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Foreign direct investment and economic growth in China

Master Thesis

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Abstract

This thesis researches the relation between Foreign Direct Investment and economic growth in China on a regional level for the period of 2001-2012. It theoretically analyses the relation and makes use of a panel data set, which is created by the author, to test the relation empirically by making use of growth models that originate from scientific literature, mainly from Zhang (2001). Significant and positive results are found for the relation between FDI and economic growth in China but the sustainability of the relation is called into question.

Contents

1. Introduction

China, nowadays known as one of the world's largest economies, has experienced phenomenal economic growth and development during the last decades. However, it has not always known this extraordinary progress and predominantly used to be a country with agricultural and rural focus. The opening of China's borders and the economic reforms it implemented in the early eighties ushered in these impressive changes and ensured the future position of China in the global economy (Naughton & Lardy, 1996). Since then China has seen an average growth in GDP of 15,02%, 18,59% and 14,68% during the years 1980-1990, 1990-2000 and 2000-2010 respectively and an average increase in national exports of 15,38% and 21,91% for the years 1990-2000 and 2000-2010 respectively[1].

When comparing present and past China several decades ago there is no denial that a lot has changed for the country and its position in the world economy. Due to the impressive and strong growth China could call itself the world's second largest economy behind the United States from 2010 up to and including now (World Bank Group, 2014). This continuing development has caused speculations to arise that China will even surpass the United States as the world's biggest economy (Barboza, 2010). As China became a more dominant player in the world economy during the years it becomes more and more interesting to try and explain this spectacular growth.

Scientific literature shows a great deal of interest in this matter and much attention has been dedicated to understand and explain this phenomenon by researching the relation between FDI and economic growth. In the past, economic growth was explained through the use of neoclassical growth models which stated that FDI improved economic growth by increasing the efficiency of the economy as an indirect effect and by increasing the level of capital as a direct effect. This has later been expanded with the reasoning that FDI can also improve economic growth by bringing externalities such as technological

[1] Calculations have been made by the author himself

diffusion. This diffusion is mainly said to be active when the flow of FDI originates from a developed country to a "lower" developed country (Li & Liu, 2005).

This paper seeks to contribute to this section of research and examines the relation between Foreign Direct Investments (FDI) and economic growth in China and does so on a regional level for the period 2001-2012. It differs from previous researches in the sense that theoretically this time period is fairly well described while the empirical analysis to support these theories about the relationship between FDI and economic growth is often missing (Whalley & Xin, 2010). This relation is theoretically and statistically analysed by making use of growth models which are suggested by earlier scientific literature (Zhang, 2001).

To research the relationship data for each single region and variable for the period of 2001-2012 is gathered by the author in order to make use of a panel data set which can be statistically analysed. The data that is put in the data set originates from the National Bureau of Statistics of China which collects statistics of all the Chinese regions. This panel data is then analysed by making use of regression models suggested by scientific literature and is mainly based on the model from Zhang (2001). The results from the data analysis suggest a positive and significant relation between FDI and economic growth. However, it also finds other statistically significant suggestions that raise questions about the sustainability of this relation.

The rest of the thesis is constructed as followed. In section 2 relevant scientific literature and theories will be reviewed and linked to the case of real-life China. In section 3 the research question is elaborated along with the contribution of this thesis. In section 4 the research methodology is explained and the model which is used is shown. In section 5 the variables as they are mentioned in the model and the data from the panel data set are clarified. In section 6 the main results are discussed. In section 7 conclusions are drawn from the main results. Section 7 reviews the research and discusses its limitations and possibilities for future research.

2. Review of literature and theory

In this section the theory and supposed relation between FDI and economic growth will be elaborated by discussing existing literature and by presenting up to date country statistics from China which relate the existing literature and theories to reality. At first a general definition of FDI will be given where after existing literature will be discussed along with statistics from China to substantiate the theories from this literature.

2.1. FDI

The Chinese statistical bureau explains and refers to "Foreign Direct Investment" (FDI) as foreign investment in China through the establishment of foreign invested enterprises, cooperative exploration and development of petroleum resources with domestic investors and the establishment of branch organizations of foreign enterprises. These foreign investment can be made in different forms such as cash, intangible assets and equity, physical investment, in addition with reinvestment of the foreign enterprises with the profits gained from the investment" (China Statistics Bureau, 2013). This general definition and meaning of FDI, provided by the Chinese government, is used throughout the rest of the research.

Firms that make direct use of these inflows of FDI are called Foreign Funded Enterprises or Foreign Invested Enterprises (FIE's). These enterprises are often joint ventures between foreign companies and Chinese enterprises but also but also comprise others (Whalley & Xin, 2010).

Several common propositions are suggested why FDI is a credible driver of economic growth in a host country. Research suggests that FDI is able to increase employment and capital formation, to promote exports (especially manufacturing exports), it is able to bring special resources such as specific knowledge and know-how to the host country and can result in diffusion of

technology and other spillover effects (Markusen & Venables, 1999) (Zhang, 2001).

Transfers of technology and other spillovers play a key part in the growth and development of an economy. When a country is significantly technologically underdeveloped relative to the rest of the world it can be said that such a country could benefit from the possible diffusion of foreign technology. A certain dependence therefore exists between the growth rate of an economy and the level of domestic technology compared to that of other countries (Borensztein, De Gregorio, & Lee, 1998) (Wei, Yao, & Liu, 2007).

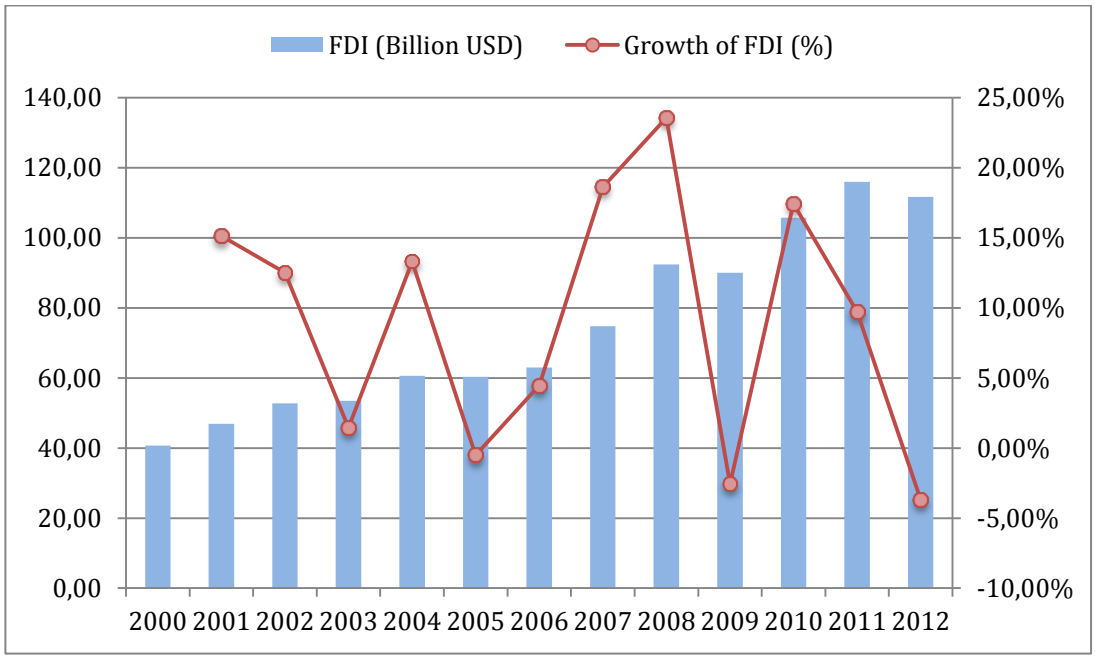
For an economy that is technologically underdeveloped it can be advantageous to adopt new technologies instead of trying to reinvent specific ideas for themselves. The diffusion of technology can take place through different channels that transfer new technologies and ideas. FDI is seen as a major channel through which countries can access advanced foreign technologies (Easterly, King, Levine, & Rebelo, 1994). FDI is thus seen as a channel for spillovers and can assist and ease the transfer of business knowledge and technology. The transfers that occur via these investment flows can have spillover effects for the whole of the host-economy. This means that the firms that receive these investments are not benefiting exclusively from these flows but all firms are able to benefit (Rappaport, 2000).

2.2. Growth and distribution of FDI inflows

The flow of FDI into China has seen an impressive growth since the 1980's. Before these years FDI was even prohibited in the country. After the initiation of the open door policy a foreign investment law was implemented which allowed the inflow of FDI into the domestic economy. At first these flows were restricted to specific sectors and Special Economic Zones (SEZ's). However, after the years past and more steps were taken to create a more open and market-oriented economy more and more FDI was allowed and flowed into the country. And even

in the year 2012 the level of FDI inflow is more than double its value then at the beginning of the 21st century (Whalley & Xin, 2010).

Figure 1, Inflow of FDI (Billion USD) & Growth of inflow of FDI (%)



The annual level of FDI inflow and the yearly growth of this flow are represented in Figure 1. At the start of the 21st century China was already known as a high potential country with many opportunities for foreign companies. And after the Asian financial crises at the end of the 20th century China again saw an increase in the level of FDI that flowed into the country. An upward trend until 2012 can be noticed with a relatively high volatility level in growth percentage. A steep decline in the growth level occurred after the Economic crisis started with a rebound the year thereafter and the slowdown of growth in the last few years. The global FDI recovery that started in 2010 is stalling and with FDI flows falling even below the pre-crisis level it is expected that the recovery will take longer than formerly was expected. Nevertheless, China remains the second largest recipient of FDI in the world behind the United States (UNCTAD, 2013).

A driver for the overall upward movement along the years is the official entry of China to the World Trading Organization (WTO) near the end of 2001. By doing this China created a more “open” economy for example by getting rid of quotas

and improving the accessibility of different kinds of sectors and committing to further trade liberalisation. This served as stimulant for more FDI to find its way into the country (Xing, 2010). Given the immense size of the domestic economy and the amount of FDI it attracts, concerns are even outed about the impacts this large flow of FDI has on the welfare of other countries. The example that is given is that countries who try to attract FDI are not able to because China is crowding out these countries with its high demand. De-industrialisation could now even be a concern for a country which used to receive a steady amount of FDI which is now flowing to China (Xing, 2010).

The flows of FDI are distributed across the country but have been found to concentrate in specific regions as can been seen in Figure 2. This figure shows the average distribution of FDI across China over the period 2000-2012. The historically richer regions have attracted more FDI on average along the years. This means a concentration of FDI in the east of China and especially along the coastline. The introduction of the SEZ's further enhanced this concentration. Over 80% of the FDI flows to the coastal region. Concerns have been expressed about this distribution, as it would increase disparities and differences in wealth levels between the regions in China (Wei, Yao, & Liu, 2007).

Figure 2, Average regional distribution of FDI inflow in China over the period 2000-2012

2.3. Sources of FDI

Table 1 shows the distribution of the geographic origin of FDI that comes into China. A large amount, almost a quarter, of the total FDI used to directly originate from western countries in North America and Europe, where the most developed countries are concentrated. This can be seen as a small percentage of countries supplying a large proportion of the total inflow of FDI in China.

Table 1, Value & Share of FDI from total per origin

Year	North America		Europe		Latin-America		Asia (ex. HK)		Hong Kong		Africa		Oceanic &		Others	
	Value (Billion USD)	Share (%)	Value (Billion USD)	Share (%)	Value (Billion USD)	Share (%)	Value (Billion USD)	Share (%)	Value (Billion USD)	Share (%)	Value (Billion USD)	Share (%)	Value (Billion USD)	Share (%)	Value (Billion USD)	Share (%)
2000	4,79	11,75%	4,77	11,70%	4,62	11,34%	9,98	24,52%	15,50	38,07%	0,29	0,71%	0,69	1,70%	0,08	0,20%
2001	5,10	10,87%	4,48	9,57%	6,31	13,46%	12,90	27,51%	16,72	35,66%	0,33	0,70%	1,01	2,16%	0,03	0,06%
2002	6,49	12,31%	4,05	7,68%	7,55	14,32%	14,71	27,89%	17,86	33,86%	0,56	1,07%	1,42	2,69%	0,10	0,19%
2003	5,16	9,65%	4,27	7,98%	6,91	12,91%	16,40	30,65%	17,70	33,08%	0,62	1,15%	1,73	3,24%	0,71	1,33%
2004	4,98	8,21%	4,80	7,91%	9,04	14,92%	18,62	30,71%	19,00	31,33%	0,78	1,28%	1,97	3,26%	1,44	2,38%
2005	3,73	6,18%	5,64	9,35%	11,29	18,72%	17,77	29,46%	17,95	29,75%	1,07	1,78%	2,00	3,31%	0,87	1,44%
2006	3,69	5,85%	5,71	9,06%	14,16	22,47%	14,85	23,57%	20,23	32,11%	1,22	1,93%	2,26	3,59%	0,90	1,42%
2007	3,39	4,53%	4,37	5,84%	20,12	26,91%	14,41	19,28%	27,70	37,05%	1,49	1,99%	2,74	3,67%	0,55	0,73%
2008	3,96	4,28%	5,46	5,91%	20,90	22,62%	15,31	16,57%	41,04	44,41%	1,67	1,81%	3,17	3,43%	0,89	0,97%
2009	3,68	4,08%	5,50	6,10%	14,68	16,31%	14,57	16,18%	46,08	51,18%	1,31	1,45%	2,53	2,81%	1,69	1,88%
2010	4,01	3,80%	5,92	5,60%	13,53	12,79%	17,03	16,10%	60,57	57,28%	1,28	1,21%	2,33	2,20%	1,07	1,01%
2011	3,58	3,09%	5,88	5,07%	12,50	10,78%	19,01	16,39%	70,50	60,77%	1,64	1,41%	2,62	2,26%	0,27	0,23%
2012	3,83	3,42%	6,29	5,63%	10,18	9,12%	21,13	18,92%	65,56	58,69%	1,39	1,24%	2,27	2,03%	1,07	0,95%

However, over the years FDI came from more and more different countries and a large increase in the supply of FDI from, in the already strong position of Hong Kong can be seen. At first sight the flows of FDI could be related to the countries themselves but for example seeing that the majority of FDI in Latin-America originates from the Cayman Islands preceded by the Virgin Islands could suggest that these countries are used to avoid taxes by firms originating from other countries (UNCTAD, 2013). This could be a possible explanation why the proportion of FDI for which western countries are responsible is declining (assuming that real origin of FDI is from those regions). The latter explanation can also be used for the FDI that originates from Hong Kong. Some of the enormous expansion in the flow of FDI from this region can be assigned due to the use of tax-havens and off-shore finance. And it has been found that a large proportion of these of the flows of FDI from Hong Kong are round-tripping investments from China. These are directed and channelled this way in order to make use of the advantages foreign investments receive from the Chinese

government (Xing, 2010). The origins of the total FDI flow China receives can thus be said to be a bit problematic

Despite the fact that the FDI inflow of China originates from a large variety of countries the largest suppliers are not the governments of these countries but the firms that operate in it. One of the largest suppliers of FDI are Multinational Corporations (MNC's). MNC's account for a substantial part of the world's investment in research and development and bring new technologies/practices to a country through its investments. This is a possible way for FDI to carry spillover effects to the host economy. To adapt these new technologies a country would need qualified workers to incorporate them since these developments require more and further advanced education to understand and implement them (Easterly, King, Levine, & Rebelo, 1994). Further evidence for this proposition has been found in the scientific literature. It is suggested that the level of human (resources) capital determines the ability of a host economy to adopt technology which can be complementary to FDI. So when a host economy has a sufficient level of human capital it can optimally make us of the possible spillovers that are carried by FDI. This optimal use of the FDI should result in higher economic growth. The reasoning follows that greater levels of human capital should enable higher economic growth for a specific amount of FDI (Borensztein, De Gregorio, & Lee, 1998).

Not only is the level of human capital an important factor to make use of the possible corresponding spillovers of FDI, the availability and accompanying costs of labor also have been found to be a relevant factor to attract FDI to a an economy. When competing for FDI between developing countries it is important that such countries invest in their human capital. This will not only benefit the volume of FDI entering a host-economy but will also determine the characteristics, such as the quality of the flow an economy can attract. Countries that are mainly focussed on primary industries/sector and low cost/skilled labor will have difficulty attracting FDI for their tertiary industries/sector and may suffer slower economic growth (Paloni & Noorbakhsh, 2001).

2.4. Benefits of FDI through FIE's - Export

It has been found that FDI can increase the growth of an economy by stimulating industries that are present in the host-country. FDI has performed an essential role in the promotion and development of Chinese exports. Because China missed the proper brand recognition, technology, marketing channels and capital it was difficult for these early companies to enter the global trade market. With the start of the large levels of FDI inflow, creating FIE's in the process, a way to confront these shortcomings had arrived. This process put China in the trade markets around the world as a large player to be reckoned with (Xing, 2010).

The economic-reforms china introduced in the early 80's led to the transition of a centrally planned economy to a more market-based economy. FDI is said to be a driver behind this transition by creating competition for state-owned enterprises by investing in companies, foreign-invested firms. This competition intensified the more FDI came into the country and improved the efficiency of the domestic economy (Xing, 2010).

Table 2, National export and share of FIE's

Year	Total export		FIE export		Non-FIE export		FIE share of total export
	Value (Billion USD)	Growth (%)	Value (Billion USD)	Growth (%)	Value (Billion USD)	Growth (%)	
2000	249,20	-	119,44	-	129,76	-	47,93%
2001	266,10	6,78%	133,22	11,53%	132,88	2,41%	50,06%
2002	325,60	22,36%	169,99	27,60%	155,61	17,11%	52,21%
2003	438,23	34,59%	240,31	41,37%	197,92	27,19%	54,84%
2004	593,33	35,39%	338,61	40,91%	254,72	28,70%	57,07%
2005	761,95	28,42%	444,18	31,18%	317,77	24,75%	58,30%
2006	968,98	27,17%	563,78	26,93%	405,20	27,51%	58,18%
2007	1.220,46	25,95%	695,37	23,34%	525,09	29,59%	56,98%
2008	1.430,69	17,23%	790,49	13,68%	640,20	21,92%	55,25%
2009	1.201,61	-16,01%	672,07	-14,98%	529,54	-17,29%	55,93%
2010	1.577,75	31,30%	862,23	28,29%	715,53	35,12%	54,65%
2011	1.898,38	20,32%	995,23	15,42%	903,15	26,22%	52,43%
2012	2.048,71	7,92%	1.022,62	2,75%	1.026,09	13,61%	49,92%

Through the inflow of FDI the industries in China could become more developed and further industrialisation was instigated. Local players could become significant competitors which can compete amongst others for market share (Markusen & Venables, 1999). As can be seen in Table 2 the level of exports from FIE seems to be gradually losing ground due to the larger growth in exports from domestic enterprises (Non-FIE's). When looking at the FIE-share of the total it can be seen that from 2006 onwards a slow decline sets in which continues until 2012. The period 2000-2005 shows a large differences between the growth rates of FIE's and non-FIE's. In this period growth of the Chinese export sector would be lower without the FIE's. Around the years 2006-2008 a change is setting in and non-FIE's were growing more than the FIE's. Although FIE's deliver less and less exports proportionally to the national total they still represent a large majority and could, because of the immense size, still have a positive influence on the economy of the nation and its growth (Whalley & Xin, 2010).

2.5. Benefits of FDI through FIE's – Employment, productivity and tax.

There are more effects of FDI on the Chinese economy besides the prominent contribution of expanding the Chinese export. For China more FDI means more jobs are generated in the host-economy. As can be seen in Table 3 the amount of people that find employment with FIE's has continuously increased and almost tripled over the twelve year period. FIE's are responsible for almost 3% of the total employed population in the year 2012. This may seem a relatively small amount but taking in consideration the enormous population of China this translates to roughly 22 million people who find jobs with FIE's.

Table 3, National employment & industrial revenue by FIE's and Non-FIE's

Year	Employment					Industrial revenue from principal business				
	Total	FIE		Non-Fie		Total	FIE		Non-FIE	
	Value (Million people)	Value (Million people)	Share of total	Value (Million people)	Share of total	Value (Trillion Yuan)	Value (Trillion Yuan)	Share of total	Value (Trillion Yuan)	Share of total
2000	720,85	6,42	0,89%	714,43	99,11%	8,42	2,25	26,79%	6,16	73,21%
2001	727,97	6,71	0,92%	721,26	99,08%	9,37	2,60	27,76%	6,77	72,24%
2002	732,80	7,58	1,03%	725,23	98,97%	10,95	3,12	28,49%	7,83	71,51%
2003	737,36	8,63	1,17%	728,73	98,83%	14,32	4,36	30,46%	9,96	69,54%
2004	742,64	10,33	1,39%	732,31	98,61%	19,89	6,51	32,73%	13,38	67,27%
2005	746,47	12,45	1,67%	734,02	98,33%	24,85	7,86	31,61%	17,00	68,39%
2006	749,78	14,07	1,88%	735,71	98,12%	31,36	9,89	31,55%	21,47	68,45%
2007	753,21	15,83	2,10%	737,38	97,90%	39,97	12,55	31,40%	27,42	68,60%
2008	755,64	16,22	2,15%	739,42	97,85%	50,00	14,66	29,32%	35,34	70,68%
2009	758,28	16,99	2,24%	741,29	97,76%	54,25	15,03	27,70%	39,23	72,30%
2010	761,05	18,23	2,40%	742,82	97,60%	69,77	18,87	27,05%	50,90	72,95%
2011	764,20	21,49	2,81%	742,71	97,19%	84,18	21,63	25,69%	62,55	74,31%
2012	767,04	22,15	2,89%	744,89	97,11%	92,93	22,19	23,88%	70,73	76,12%

At the right hand side of Table 3 the industrial revenue is distinguished between FIE's and non-FIE's. The revenue of both origins has seen a large growth and has grown almost tenfold its value at the year 2000. Up until the Economic crisis the share of FIE's in the revenue stream was steadily increasing. However, a decline has set in the aftermath of the crisis. Still, after this decline FIE's are responsible for a significant part, almost a quarter of the total industrial revenue stream.

Although the total national employment does not differentiate between sectors, this division of employment is roughly assumed to be the same over different sectors, at least the assumption can be made that the majority of employment can be found with non-FIE's and the minority with FIE's. Keeping this assumption in mind it can be noticed that although FIE's employ a relatively small proportion of people it still accounts for almost a quarter of the industrial revenue stream. This can mean for example that FIE's are more efficient. This can possibly come due to the fact that these enterprises have more knowledge and or better technology. Scientific literature has found that these advantages are present and even carry over to the domestic competitors who keep learning from these spillovers and also see growth (Li, Xiaming, & Parker, 2001) (Chuang & Hsu, 2004). The decline of FIE's share of total industrial revenue could also signal that this supposed efficiency is less and less present.

Another contribution of FDI to the domestic economy of China is the adding of tax revenue. As can be seen on the left hand side of Table 4 again a distinction has been made between FIE and non-FIE but it now concerns the industrial tax which has been paid from principal business. In accordance with the rising of the revenue stream, which can be seen in Table 3, the government tax revenue stream is rising year after year as well. In the period 2000-2012 this amount has grown almost twenty times its former value. From combining the information in Table 3 & 4 it can be noticed that although FIE's are roughly responsible for a quarter of the industrial revenue they are not responsible for such a proportion in the tax revenue stream. Possible tax exemptions could be used to attract FIE's which causes this distorted distribution. Nevertheless the tax income from these enterprises is growing and contributes to the national income for the Chinese government. Yet, when looking at industrial tax from principal business, the share that originates from FIE's is somewhat stagnating the last years. This means that, relatively speaking, FIE's are losing ground in comparison to the whole or at least their share is seemingly stable. Thus, even though their absolute value is increasing the share they supply to the Chinese government is not seeing this same growth path.

Table 4, Industrial tax from principal business & industrial added tax value

	Industrial tax from principal business					Industrial added tax value				
Year	Total	FIE		Non-FIE		Total	FIE		Non-FIE	
	Value (Trillion Yuan)	Value (Trillion Yuan)	Share of total	Value (Trillion Yuan)	Share of total	Value (Trillion Yuan)	Value (Trillion Yuan)	Share of total	Value (Trillion Yuan)	Share of total
2000	0,14	0,01	9,05%	0,13	90,95%	0,37	0,07	20,05%	0,29	79,95%
2001	0,16	0,01	8,67%	0,14	91,33%	0,40	0,09	21,81%	0,31	78,19%
2002	0,18	0,02	8,62%	0,16	91,38%	0,45	0,10	21,47%	0,35	78,53%
2003	0,20	0,02	10,91%	0,18	89,09%	0,55	0,12	21,67%	0,43	78,33%
2004	0,26	0,03	11,35%	0,23	88,65%	0,69	0,15	21,82%	0,54	78,18%
2005	0,30	0,03	10,91%	0,27	89,09%	0,85	0,18	21,26%	0,67	78,74%
2006	0,37	0,05	12,75%	0,33	87,25%	1,07	0,24	22,06%	0,83	77,94%
2007	0,48	0,07	13,70%	0,41	86,30%	1,37	0,30	22,10%	1,06	77,90%
2008	0,63	0,09	14,10%	0,54	85,90%	1,77	0,39	22,14%	1,38	77,86%
2009	0,90	0,12	12,93%	0,78	87,07%	1,75	0,40	23,06%	1,35	76,94%
2010	1,12	0,15	13,31%	0,97	86,69%	2,25	0,51	22,79%	1,74	77,21%
2011	1,27	0,17	13,14%	1,10	86,86%	2,63	0,57	21,58%	2,06	78,42%
2012	1,45	0,19	13,38%	1,25	86,62%	2,96	0,62	20,97%	2,34	79,03%

Besides the rise of tax income from principal business, a rise can also be seen in the added tax value. The added tax value represents the taxes which are supposed to be paid or have been paid to the Chinese government by firms which engaged in selling goods or providing services that bring added value to the goods. Processing, repairing, fitting and other activities are examples of these services (China Statistics Bureau, 2013). So besides adding value through their own principal business, FIE's generate income for the Chinese government by doing business with domestic enterprises which again contributes to the economy of China. The added tax value has grown almost by tenfold over the 2000-2012 period. Added tax value for non-FIE sees a similar increase. However, their share of total industrial added tax value shows a decline the last few years, less and less of this income is originating from FIE's.

3. Research question

Throughout this section the main research question is constructed and is eventually formulated. Besides this, emphasis is put on the contribution of the thesis and the problems of endogeneity and causality are addressed.

3.1. Research question

Whally & Xin (2010) also observe the large growth China experienced and the influence FDI has had, however, they wonder if this phenomenal growth is sustainable. They look at the effects of FDI compared to domestic investments and claim that FDI are responsible for more than 40% of the economic growth in 2003 and 2004 in China. From their results it is suggested that the sustainability is questionable if future FDI are not properly channeled and assisted. A report published by PricewaterhouseCoopers (PwC) (2011) discusses China's five-year-plan and states that the Chinese policy concerning foreign capital is changing and is becoming less aggressive compared to previous decades and more focused on the domestic market. It is possible that this will affect the economic growth of China.

Continuing on this path of reasoning it is possible for China to lose its impressive growth rate which than could change its position in the world economy. Xing (2010) strictly describes the development of FDI and its effects on China and the world economy until 2008 and brings up the possibility of China losing its exceptionally high growth rates due to the economic and social development the country is experiencing like the gradual increase of Chinese labour costs. This scenario can be supported by Li & Liu (2005)as they claim that the effect of FDI on economic growth is different for a developed than for a developing country. The more a country transitions from a developing country to a developed country could therefore impact the relation.

Looking at the current state of the literature it can be stated that researchers have been trying to explain and provide proof for the relationship between

economic growth and FDI and have found evidence that FDI positively affected economic growth in China in the past. For China it is now possible to look at, and empirically test, the relation between FDI and economic growth after its further development during the last 10 years, after the financial crisis and its continuously changing policy. These developments could, as suggested by Xing (2010) and Whally & Xin (2010), affect the outcome of the relation between FDI and economic growth. This research intends to investigate the influence of FDI on the economic growth of China these last several years. Therefore the main research question is stated as:

"How does FDI influence the economic growth in the country of China?"

Considering the size of the Chinese economy, the fact that it plays an influential and noteworthy role in the world economy and the significant effects FDI have had on the country in the past emphasizes the relevance of this topic. This research will further contribute to already existing literature on the relationship between FDI and economic growth and can have practical implications for possible, private as well as public, investors in China. It also tries to clarify whether or not the Chinese economy keep seeing such impressive growth as it has done in the past. In this way it can objectively be used to evaluate future expected growth rate for the Chinese economy and support or deconstruct critique and doubts that have been made public about the Chinese prospects.

3.2. Causality & endogeneity

It should be noted that the research topic which is stated in the section above could be subject to problems of endogeneity and causality. The following reasoning is common when discussing the problem of causality. FDI is suggested to have a positive effect on economic growth which leads to an increase in the size of the domestic economy. This in turn attracts even more FDI because other countries, corporations or smaller firms see more profitable possibilities in the host-country. So FDI could make economic growth increase but growth in the latter may also lead to growth in the former (Shujie, 2006). The possibility of this

two-way causality is often explained by standard economic theory by referring to “cumulative causation”, meaning that each change in an economy could cause a chain reaction of other alterations in the economy which in turn cause other things to alter (Tekin, 2012).

Numerous econometric analyses have focussed on the causality relation between the independent and dependent variables of FDI and economic growth. Most of the empirical results that covered this topic support the causal relation that FDI can promote economic growth. It has been suggested that other factors are important for the attraction of FDI (Shujie, 2006). Amongst these factors are for example; location, labour costs and market size. Similar factors have been found in cases for India, Turkey and the US.

Just as in China, Turkey knows regional inequality in the distribution of FDI. The flows here are also drawn to specific regions with certain regional determinants such as coastal regions and large agglomerations (Deichmann, Karidis, & Sayek, 2003). In the case of India it is said that the market size and labour costs are determinants for the attraction of FDI (Chakraborty & Basu, 2002). For the US these determinants have been researched from another perspective, the FDI outflow side. The outflow and destination of US FDI has been researched and it is found that FDI flows to similar regions with these determinants which have been mentioned above (Filippaios, Papanastassiou, & Pearce, 2003).

Besides the discussion about causality the issue of endogeneity is also a persistent one. The specific relation between FDI and the economic growth rate could find its origin in an endogenous determination of FDI. This means that the variable FDI could possibly be affected by something that is also determining the economic growth rate in the regions of China. There is a possibility variables have been omitted which affect both the main independent variable and the dependent variable. One of the solutions that is used to correct for endogeneity is to use a variable that is highly correlated with the main independent variable FDI but not with the error term in the regression that is used to answer the research question. This is an instrumental variable technique. Variables that are

suggested to control for endogeneity are for example a log value of GDP, the lagged value of FDI or regional dummies but many researchers have trouble finding a correct and usable variable which is a suitable proxy for the unobserved and claim that there are no ideal instruments available (Borensztein, De Gregorio, & Lee, 1998).

Researchers also try to correct for this by adapting the research model they are using. One of the models which is used to correct for the problem is called the "simultaneous equation system" and tries to run regressions for both the dependent variable economic growth rate and its main independent variable FDI, both with corresponding variables which match each dependent variable and try to explain them. But with this system it is again hard to find the ideal instruments (variables) that could explain each dependent variable. (Shujie, 2006) (Li & Liu, 2005).

It can be observed in the literature used for this thesis that many researchers acknowledge the problem of endogeneity but neglect correcting for it because of the difficulties this causes and that the ones who try to correct for it are having great trouble finding the correct instruments (Li & Liu, 2005). Therefore, for this research the problem of endogeneity will be acknowledged but not corrected for. This means that the model that will be used to answer the research question can be subject to endogeneity which causes the variables that are used in the regression to possibly be biased.

4. Methodology

In this section the research methodology to perform the empirical analysis will be explained. The main regression will be discussed and decomposed. Each variable will be clarified and assumptions will be made about their effect in the regression as a whole.

4.1. The model

An aggregate production function is used to estimate the effect FDI has on economic growth. To answer the research question a derivative of the Solow growth framework of an aggregate production function is used as a theoretical basis. This adaptation allows the data to be tested for the impact of FDI and other variables, which are suggested by scientific literature, on economic performance. The growth framework is used in multiple publications such as Borensztein, De Gregorio, & Lee (1998), Zhang, (2001), Li & liu (2005) and Whalley & Xin (2010). The adaptation allows the growth in an economy to be determined by a number of different variables. The regression function in this research is derived from the model that is used in Zhang (2001) and is stated as:

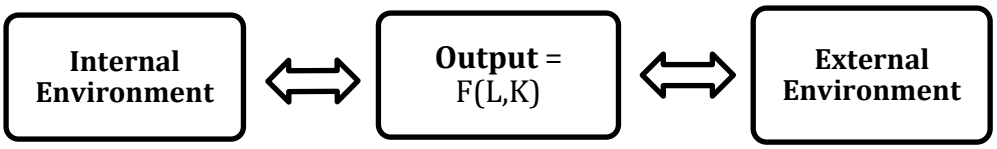
$$Y_{it} = A_{it} L_{it}^{\beta_1} K_{it}^{\beta_2}, \qquad A_{it} = B_{it}\left[1 + \theta_0 \left(\frac{F}{Y}\right)_{it} + \theta_1 H_{it} \left(\frac{F}{Y}\right)_{it}\right] F_{it}^{\alpha}$$

The model is specified as follows: Y = GDP, A = total factor productivity level, L = a proxy for labour input (labour productivity), K = the stock of domestic capital, F = stock of FDI and H = the level of human capital. This combination allows the total factor productivity to be determined by the share of FDI in GDP and FDI itself. All variables are per province i and per time period t.

The basic Cobb-Douglas function implies that the growth in GDP should depend on the growth of L and K given the size of their individual input elasticities β_1 and β_2. It is possible to further expand the model by including other variables that may have an effect on Y. This means that the multiplier A does not have to

be constant and can be expanded with other input variables in the framework that is present here. The combination of these variables form different groups, one is the internal production environment (L and K) and and the other is the external environment (A) (Shujie, 2006). These two groups affect the efficiency of the process. This process is illustrated in Figure 1.

Figure 1, Visual representation of the model



The internal environment of the process contains the variables that are domestically endogenous whereas a variable in the external environment are exogenously influenced. The main focus of the research will lie on the external environment, which entails the variable FDI, and its effects on the output (economic growth). All of the FDI related variables are therefore the main variables while the rest functions as control variables.

The initial level of development and human capital are added as possible determinants for growth. Per capita GDP proxies for the initial level of development and is predicted to have a negative effect on economic growth. Research has been found to support that countries, which start further away from their "steady state", will see larger growth. Developed countries, in comparison with developing countries, will therefore see less economic growth because they will already have reached this state and have less catching up to do (Barro, Mankiw, & Sala-i-Martin, 1995). Besides the addition of human capital as a variable on its own, an interaction term of the variable with FDI is also incorporated. Other scientific literature has suggested that externalities, which originate from FDI, can only be used optimally when there is a sufficient level of human capital. A sufficient level of human capital makes sure FDI can contribute to economic growth by providing adequate absorptive capabilities to learn from foreign technologies accessible in the domestic economy (Borensztein, De Gregorio, & Lee, 1998).

$$\dot{Y} = \beta_0 + \beta_1 \dot{L} + \beta_2 \left(\frac{I}{Y}\right) + \beta_3 \left(\frac{I_F}{Y}\right) + \beta_4 \Delta \left(\frac{F}{Y}\right) + \beta_5 y_0 + \beta_6 H + \beta_7 H \cdot \Delta \left(\frac{F}{Y}\right) + D + \varepsilon$$

The latter equation comprises the basis for the panel analysis of the affect FDI has on the economic growth in China at a provincial level for the period 2001-2012. The variables that have a dot over them indicate the rate of growth of the specific variable. I and I_F now symbolize the domestic investment and flows of FDI. β_0 represents the constant term, β_1 the output elasticity of labour, β_2 and β_3 are the marginal product of domestic investment and FDI (in that corresponding order). The coefficient β_3 captures the influence of externalities of FDI. All of the previous coefficients are expected to be positive. β_4 reflects the superior productivity of foreign-invested enterprises and is expected to be negative. β_5 captures the effect of the initial development level, here y_0 is equal to the per capita GDP, this coefficient is expected to be negative. β_6 and β_7 will represent the influence of the level of human capital and its interaction term with the change in the ratio FDI stock to GDP and are expected to be positive. Because of the regional differences in receiving FDI a regional dummy (D) is added to control and capture these differences, this can control for policy-induced effects that create economic growth. This coefficient is expected to be positive. The parameters of the regression will tell how each individual independent variable and other control variable affect the dependent variable. Li & Liu (2005), Shujie (2006) and Mah (2010) use a similar regression to estimate the relationship between FDI and economic growth.

The main hypothesis is that the independent variable "FDI" will have a positive, and significant, effect on the dependent variable "economic growth" which, would represent the importance of FDI in the Chinese economy, but that the variable $\Delta \left(\frac{F}{Y}\right)$: superiority of foreign-invested enterprises, will have a negative and significant relation with economic growth.

5. Data

In this section each variable that is in the regression will be described, how it is calculated in order to be used in the regression in the first part and in the second part it is explained how the dataset was made and what each variable comprises of in the used database.

5.1. Regression variables

The real GDP growth rate is taken as a proxy for the variable $\dot{Y}$, and is calculated by correcting the regional nominal GDP with the corresponding consumer price index (CPI) for that year. The growth rate of population per province is used for the variable $\dot{L}$ and is calculated with the following formula: $\frac{Population_{i,t+1} - Population_{i,t}}{Population_{i,t}}$ with i being the specific region and t being the specific year. The variable $\left(\frac{I}{Y}\right)$ now represents the domestic investment-output ratio. This ratio is calculated by dividing the nominal gross fixed capital formation by the nominal GDP. The same goes for the FDI-output ratio $\left(\frac{I_F}{Y}\right)$ it divides the proxy for FDI, flow of investment received by FIE's from foreign partners, by the nominal GDP, which is converted into USD for this variable by using the history of exchange rates provided by statistical yearbooks. Both of these ratio variables are per region. The variable $\Delta\left(\frac{F}{Y}\right)$, which represents the changes in the ratio of FDI to GDP, is computed in the following way. First, the data on the proxy for FDI is obtained by accumulating it over the period that is researched. After this the ratio is computed by dividing the stock of FDI by GDP and then the differences of the ratio is taken. y_0 represents the per capita real GDP level and proxies for the initial level of economic development per region. This variable is fixed at the beginning of each period at the years 2000, 2004 and 2008. H stands for the level of Human Capital in a region and is measured by computing a ratio by dividing the amount of secondary school enrolments per region by the amount that is present in the total population. The variable $H\Delta\left(\frac{F}{Y}\right)$ is the interaction term of the two Human Capital variables and changes in the ratio of FDI to GDP. The last

variable is the regional dummy *D*. This will take the value of one if the specific region is located is a coastal one, and will take the value of zero for non-coastal regions.

5.2. Variables from the database

All of the data which is region specific is provided by the statistical bureaus of these regions and combined by the National Bureau of Statistics of China (NBSC). The data is collected for the 31 regions in China for the period 2000-2012. It has to be noted that the Chinese government has received some critique on the reliability of the statistics it publishes. Accusations of major exaggerations have been made about the authenticity of the figures Chinese governmental instances make public (Rawski, 2001). Unfortunately due to limited availability of specific Chinese statistics it is required to rely on the figures and statistics the Chinese government publishes and make use of the NBSC. The data for each variable has been extracted from multiple statistical yearbooks that have been published over the period of 2001-2012. Each of these variables provided data on a regional level and on a yearly bases. These were combined in order to obtain a panel data set in order to statistically analyse the variables.

In the Chinese statistical yearbooks Gross Domestic Product (GDP) is referred to as "the final products at market prices produced by all resident units in a country during a certain period of time" (China Statistics Bureau, 2013). This statistic is denoted in different perspectives, income, products and value respectively, and is also calculated from these three different approaches to reflect its formation from different angles. For this research GDP from a value perspective is chosen. From this perspective GDP is calculated as "the balance of total value of all goods and services produced by all resident units during a certain period of time, minus the total value of input of goods and services of the nature of non-fixed assets" and is denoted in 100 million Yuan (China Statistics Bureau, 2013). This definition is simply put equivalent to the total value-added of all the resident units. This data is also used for the per capita GDP level and comprises of the

regional GDP and the population per region in order to calculate the per capita GDP level.

The Consumer Price Indices are obtained by the Chinese government through a combination of surveys of key units and other sample surveys. These indices show the degree of change and the trend/development in prices of consumer goods and services that are purchased by as well as urban as rural households over a specific time period. These statistics enable different kinds of analysis and observation of the impact changes in prices has (China Statistics Bureau, 2013).

Population per region refers to the total number of people which reside in the specific time period in the specific region (China Statistics Bureau, 2013). These numbers are obtained via surveys and are therefore an estimation made by the Chinese government which leads the numbers to be rounded. Although this does not give an exact number it is specific enough to see regional differences and to provide the dataset with growth rates with multiple decimals.

Data on Gross Fixed Capital Formation refers to "the value of acquisitions less the disposals of fixed assets during a given period" and is denoted in 100 million Yuan (China Statistics Bureau, 2013). These fixed assets are defined as the assets which are produced through certain production activities with a unit value above a specific amount. The assets are supposed to be useable for more than one year and can be categorized into total intangible and total tangible fixed capital formation (China Statistics Bureau, 2013).

The level of capital which is invested by foreign investors in FIE's is used as the proxy for FDI and is denoted in 100 million USD. The Chinese government registers which companies, or any other sort of entity, receives foreign investments and names these FIE's. It is recorded how much such an enterprise receives and is shown in an accumulated form in the database. To get the yearly flow of foreign investments the difference between the value of the stock at beginning of the year and year-end is taken.

The amount of school enrolments measures the level of human capital and is allocated over two parts: enrolments for senior secondary school and higher education (college/university). These statistics are also created by sample surveys in each region and give insight in the level of education of the nation (China Statistics Bureau, 2013). This statistic has a different sampling fraction each year which is often around 1% and is also shown as amount of students per 100.000 citizens. Both the statistics for secondary school and higher education are corrected for these things in order to obtain the estimation of students per region.

6. Main results

In this section the dataset, which was manually created by combining all the yearly data from the Chinese regions, is statistically examined by applying the model that was stated in the methodology section above. The results from that regression are represented in a table and will be discussed and linked to the theory that has been covered. In this manner each variable will be discussed individually.

6.1. Regression results

The regression that is stated in the methodology section is the base for the statistical analysis of the panel data that has been gathered for the time period 2001 until 2012. Multiple variations of this equation have been generated to see what happens when more variables are added. The outcome of the statistical analysis can be seen in the table below, Table 5.

This table contains the regressions of the independent variables on the real GDP growth rate and shows this regression in four different variations. The first row represents the regression without any of the FDI related variables. The further one goes to the right the more FDI related variables are added in order to see how the model is affected. The fourth regression is the final outcome of the statistical analysis and shows the results from the equation on which the research is based on. Recalling that the research question of this thesis is focused on the effect of FDI on the growth in the Chinese economy makes the FDI-related variables the main variables to focus on.

Table 5, Regression results from the panel data, dependent variable: growth rate real GDP

Independent variables	2001-2012							
	Coefficients	*t*-statistics	Coefficients	*t*-statistics	Coefficients	*t*-statistics	Coefficients	*t*-statistics
$\dot{L}$	0,1150	0,55	0,1170	0,56	0,0342	0,17	0,0426	0,21
$\frac{I}{Y}$	0,0512 **	2,26	0,0495 **	2,19	0,0211	0,92	0,0229	0,99
y_0	-7,2E-07	-0,84	-1,10E-06	-1,25	-2,63E-06 **	-2,83	-2,81E-06 **	-2,83
$H_{secondary}$	-0,2660	-0,75	-0,2921	-0,83	-0,3568	-1,04	-0,4080	-1,15
$H_{College/university}$	0,2210	0,54	0,2232	0,54	0,0569	0,14	0,0980	0,24
D	-0,0014	-0,17	-0,0005	-0,06	0,0039	0,49	0,0038	0,48
$\frac{I_F}{Y}$			0,0931 **	1,89	0,7510 *	4,65	0,7715 *	4,58
$\Delta\left(\frac{F}{Y}\right)$					-0,6534 *	-4,26	-0,7153 *	-4,32
$H_{secondary} \cdot \Delta\left(\frac{F}{Y}\right)$							3,5453	0,31
$H_{College/university} \cdot \Delta\left(\frac{F}{Y}\right)$							0,6303	0,06
Adjusted R-squared	0,0164		0,0233		0,0673		0,0651	
F-statistic	2,03		2,26		4,35		3,58	
Observations	372		372		372		372	

* = level of significance at 1%, ** = level of significance at 5%, *** = level of significance at 10%

The first variable is $\dot{L}$ and represents the output elasticity of labour and is expected to be positive (+). A larger growth rate in the population would mean a larger part of the population is ready to join the working population of a region. This larger accessibility should result in more economic growth. In the table all of the coefficients are positive as in accordance with the theory which suggests a positive relation between the labour input of a region and its economic growth (Li & Liu, 2005). However in all of the four cases none of the coefficients have been found to be statistically significant. Looking at the main regression it can therefore be said that the results suggest a positive relation however no statistically significant proof has been found in the data.

The second variable is $\left(\frac{I}{Y}\right)$ and represents the domestic investment-output ratio and is expected to be positive (+). For example, the more capital is available in a

region the easier it should be to finance enterprises and/or projects which in return should result in larger economic growth. All of the coefficients for this variable suggest such a positive relation between the domestic investment-output ratio and economic growth (Zhang, 2001). For the first two regressions the coefficients are statistically significant at the 5% level however the variable loses this significance the more FDI related variables are added. Looking at the main regression it can be said that the results suggest a positive relation however no statistically significant proof for this relation has been found in the data.

The third variable is y_0 and represents the initial level of economic development, is fixed over the entire period and is expected to be negative (–). From the theory it is stated that an economy with a lower initial level of economic development can see more growth than an economy with a higher initial level of economic development because of the so-called "steady states" economies are suggested to reach, these lower initial levels are economies that therefore have a larger growth opportunity, thus the negative relation (Barro, Mankiw, & Sala-i-Martin, 1995). For all the variations the coefficients show a negative relation with relation to economic growth which is in accordance with the theory. In the first two regressions the coefficient is not significant in the last two however the coefficient is significant at the 5% level. Looking at the main regression it can be said that the results suggest a negative relation, in accordance with the theory, which is found to be statistically significant.

The fourth variable is H and represents the level of Human capital and is expected to be positive (+). It is expected that a more educated population can contribute more to an economy which should cause larger economic growth, through for example knowledge and know-how (Borensztein, De Gregorio, & Lee, 1998). Both of the proxies, level of secondary school enrolments and level higher education enrolments, are added to the model to look at this affect. However, the variable $H_{secondary}$ shows a negative relation across all of the four variations and the variable $H_{college/university}$ shows a positive relation across all of the four variations. These two seem to contradict each other in comparison

with the theory but both of them are insignificant. This insignificance could be interpreted as such that the relation that is predicted by the theory is inconclusive in the panel data when the contradiction is also taken into account.

The fifth variable is the dummy *D* and states whether or not a region is located near the coast and is expected to be positive (+). Due to the regional inequality, which is present in China, flows of FDI have been found to go to specific regions near the coast. These regions seem to have attractive characteristics which draw the flows there. This in turn should create more capital availability and let the region profit from the externalities of FDI (Wei, Yao, & Liu, 2007). In the first two regressions the coefficients of the variable show a negative relation. But in the third and the main regression the variable shows a positive relation. In all the four cases the variable is insignificant. Looking at the main regression it can be said that the results suggest a positive relation but no statistically significant proof has been found.

The sixth variable is $\left(\frac{I_F}{Y}\right)$ and represents the FDI output ratio and captures the influence of FDI and its externalities and is expected to be positive (+). From the theory it is stated that FDI increases capital availability and comes with externalities which are profitable for an economy and should cause more economic growth (Zhang, 2001). In all of the three cases the coefficient of the variable is positive. In the second regression the coefficient is found to be statistically significant at the 5% level and for the third and the main regression the coefficient is found to be statistically significant at the 1% significance level. Looking at the main regression it can be said that the results suggest a positive relation between the flow of FDI and its externalities and economic growth, which is in accordance with the theory. This relation is found to be statistically significant. Also when comparing the coefficients of $\left(\frac{I}{Y}\right)$ and $\left(\frac{I_F}{Y}\right)$ it can be seen that the coefficient of $\left(\frac{I_F}{Y}\right)$ is numerically larger than that of $\left(\frac{I}{Y}\right)$. This suggests that FDI is playing a large role in the economic growth of China in comparison with the domestic investments.

The seventh variable is $\Delta\left(\frac{F}{Y}\right)$ and is equal to the changes in the ratio of FDI to GDP and represent the superior productivity of Foreign invested firms and is expected to be negative (-). The literature that has been reviewed sees the productivity of FIE's as superior which should suggest a positive relation (Zhang, 2001). However, when taking into account the statistics which have been presented in the theory section another view comes to mind. Under the assumption that these statistics could be interpreted as such that FIE's are no longer superior in that sense, an expectation of a negative relation has been established (Whalley & Xin, 2010). In all of the cases the coefficient of the variable shows a negative relation. In the third and in the main regression the coefficient is statistically significant at the 1% level. Looking at the main regression it can be said that the results suggest a negative relation in accordance with the main hypothesis and this relation is found to be statistically significant.

The eighth and ninth variable are $H_{secondary} \cdot \Delta\left(\frac{F}{Y}\right)$ and $H_{College/university} \cdot \Delta\left(\frac{F}{Y}\right)$ and represent the interaction between FDI and Human capital (secondary school, college/university) and are expected to be positive (+). One of the externalities of FDI is that it brings advanced technology to an economy. The theory suggests that this technology requires a sufficient level of human capital in order to use or implement such technology. An economy which has this sufficient level and receives flows of FDI should therefore see more economic growth (Borensztein, De Gregorio, & Lee, 1998). Both of the variables are only present in the main regression and show a positive relation as in accordance with the theory. The main regression results therefore suggest a positive relation but no statistically significant proof has been found for this relation. Looking back at the fact that the relation between Human capital and economic growth seemed to be inconclusive, it could be stated that when taking into account the interaction variables the suggestion of a positive relation between Human capital and economic growth is predominant but no statistically significant proof has been found for this suggestion.

Besides the individual characteristics of all the variables the results show an increasing adjusted R-squared, with a decrease for the final regression which is likely due to a penalty that is given because of the repeated use of some of the variables. Also the first regression shows a joint significance at the 10% level, the second regression shows a joint significance at the 5% level and both of the last two regressions are jointly significant at the 1% level. The amount of observations is the same for each variation of the regression. When controlled for robustness all the results show a similar direction and significance.

In conclusion, the statistical analysis of the Chinese regional data for the period 2001-2012 seems to support the hypothesis which was stated in order to answer the research question. The relation between FDI and the economic growth in China seems to be positive. FDI plays a large role in the economic growth in comparison with the domestic investments as was suggested by the reviewed literature. However, when looking at the supposed superiority of FIE's a contradiction with the theory was found. The variable showed a negative relation which shows no sign of superiority of the FIE's. This result could feed the doubt that was made public about the economic growth of China and its sustainability. FDI can thus still be seen as a significant power in the economic growth of China but that the concerns and doubts about maintaining this growth seem realistic and should be a matter of concern looking at the relatively large influence FDI has on the economic growth in comparison with domestic investments.

7. Conclusion

This thesis has studies the relation between FDI and economic growth in China on a regional level for the period 2001-2012. The relation is studied by reviewing literature and by creating a panel data set which is used for statistical analysis. In order to analyze this data a growth model is developed which made use of the theories which were explored and which is based on other scientific literature that uses similar models.

From the theory and scientific literature which were reviewed and consulted, a positive relation is suggested between FDI and economic growth. Several figures and statistics that were obtained for this research support this suggestion but also show that the period that is researched displays differences with statistics and figures that have been evaluated in earlier scientific literature. From the start of the financial crisis change has set in and the relation between FDI and economic growth starts to show less intensity in comparison with what is suggested by the scientific literature.

To further analyze the relation statistical analysis is used to clarify the relation for the period of 2001-2012. By acknowledging the problems of data reliability, endogeneity and causality careful interpretation of the results is made possible. The model contains several control and main variables. All of the FDI related variables in relation to economic growth are seen as the main variables. The regional inequality has been suggested to be present through a positive relation between the region dummy and economic growth, however, no statistically significant proof for it has been found. Also when looking at the interaction between FDI and human capital a positive relation is suggested. Unfortunately, no statistically significant proof was found for this.

The results that are obtained suggest a positive relation between FDI and economic growth and this relation is found to be statistically significant. When carefully interpreted it can be stated that FDI is a large contributor to economic growth relative to the contribution of domestic investments. When linked to the

theory FDI causes economic growth through the physical flow of FDI and the effects of its externalities. However, when looking at the supposed superiority of FIE's a contradiction with the scientific literature is found. This relation is no longer found and now appears to be negative and statistically significant. When referring back to the statistics and figures that were obtained for this research a similar trend can be interpreted. The superiority of FIE's is possibly no longer present which supports the concerns about the sustainability of the large Chinese economic growth.

8. Discussion

When reviewing this research it should be noted that the problems of data reliability and availability and endogeneity are very important. The fact that the only supplier of data is the Chinese government who has been accused of altering these for their own benefit is a point of concern. An objective supplier of such statistics and data would be preferred and would greatly increase the reliability and availability of such data. Such an instance with such detailed regional statistics about China does not exist as far as is known to this research. If such an instance would come to exist it would be preferred over the NBSC. Besides this, it should also be noted that this research does not claim to be complete in any aspect whatsoever. Other factors that could influence the economic growth of China, FDI and the relation between the two may exist.

However, if the results are assumed to be unbiased it can be stated that FDI is still an important factor in the economic growth of China but that the negative relation for the superiority of FIE's supports the concern of the sustainability of the large economic growth China has known in the past. For example, if these FIE's are supposedly less efficient they will contribute less to the economic growth of the country, direct or indirectly. Future growth expectations which have been based on old data from the Chinese economy should therefore be adjusted downwards. Any stakeholder who has an interest in the Chinese economy should be aware of this point of concern. Keeping in mind that these statements are based on assumptions of the results being unbiased a suggestion for future research would be to keep track of this relation. By doing so this will further contribute to the overall scientific literature about FDI and economic growth and it could also contribute to evaluation of the Chinese economy which would benefit stakeholders with certain interests in the Chinese economy.

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