Heilongjiang	0,110014	-0,028542	-0,032517	-0,027752	-0,002808	0,020638	0,013474	0,023645	-0,008938	-0,034704	-0,038515	-0,040291	-0,045404	-0,048766
Anhui	-0,017087	-0,039996	-0,033362	-0,008976	0,018048	0,01022	0,000942	-0,0325	-0,045351	-0,042477	-0,029956	-0,034639	-0,036879	-0,04104
Jiangxi	-0,022466	0,011975	0,055289	0,003418	0,014788	0,005713	-0,006124	0,018812	0,022681	-0,00106	-0,016501	0,01177	0,187497	0,303575
Henan	-0,064645	0,005723	-0,070676	-0,051179	-0,033122	-0,048476	-0,055354	-0,045725	-0,050382	-0,051786	-0,045977	-0,071601	-0,077477	-0,077111
Hubei	0,10591	0,090733	0,147928	0,087115	0,088714	0,028422	0,01113	0,009892	0,076143	0,115292	0,138018	0,212622	0,203416	0,178848
Hunan	-0,029274	-0,017822	0,035867	0,046901	-0,014806	0,004621	0,051349	0,052832	0,048131	0,029919	0,039458	0,044957	0,033981	0,031556
Twithin central	0,125875	0,106589	0,115024	0,060844	0,061162	0,053406	0,042412	0,028044	0,054857	0,069054	0,061832	0,115229	0,220514	0,293386
Inner Mongolia	-0,007329	-0,020772	-0,024003	-0,030922	-0,026587	-0,028903	-0,026936	-0,029041	-0,02879	-0,030039	-0,022231	-0,023384	0,001143	-0,030873
Guangxi	0,198507	0,093396	0,608504	0,542574	0,327607	0,30841	0,347456	0,304062	0,40161	0,344627	0,237836	0,098003	0,111333	0,172753
Chongqing	-	-	-	-	-	-	-	0,085935	0,115721	0,040455	0,043347	0,044882	0,000458	0,066948
Sichuan	-0,11165	0,185926	-0,032767	-0,035333	0,078772	-0,042018	0,011451	-0,087595	-0,068676	-0,049225	-0,005369	0,067129	0,037748	0,001434
Guizhou	0,001024	0,010575	-0,017717	-0,024618	-0,022087	-0,020439	-0,020799	-0,020987	-0,021061	-0,021845	-0,020046	-0,020544	-0,021456	-0,021299
Yunnan	-0,040681	-0,034577	-0,02988	-0,039486	-0,039548	-0,040824	-0,043449	-0,039042	-0,042214	-0,030801	-0,036661	-0,040951	-0,03826	-0,038531
Tibet	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shaanxi	0,373769	0,103332	0,0097	0,016943	0,003615	0,104275	0,125324	0,234102	0,03866	0,040196	0,068869	0,108436	0,097524	0,117605
Gansu	-0,017759	-0,02343	-0,003806	-0,013726	-0,012819	-0,014595	-0,005773	-0,020217	-0,021112	-0,02233	-0,018949	-0,016185	-0,019383	-0,019442
Qinghai	0	0	-0,004056	-0,003859	-0,002866	-0,002521	-0,00185	-0,00263	0	-0,004561	0	0,002656	0,0078	-0,002198
Ningxia	-0,004033	-0,002973	-0,002614	-0,005989	-0,005074	-0,004249	-0,005028	-0,004621	-0,00534	0,016001	-0,004978	-0,005477	-0,004365	-0,005127
Xinjiang	-0,024543	-0,005346	0	-0,029188	-0,02789	-0,028686	-0,025434	-0,019952	-0,019476	-0,023025	-0,021351	-0,021588	-0,020112	-0,019738
Twithin western	0,367305	0,30613	0,50336	0,376396	0,273122	0,230448	0,354961	0,400013	0,349321	0,259453	0,220466	0,192978	0,15243	0,221533
T within Eastern	0,43413	0,395121	0,271973	0,172794	0,168679	0,174519	0,164673	0,151268	0,141969	0,185826	0,145994	0,133147	0,095924	0,056126
T within Central	0,004677	0,004733	0,007785	0,005213	0,004731	0,004838	0,003964	0,00289	0,005107	0,006259	0,005422	0,010343	0,021058	0,031987
T within Western	0,015261	0,011687	0,018059	0,027472	0,018979	0,011612	0,01491	0,021948	0,017399	0,011515	0,009735	0,007683	0,005588	0,006873
T within	0,454068	0,41154	0,297818	0,20548	0,192389	0,190969	0,183547	0,176106	0,164474	0,2036	0,161151	0,151174	0,12257	0,094986
T between	0,394731	0,363555	0,297858	0,182589	0,203165	0,213496	0,228195	0,190943	0,20542	0,210956	0,207138	0,209453	0,20284	0,190143
Theil index	0,8488	0,775095	0,595676	0,388069	0,395554	0,404465	0,411742	0,367049	0,369894	0,414556	0,368289	0,360626	0,32541	0,285128
C within	0,534953	0,530954	0,499966	0,529493	0,486378	0,472152	0,445781	0,479789	0,444652	0,491127	0,437568	0,419197	0,376663	0,333133
C between	0,465047	0,469046	0,500034	0,470507	0,513622	0,527848	0,554219	0,520211	0,555348	0,508873	0,562432	0,580803	0,623337	0,666867