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The day-of-the-week Effect in the Australian Stock Market: An Empirical Note on the Market, Industry and Small Cap Effects

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Abstract

This note examines the day-of-the-week effect in Australian daily stock returns at the market and industry levels and for small capitalization stocks from Monday 9 September 1996 to Friday 10 November 2006. A regression-based approach is employed. The results indicate that while the Australian market overall provides no evidence of daily seasonality, there is evidence of a small cap day-of-the-week effect with systematically higher returns on Thursdays and Fridays. The analysis of the sub-market returns is also partly supportive of day-of-the-week effects in the banking, diversified financial, energy, healthcare, insurance, materials and retail industries. However, these rarely coincide with the lower Monday or lower Tuesday returns typified in earlier work.

Keywords: Calendar effects, Market anomalies, Market efficiency

1. Introduction

A consistent theme in the market efficiency literature has concerned the presence of calendar anomalies or seasonality in stock market returns. If, and as hypothesised, readily identifiable seasonal patterns occur there are, amongst other things, the possibility of abnormal returns through market timing strategies. Within this burgeoning and widely-spread literature, one of the more well-known calendar anomalies comprises the day-of-the-week effect, where returns on some trading days are higher than others.

A number of hypotheses have been put forward to explain the presence of this seasonality: namely, an information release hypothesis, whereby firms delay the release of negative information until late in the week, a settlement regime hypothesis, associated with differences in the timing of transactions and settlement, and an information processing hypothesis linked with the asymmetry in information costs across small and large investors [see, for example, Keim and Stambaugh (1984), Thaler (1987), Rystrom and Bensen (1989), Chang *et al*. (1993; 1998), Abraham and Ikenberry (1994), Agarwal and Ikenberry (1994), Arsad and Coutts (1997), Wang et al. (1997) and Keef and Roush (2005) Chang *et al*. (1993)].

The most commonly reported empirical finding in this literature is significantly lower (if not negative) Monday returns. Interestingly, this effect is rarely consistent in all market contexts, with Jaffe and Westerfield (1985), Finn *et al*. (1991), Easton and Faff (1994), Agrawal and Tandon (1994) and Davidson and Faff (1999) finding a significantly negative Tuesday effect in Australian stock returns, and Jaffe and Westerfield (1985) proposing a linkage between Tuesdays in the Asia-Pacific and the (negative) Monday effect in the US. At the same time, some recent studies have shown a decline in the Monday effect in the US (Chen and Singal 2003; Marquering *et al*. 2006), especially in stocks with actively traded options.

The purpose of this note is to re-examine the day-of-the-week effect in the Australian stock market. While it resembles previous research in this context, it complements existing work by including marketwide, industry and small cap returns, thereby providing a more detailed understanding of the day-of-the-week effect in all its

manifestations. The remainder of the paper is divided into four main areas. Section 2 provides a description of the data employed in the analysis. Section 3 discusses the empirical methodology used. The results are dealt with in Section 4. The paper ends with a brief conclusion in Section 5.

2. Description and properties of the data

Twelve different stock indices are used to test for the day-of-the-week effect in the Australian stock market. Each index series runs from 9 September 1996 to 10 November 2006 providing 2,635 end-of-day observations on the Australian Stock Exchange (ASX). Unfortunately, the sample period is the longest period over which daily prices are available for all twelve series. This is because the ASX, in association with Standard and Poor's (S&P), only introduced new indices based upon the Global Industry Classification Standard (GICS) in April 2000. While the daily price series for the market as a whole spans this change in classification, only a small number of sub-market series have been created by Global Financial Data (2006) using the post-April 2000 ASX/S&P series and the earlier ASX series. All data is sourced from Global Financial Data (2006).

To start with, the capitalisation-weighted All Ordinaries index is used to measure marketwide returns. Currently, the index includes the top ASX-listed stocks by capitalization, covering about 92 percent of domestic companies by market value. To be included in the index stocks must have an aggregate market value of at least 0.02 percent of all domestic equities, and maintain an average turnover in excess of 0.5 percent of quoted shares each month. Following this, the Small Ordinaries index is used to measure the returns on small capitalisation stocks. This index is composed of companies included in the S&P/ASX300 (top-three hundred companies by capitalisation), but not in the S&P/ASX100 (top-one hundred companies by capitalisation), and covers approximately 7 percent of the ASX. Because the Small Ordinaries index does not contain any of the hundred largest stocks it is regarded as a better proxy for small firms.

Finally, ten ASX/S&P industry indices are used to measure returns in different industries. The industries selected are banking, diversified financials, energy, healthcare, insurance, materials, media, retailing, telecommunications and transportation. Each index consists of fifty stocks in business areas within the industry. First, the banking, diversified financials and insurance indices contain companies involved in activities such as banking, mortgage finance, consumer finance, specialized finance, investment banking and brokerage, asset management and custody, corporate lending, insurance and financial investment and real estate. Second, the energy index comprises companies whose businesses are dominated by either of the following activities: the construction or provision of oil rigs, drilling equipment and other energy related service and equipment, including seismic data collection; or, companies engaged in the exploration, production, marketing, refining and/or transportation of oil and gas products, coal and other consumable fuels.

Third, the healthcare index encompasses two main industry groups. The first group includes companies who manufacture health care equipment and supplies or provide healthcare related services, and owners and operators of healthcare products, providers of basic healthcare services, and owners and operators of healthcare facilities and organizations. The second group includes companies primarily involved in the research, development, production and marketing of pharmaceuticals and biotechnology products. Fourth, the materials index encompasses a wide range of commodity-related manufacturing industries. Included in this index are companies that manufacture chemicals, construction materials, glass, paper, forest products and related packaging products, and metals, minerals and mining companies.

Fifth, the transport index consists of companies involved in three main groups; manufacturers, suppliers and repairers of commercial vehicles including coaches and buses, and their components; transport operators engaged in the movement of freight; and public and private operators involved in the movement of passengers. Sixth, the media index contains companies involved with communication services as well as printing and publishing. Seventh, the retail index contains companies involved with clothing and footwear, miscellaneous manufacturing and retail trade. Lastly, the telecommunications index contains companies involved in communication services, internet service providers and the manufacturing of communications equipment.

The natural log of the relative price is computed for the daily intervals to produce a time series of continuously compounded returns, such that:

$$r_t = \log\left(p_t / p_{t-1}\right) \times 100 \tag{1}$$

where p_t and p_{t-1} represent the index price at time t and t-1, respectively. Table 1 presents descriptive statistics of the daily returns. The sample and annualised means, medians, standard deviations, skewness, kurtosis and Jacque-Bera statistics are reported.

By and large, the distributional properties of the twelve return series appear non-normal. Most series, with the

exception of the healthcare and media industries, are significantly negatively skewed, indicating the greater probability of large deceases in returns than rises. The kurtosis or degree of excess, in all return series is also significantly large, thereby indicating leptokurtic distributions with many extreme observations. Finally, the calculated Jarque-Bera statistics are used to test the null hypotheses that the daily distribution of returns is normally distributed. All p-values (not shown) are smaller than the .01 level of significance suggesting the null hypothesis can be rejected. None of these return series are then well approximated by the normal distribution.

3. Empirical methodology

The approach used to test the day-of-the-week hypothesis is a regression-based approach. The day-of-the-week effect is examined on the basis of a trading time hypothesis whereby returns are created only on trading days during the week. As an alternative, Mills et al. (2000) proposed a calendar time hypothesis whereby returns are also created on non-trading days: that is, the Monday return would be expected to be some three times larger than returns on other days if the market efficiency null hypothesis holds. The following model is specified:

$$R_t = \sum_{i=1}^{5} \alpha_i W_i + \varepsilon_t \tag{2}$$

where W_i is a dummy variable taking a value of one for day i and zero otherwise where $i = 1$ (Monday), 2 (Tuesday)…5 (Friday), α are parameters to be estimated and ε is the error term. The hypothesis tested is:

$$H_0 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 \tag{3}$$

against the alternative that not all α are equal. If the null hypothesis is rejected, then the returns exhibit day-of-the-week seasonality.

4. Empirical results

The estimated coefficients and standard errors of the parameters detailed in Equation (1) are presented in Table 2. Breusch-Godfrey Lagrange multiplier and White's heteroskedasticity tests (not shown) were initially used to test for higher-order serial correlation and/or heteroskedasticity in the least squares residuals, respectively. As expected, almost all of the least squares residuals displayed some form of both heteroskedasticity and serial correlation: the energy and retail industries models displayed only heteroskedasticity. Accordingly, all standard errors and p-values in Table 2 with the exception of the energy and retail industries incorporate corrections for heteroskedasticity and autocorrelation following Newey-West. The energy and retail industries models include corrections for heteroskedasticity following White.

Consider the day-of-the-week model of returns on the All Ordinaries. While returns on Friday and Tuesday are lower in magnitude than Monday, Wednesday or Thursday, in no instance are the estimated coefficients significant. Clearly, and contrary to the results found in earlier studies, there is no evidence of a day-of-the-week effect in Australia at the market level. However, the Small Ordinaries returns model does display significant day-of-the-week seasonality; namely, significantly higher returns on Thursdays and Fridays. A small firm effect then appears to be present in the day-of-the-week effect, at least in Australia.

The results for the industry return models also illustrate the varying impact of the day-of-the-week effect in Australia. Significantly higher returns are observed on Mondays in the energy industry, on Tuesdays in the banking and diversified financials industries, on Wednesdays in the retail and banking industries, on Thursdays in the diversified financials, healthcare and insurance industries and on Fridays in the materials industry. In terms of the magnitude of returns, the Tuesday and Wednesday effects in the banking industry are the most substantial, being more than double the mean daily return over the sample period in this particular industry. There is no evidence of a day-of-the-week effect in the media, telecoms or transport industries.

In only three instances is there a significant negative day-of-the-week effect in the industry returns: Friday in the banking industry, Wednesday in the diversified financials industry and Tuesday in the healthcare industry. The mean daily return in the banking industry on any day of the week is .051 percent whereas mean returns on Fridays are -.078 percent. A possible explanation for the consistently negative Friday returns in the banking industry could be due to investor psychology whereby investors who have made high returns on bank stocks during the week may wish to close out their positions on Friday. The diversified financials index exhibits significantly negative returns on Wednesdays. The mean return for the diversified financials index on any day of the week is .312 percent whereas Wednesday returns are -.039 percent. One possible explanation may be related to the market for bank bills and treasury notes in Australia. Keef and Roush (2004), for example, have found that bank bills and treasury notes generally have higher returns on Wednesdays. As finance companies often use these instruments as a form of short-term financing, the increased returns imply increased costs to the borrower. Low returns on diversified

financial stocks may then result.

Lastly, the healthcare index displays a significantly negative Tuesday return. The mean return on the healthcare index during the sample is .0373 percent whereas returns on Tuesdays are -.031 percent. This may be related to defensive behaviour by investors. The healthcare industry has traditionally been one of the most defensive of industries (Korn 2001). Investors may purchase healthcare stocks toward the end of the week to immunise their portfolio against any negative effects over the weekend. After observing the local market and US market openings, investors then sell the defensive healthcare stocks and re-invest in riskier stocks.

5. Conclusion

This study examines the presence of the day-of-the-week effect in Australian market and industry returns over the period 1996 to 2006. In only one instance (Healthcare) are the results consistent with the typical manifestation of daily seasonality in Australian returns: a negative Monday and/or Tuesday effect (the latter conceivably corresponding to a lagged US market influence). No evidence is found of a day-of-the-week effect at the market level, though there is an indication of a positive Thursday and Friday effect in small cap returns, perhaps associated with the information processing hypothesis. At the sub-market level, day-of-the-week effects are found in the banking, diversified financials, energy, healthcare, insurance, materials and retail industries, but not in the media, telecoms and transport industries. The three most substantial day-of-the-week effects over the entire sample period at the industry level are all found in the banking industry.

The low level of observed daily seasonality implies that the Australian stock market overall is approximately weak-form efficient. A number of contributory factors are possible, including the growth in derivative markets, the increasing internationalisation and liberalisation of the domestic capital market, increased trading by institutional rather than individual investors, and the dramatic fall in transaction costs, especially those relating to brokerage, taxation and information procurement. However, day-of-the-weeks are found in small cap and some industry stocks. Since these represent unexploited profit opportunities and violations of market efficiency, interesting opportunities for research exist in terms of identifying whether market conditions such as liquidity and/or industry-specific operational factors represent the source of these anomalies.

Table 1. Selected descriptive statistics

	Sample mean	Annualised mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
All Ordinaries	0.0333	8.6798	0.0348	0.7540	-0.6586	10.9597	7200.765
Small Ordinaries	0.0160	4.0807	0.0356	0.6691	-1.6818	31.8639	115019.2
Banking	0.0510	13.5948	0.0299	0.9532	-0.2755	5.5501	745.04
Diversified financials	0.0312	8.1110	0.0304	0.9718	-0.3633	9.0491	4033.73
Insurance	0.0261	6.7417	0.0000	1.2442	-1.3052	22.1254	40876.94
Energy	0.0459	12.1563	0.0371	1.1886	-0.2947	6.5117	1391.02
Healthcare	0.0373	9.7717	0.0033	1.0889	0.1773	13.8789	12997.83
Materials	0.0263	6.7950	0.0000	1.2837	-0.1147	7.7426	2473.31
Transport	0.0427	11.2631	0.0135	1.1310	-0.3924	9.2485	4341.03
Media	0.0261	6.7417	0.0000	1.7913	0.5310	13.6408	12507.61
Retail	0.0418	11.0131	0.0067	1.0880	-0.0718	7.6393	2363.48
Telecommunications	0.0036	0.9040	0.0000	1.2738	-0.1993	11.8887	8685.34

Notes: Sample period is Monday 9 September 1996 to Friday 10 November 2006. The means and medians are expressed as percentages; All Jarque-Bera statistics for normality are significant at the .01 level; critical values for significance of skewness and kurtosis respectively at the .05 level are 0.0935 and 0.1870. The annualised mean assumes 250 trading days per year.

Table 2. Estimated coefficients and standard errors

		Monday	Tuesday	Wednesday	Thursday	Friday
All Ordinaries	Coefficient	0.0455	0.0296	0.0404	0.0469	0.0039
	Std. error	0.0327	0.0327	0.0327	0.0327	0.0327
Small Ordinaries	Coefficient	-0.0293	-0.0270	0.0134	0.0462	0.0766
	Std. error	0.0343	0.0337	0.0320	0.0283	0.0243
Banking	Coefficient	0.0404	0.1135	0.1313	0.0480	-0.0778
	Std. error	0.0416	0.0411	0.0411	0.0409	0.0415
Diversified Financials	Coefficient	-0.0215	0.0972	-0.0393	0.0739	0.0457
	Std. error	0.0466	0.0386	0.0453	0.0440	0.0406
Energy	Coefficient	0.0889	0.0095	-0.0012	0.0698	0.0626
	Std. error	0.0518	0.0518	0.0518	0.0518	0.0518
Healthcare	Coefficient	0.0033	-0.0310	0.0846	0.0815	0.0483
	Std. error	0.0420	0.0470	0.0530	0.0474	0.0462
Insurance	Coefficient	-0.0233	-0.0316	0.0707	0.0850	0.0300
	Std. error	0.0656	0.0521	0.0536	0.0482	0.0503
Materials	Coefficient	0.0763	-0.0476	-0.0535	0.0498	0.1066
	Std. error	0.0555	0.0539	0.0541	0.0578	0.0567
Media	Coefficient	0.1097	0.0008	-0.0096	0.0449	-0.0154
	Std. error	0.0770	0.0791	0.0821	0.0832	0.0737
Retail	Coefficient	0.0089	0.0634	0.0893	0.0381	0.0090
	Std. error	0.0474	0.0474	0.0474	0.0475	0.0475
Telecoms	Coefficient	0.0620	0.0327	-0.0562	-0.0279	0.0076
	Std. error	0.0615	0.0558	0.0577	0.0492	0.0484
Transport	Coefficient	0.0596	0.0421	0.0434	0.0529	0.0156
	Std. error	0.0471	0.0477	0.0492	0.0494	0.0482

Notes: Dependent variables are daily returns on the market or industry in the first column. Sample period is Monday 9 September 1996 to Friday 10 November 2006. All standard errors and p-values incorporate either White's corrections for heteroskedasticity of unknown form (energy and retail industries only) or Newey-West corrections for heteroskedasticity and autocorrelation of unknown form (all other industries and markets). Significant coefficients (*p*-value <.10) in bold.

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Problems Existing in the Development of Economy Organizations for Agriculture and Strategies to Cope with Them

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Abstract

This paper analyzes the agricultural economy organizations appeared in recent years in the industry structure of agriculture and their current conditions and functions and explores the problems existing in the development of economy organizations for agricultural cooperation, based on which the authors of this paper puts forward strategies to push the sound development of economy organizations for agricultural cooperation.

Keywords: Agriculture, Economy organizations, Problems, Strategies

In recent years, with the gradual improvement of "three agricultral problems", various types of economy organizations for cooperation well up in the rurual areas of China, which greatly pushes the development of the mangement of agricultural industrialization and the adjustment of agricultural structure, raises the organizational degree of farmers and the competition force of agrucultural products, perfects the agricultural socialized service system, enriches the meaning of rurual management structure and becomes the new way for farmers to increase incomes and for rural areas to develop economy and the creation point for agricutural management structure. But because the history of specialized economy organizations for cooperation for farmers is short, there exsit many problems in the process of development. Therefore, to correctly understand economy organizations for agriculture copperation plays significant role in futher improving the "three agricultural problems".

1. The current condition and functions of economy organizations for agricultural cooperatin

As per statistics, there are about 1,600,000 economy organizations for agricultural cooperation in rural areas of China, among which 150,000 are of certain scale and standard management covering such industries as agriculture, forestry, stockbreeding and fishery and each aspect in the productions and managements in rural areas. The service functions and types of the existing specialized economy organizations for agriculture cooperatin can be put into thres types. The first one is farmer asscociation, which is organized voluntarily by the minority specialty farmers and able persons for farmers who are engaged in the production and sale of special agricultural products to sell their products and the managment pattern is association+farmers; the second one is order agriculture,which carries out the planting and sale of ordered agricultural products and agricultural byproducts in the form of large individual sale families and sale companies and the management pattern is companies+cooperation assosications+farmers; the third one is technology service organization, which develops production bases in the areas the organizations locate through the local scientific and research companies, technology extending departments and leading companies and adds the science and tehcnology contents and values of the products via the techology service throughout the whole production process.

The current development condition of specialized economy cooperatin organizations for agriculture demeonstrates the functions of economy organizations for agricultural cooperation in pushing the development of local economy. Firstly, the estblishment and development of specialized economy cooperatin organizations for agriculture protects well the interests of farmers, which organizes farmers orginially engaged in seperated management, raises the status of farmers in market economy, and solves the problems which cannot be treated well by a signal family; secondly, the estblishment and development of specialized economy cooperatin organizations for agriculture improves the stability of the supply of raw materials for processing companies; thridly, the estblishment and development of specialized economy cooperatin organizations for agriculture further optimizes the elements of productions; fourthly, the estblishment and development of specialized economy cooperatin organizations for agriculture provides an effective road for government to regulate and control agricultural and rural economy. The establishment of these "organizations" provides reliable ground for government to exercise policy instruction and provide services.

2. Problems existing in developing the economy organizations for agricultural cooperation

Because the specialized economy organizations for agricultural cooperation are now in the primay stage, there are some problems that cannot be neglected in their development process.

2.1 The thoughts and understanding are not enough

Some officials in counties and towns lack adequate understanding of the important role and positive functions which specialized economy organizations for agricultural cooperation play in advancing the adjustment of agricultural structure and driving farmers to become rich. There exist among them the concept of emphasizing production and neglecting circulation. They do not take the development of specialized economy organizations for agricultural cooperation and the adjustment of agricultural structure as connected matters and cannot make plans with these two as a whole. Their work enthusiam and activism is not enough.

2.2 The legal status is not clear

Because there are no provisions enacted by the state and no relevant policies promulaged by local goverments, the legal status of specialized economy organizations for agricultural cooperation has not been determined. As a result, the management process of these organizations has no rules to follow. Inside these organizations, there lack standard articles of association and management systems and the cooperation among them has no effective and legal guarantee. The long-term system to offer specialized economy organizations for agricultural cooperation financial support has not been established in deed. The contradict of the hardness to get loans from banks still exists and there are many problems in the detailed taches in registration in industry and commerce administrative offices and tax adminisrative offices.

2.3 The comprehensive strength is not strong enough

The economy strength, management scale, administration level, processing ability, transportation instruments, transaction modes and the cultural makings of workers in specialized economy organizations for agricultural cooperation cannot meet and adjust to the demand of market economy, which respectively limits their development.

2.4 The connection of interests is not close enough

Most of the specialized economy organizations for agricultural cooperation have not established the relationship with farmers and companies to shoulder risks and enjoy interests together. There are no sale contracts between them. The trades are of random property, which can easily damage the interests of farmers.

3. Strategies to accelerate the development of economy organizations for agricultural cooperation

3.1 Raise the understanding and reinforce leadership

Firstly, the economy organizations for agricultural cooperation should be given emphasize from thoughts. Governments of various levels should understand and treat the significance and necessity of developing specialized economy organizations for agricultural cooperation in conformity with the "three representatives". The governments should take it as an important work to help farmers to increase work effectiveness and incomes and to maintain the stability of rural areas and an important method to advance the adjustment of agriculture structure and push the industrialized managements of agriculture. To develop specialized economy organizations for agricultural cooperation should be an important part in the work in rural areas. The directing thoughts and work aim for it should be clarified and the work for it should be enhanced. Secondly, the legal status of economy organizations for agricultural cooperation should be determined. Before the state enacts any legislation, the local governments should issue direction advice to determine and regulate the property, competent departments, registration departments, condition for registration, forms to shoulder responsibilities, guarantee of rights and interests and the distribution of profits for the economy organizations for agricultural cooperation so as to provide grounds for the organizations and enhance administration. By this way, we can avoid random actions and lead economy organizations for agricultural cooperation into a sound road for development. Thirdly, the relevant preferential policies should be put into effect. In order to help and support the sound development of specialized economy organizations for agricultural cooperation, the relevant preferential policies should be put into effect. For example, the agricultural products and primarily processed products produced by specialized economy organizations for agricultural cooperation can be exempted from value-added-tax.; the interests and bonuses and other incomes distributed by the organizations to their members can be exempted from individual income tax; the newly-established companies engaged in the processing and circulating agricultural products can be supported by way of refunding taxes; seeing that the profit rates of specialized economy organizations for agricultural cooperation are rather low and their capitals for starting business and running business are hard to obtain, so they should be supported by way of policy loans and compensation of interestes. For those organizations who are of certain scale and good management and have exerted prominent functions on the development of leading industries, within 3 years since their establishment, each of them can get

certain activity fees from local finance.

3.2 Plans should be made and emphasis should be pointed out

Firstly, the instruction depth should be deepened. Local areas shall, in accordance with the plans for the development of local agriculture and based on the reality of economy development, carefully analyze and summarize the advantages and features of the development of the local agriculture and the current conditions of the development of the specialized economy organizations for agricultural cooperation, list the emphasis for supporting and encouraging and make short term and long term plans for the development of the specialized economy organizations for agricultural cooperation. Relevant departments of various levels should use the direction functions of economy methods and policies to enhance the depth of instruction, harmonizing and service work, and summarize and extend their successful experience in specialized economy organizations for agricultural cooperation. Each area should set up their own representative modes, increase the degree of supporting, enhance the instruction for per class per tier, and exert the demonstration functions of the representative modes. Secondly, the developing emphasis should be given prominence. In recent years, among various specialized economy organizations for agricultural cooperation, the combination and cooperation organizations in circulation are active and are of strong surviving strength and great development potential, so they should be the main direction and forms in the future. The agriculture demonstration bases should be managed in the form of economy cooperation organizations in order to realize the unification of production, processing and sale. For the specialized economy organizations of basic forms and primary scales, we should give them strong supports; for the economy cooperation organizations engaged in specialized managements, we should help them to extend their business scales and to grow strong; thirdly, there should be a clear aim and we should take steps marching towards the aim. In accordance with the aim of establishing specialized economy cooperation organizations of standard system, strict administration and ordered management, when making plans for developing them, we should pay special attention to doing researches on advancing the development of specialized economy organizations for agricultural cooperation, enlarging the export of agriculture products, and finding out ways and methods for them to actively join in the international competition. In the development process, we can advance gradually. Under the existing system and the immaturity of the market, it is hard and unrealistic to reach a higher standard. Therefore, we need to activate and organize farmers. To those that are good for production and management, that are beneficial for farmers to enter into the market, that are propitious for agriculture to become more effective and for farmers to increase incomes, and that are welcomed by farmers, we should give supports. Through gradual cultivation and perfection, these organizations will ultimately become specialized economy cooperation organizations operated, managed by farmers, and beneficial for farmers.

3.3 We should bravely explore and search the development of multi-mode

While we stick to the combination of family contract management and double management system, we should actively encourage and support new ways to develop specialized economy cooperation organizations. Firstly, we should encourage farmers to cooperate in production, transportation, sale, processing and service and to voluntarily set up specialized associations, cooperation organizations. We should organize able persons, leading companies, collectively owned economy organizations in towns and villages, technology service departments, and the stated owned organizations for food and supply and sale to initiate various specialized economy cooperation organizations, which mainly are the economy organizations for the unification of production and sale and share cooperation. Secondly, based on the reform of career organs, we should encourage the personnel split from career organs and agriculture technologists to initiate various specialized economy cooperation organizations, which can specialize in production, processing or sale, or the unification of production, processing and sale, and whose contents can either be the production and management of agricultural products or be scientific service and the running of production materials. For these organizations, we should give our supports and help them become the main strength to lead farmers to enter into markets and join in market competition. Thirdly, in order to accelerate the development of specialized economy cooperation organizations, we should stick to the principle of standardizing in the process of development, developing in the process of standardization, and encouraging brave try. By this way, we can help these organizations to develop towards standardization, multi-mode, standard management, democratic policymaking, management of large scale, series service and socialized profits.

3.4 The environment shall be optimized and the system shall be perfected

Firstly, we should reinforce the construction of service system. The governments need to set up a group of markets for whole-selling agricultural products and computer information networks connecting departments of agriculture, trade and price with markets for whole-selling agriculture products. The governments should also actively explore new transaction ways such as auction, price quotation and internet balance. The necessary service facilities shall be constructed with the aim to build the markets for whole-selling agriculture products into the centers for gathering, processing and distributing agriculture products and for the formation of prices and issue of information. The

departments of agricultural economy and the departments of science and technology shall enhance their training for the administration workers in specialized economy cooperation organizations and help them improve management and administration level. These departments should explore and create conditions for specialized economy cooperation organizations through holding exhibition fairs, consulting fairs and products issuing fairs for agricultural products and the comparison and selection of famous agricultural products. The relevant standards for the quality of agricultural products shall be set down and perfected and the supervision, examination and test centers for agricultural products, livestock products and aquatic products shall be constructed so as to raise the safety degrees of agricultural products and help agriculture products to join in market competition, especially in international markets. Secondly, the interest distribution system shall be perfected. It is advisable to take steps towards this aim. With regard to the organizations newly-established and of loose cooperation relationship, on one hand, the governments can through these organizations help them by way of providing seeds and breeding stocks of good quality, fertilizers and pesticide of preferential prices, and skill instruction and training free of charge and helping farmers to transport and sell agricultural products; on the other hand, we can adopt contract system to establish stable selling and purchasing relationship between farmers and companies on stable prices or protective prices. By this way, the companies can obtain raw materials of stable quantity and quality and the interests of farmers can at the same time be protected from either the selling or the price, which is of mutual benefits. With regard to the organizations of long-term establishment and close cooperation relationship, based on the stable selling and purchasing relationship, the companies can obtain profits in processing and selling and refund part of the profits to farmers according to the amount of the sale of the products. Also, under the premise of volunteer wishing of the farmers, a reasonable land circulation and transferring system can be established. Under the forms of the cooperation between companies and specialized economy cooperation organizations or share cooperation system among farmers, the companies and farmers can jointly hold shares of lands, capital, labor and skills. By this way, a new asset relationship between the farmers and the companies linked by asset rights can be formed. They mutually depend on each other, shoulder risks and share profits.

All in all, to accelerate the development of the specialized economy cooperation organizations, which can keep the independence of farmers' properties and self-determined management forms, not only perfects the double-layer management system of the combination of unification and separation in rural areas in China, but also complies with the development trend of modern agriculture management system in the world and represents the innovation direction of basic management system for agriculture, and exerts long and strategic influence on the process of agriculture industrialization and modernization and the process for rural areas to enter into markets.

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The Study of Risk about International Oil Future Market

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Abstract

VaR is one of the best methods to measure the risk of international future markets; CVaR which is calculated by modifying VaR is a better way to measure the risk in excessive condition. There are unnumbered future markets in the world, and the risk of every sort is difference, we can calculate that the largest one is crude oil. Then we will compare its risk to its history and try to find out the trend risk changes. We find that the petroleum risk cycle more like the economy cycle of the U.S. When some famous historic affairs occur, the risk of that year is obviously larger through calculate the risk of future market. Also we can use CVaR to measure the risk when excessive incidents occur.

Keywords: VaR, Oil future market, Risk measurement

1. Introduction

Petroleum is one of essential sources of energy of human society in the nowadays, it has broad application in a lot of industry fields such as chemical industry, transportation, aerospace. In recent years, price continues going up, international petroleum price already becomes the key factor affecting world trends in economic development's with the fact that rising, oil that petroleum needs. Petroleum price fluctuation can affect to relevance industry. The quantity that a country's petroleum store is also having direct impact to country's economic security.

Exploit without the petroleum handling calling crude oil, since crude oil fluctuations in prices is acute , many countries all leads into crude oil futures to help pertinent enterprise to reduce risk. Influence is maximal be USA NYMEX crude oil futures. USA crude oil futures circumstances is already representing international crude oil price circumstances at present is becoming the undulate barometer of crude oil. Crude oil futures debuting also has double effect but , it can be that enterprise provides the implement evading oil price risk on one hand , but meanwhile enterprise event repeatedly enormous deficit happened in futures trading in crude oil judging that the fault can be used since to oil price. For calculating and managing risk effectively, need some science risk management method right away, VaR method among them is comparatively popular risk management method.

VaR method provides an indication of the possible maximum loss of a portfolio over a given time horizon at a certain confidence level (F.R. & Miao, 2005). It originates from the fundamental mean - variance model that Markowitz founds in 1952.   In 1980s, J.P. Morgan's Till Guldimann has brought forward the method with VaR management risk, but until 1994, the standardizing VaR is known to the public formally (Morgan, 1995). The Basel bank inspection committee announced 'relevant complement document being brought into marketplace risk factor in capital adequacy ratio' in April , 1995, makes the request suggesting that whose member bank takes inside VaR model as basis, calculating marketplace risk minimum capital requirement (Qin, Chen, Zou, 2005, pp. 12-16). VaR method has measured the lurking risk the portfolio formation that the risk factor affects is different. It has adapted to more and more complicated financial market trend. At present, VaR method is used already broadly cover west banking institution, has become the mainly method managing marketplace risk.

While but some exceeding risk condition such as unexpected event etc. appears, use VaR method to be able to underestimate risk sometimes. Within 'Conditional value-at-risk for general loss distributions' which written by R. Tyrrel Rockafeller and Stanislav Uryasev , the calculation principle according to VaR has brought forward one kind of new risk management method CVaR (condition value at risk) method therefore (R.T. & S., 2002, pp. 1443-1471).It is the amendment the VaR method is carried out, is to the circumstance that exceeding price changes appear on the marketplace having inherited VaR method merit, being able to handle.

Have many at present about using VaR and CVaR to make the thesis that demonstration studies, at home and abroad, major part all are that the demonstration making stock market is analytical but, the research to future market is very few. According to the impact of American crude oil futures influence and crude oil over world economy, this article uses this two kind's risk management method to measure USA crude oil futures risk, and compare it with other main future contract in international future markets, then analyst the changing of USA crude oil futures risk.

2. Mathematical formulation

Value at risk (VaR) provides an indication of the possible maximum loss of a portfolio over a given time horizon at

a certain confidence level. Use formula to express by:

$$VaR = \inf\{ f(x) \mid p(f(x)) \geq \alpha \}$$

Where $f(x)$ is the lose function of portfolio, α is the certain confidence level. VaR is a figure, it expresses lurking risk been confronted with by portfolio. At present, calculating VaR's has mainly parting for three kinds, is that Deta- stable method, history simulation method and Monte Carlo simulation method. The invention of VaR improved the ability of risk measurement; it can do best in controlling financial risk. VaR looks like being able to do nothing when coming across the exceeding marketplace scene but, having needed to use CVaR at this time.

Rockafeller and Uryasev have brought forward one kind of new risk management method CVaR (condition value at risk) method which being based on VaR in 1999. It is the amendment the VaR method is carried out, is to the circumstance that exceeding price changes appear on the marketplace having inherited VaR method merit, being able to handle. CVaR can use formula to express by:

$$CVaR = E[f(x) \mid f(x) \geq VAR]$$

We can perceive CVaR being the average value exceeding the VaR loss. That CVaR and the VaR difference are CVaR not that a dividing line, but the tail assembly loses average value, it is sufficient to the measurement that the tail assembly loses.

3. The history of oil fluctuation

First, we watch two figures underneath, Figure 1 and Figure 2 is changing of American crude oil from1920 to 2005 and from 1978 2006 respectively. We can see from them obviously that the price of oil is stable in history, but from the ending of 1970s and being close to 30 years, international crude oil price became undulating acutely.

From the beginning of 19 centuries to the ending of 1960s, nominal crude oil price fundamental between 2.50 to 3.00 U. S. dollar/ barrels between. From 1958 to 1970, oil price stabilizes basically in 3 U. S. dollar/ barrels. 1973 Arab countries perform embargo on the Western countries, this feasible crude oil price has quadrupled, exceed 12 U. S. dollar/ barrels. Then petroleum price stabilizes basically in 12 U. S. dollar to 14 U. S. dollar/ barrels between for 3 years. In September , 1980, Iraq assails Iran , the Iran-Iraq war outburst leads to petroleum output directly shrink by large margins , crude oil price walks highly from 14 U. S. dollar/ barrel single file of 1978 till 35 U. S. dollar/ barrel of 1981. Oil price continuing for goes up having stimulated the oil exploration being not the OPEC country and exploit an activity. From 1980 to 1986, be not that OPEC country daily outputs have increased by 10 million barrels. This period the whole world economy has appeared to decline, petroleum need has appeared to make fall, the supply and demand unbalance has made petroleum price also answer but fallen. To 1986, crude oil price falls till 10 U. S. dollar/ barrel following.

On January 2 , 1990 troops of Iraq assault to Kuwait , bay circumstances escalates rapidly, therefore, the situation in the Middle East tension has brought about oil price going up by large margins , has fled from 20 original U. S. dollar/ barrels till 37 U. S. dollar/ barrels since Middle East area has concentrated oil-producing the world country. American president Bush has approved "the desert shield plan" on August 7, has decided to augment forces to the bay. Check USA military strength confidence henceforth, all of the world; anticipate that the bay tension may be over very quickly, therefore, after the bay deploys troops for battle, crude oil price begins to drop to return to the original price place in October.

With USA economy recovery and the development of Asia, the economy rising rapidly, the need to petroleum urge petroleum price to begin to climb slowly. Everyday the whole world petroleum amount of consumption increases to 6,200,000 barrels from 1990 to 1997, Asia consumed increasing accounting for nearly to halves, petroleum price continue rising until 1997. But, in 1998, the Asian financial crisis outburst has drawn the rest, Asia petroleum consumption for Asia economy fleetness increases by appear first since 1982 to go steadily downhill. The low fan who consumes and OPEC output increasing by, oil price pushed immediately to abyss. Although OPEC debuts the measure restricting output, oil price can only maintain in 25 U. S. dollar/ barrel vicinity.

With USA and the world economy getting warm again after a cold spell, in 2000, crude oil price continues working till the high point during the past 1981. But, under converging attack between the weakness of USA economy and being not that the OPEC country increases the production in 2001, petroleum price begins to glide. Especially after the '9.11', oil price slumps, immediate price has dropped in the middle ten days of a month in November 35%.

But gradually with the fact that the world economy increase leading to increasing by that petroleum needs and petroleum producing country surplus producing energy in 2002, international crude oil price continues clambering rising, breaks 70 U. S. dollar/ barrels even on 2006. Since the surplus produces of OPEC states lower than 1 million

barrels/day at present, the member state supplying breaks off any OPEC may initiate the world energy crisis. The marketplace has begun to become sensitive and fragile at this time, crude oil futures fluctuation and risk have enlarged (Ma, 2005).

4. USA crude oil future market risk analysis

All above has introduced the history of international crude oil fluctuations in prices and it's cause, we want to analyst the risk of USA crude oil market from two the angle underneath: first, comparing the risk of USA crude oil future market and the risk of other main futures market, and then coming to analyst the changing of USA crude oil future market during the last few years quantitatively. The data using in this part originates from 'Energy Information Administration' and 'fuyuan' software, the data handling software are 'Matlab 7.1' and 'Eviews 5.0'.

4.1 USA crude oil comparison with other future's sort risk

This part will choose comparatively some future markets for both at home and aboard, then measuring the risk of these sorts. They are: USA crude oil, USA gold, LME copper, Shanghai copper, Shanghai fuel oil. We choose the nearest data for 1 year, make use of formula $R_t = \ln p_t - \ln p_{t-1}$ to calculate out these everyday breed earning ratio respectively, and then count the VaR and CvaR respectively (Wang, 2001).When calculating VaR and CvaR, since futures data existence 'heavy tail', it is unable to use Deta- stable method; we use the history simulation method and the Monte Carlo simulation method therefore respectively. Since future market can carry out two-way (buy and sell) trading, we count them respectively.

From the table upper we has measured the VaR and CVaR of some main future market, and we can get the following conclusion: (a) With regard to and for a short while paragraph of data, the result basic adopt Monte Carlo method and the history simulation method to calculate VaR and CVaR has been consistent, this has confirmed the Monte Carlo method scientific. (b) The risk of selling is greater than purchasing; this is to bring about from future price in recent years going up by a wide margin. (c) USA crude oil future market risk is max; its VAR is about 3%, but CVAR can reach 4% or so. Just say, be in 20 business day inner, above one day let your deficit reach 3%. Adopt dyadic lever business system besides since future market is common, caution money is in 10% following generally , this feasible risk one day appears on meeting more above the 10 times having been expanded, if coming across exceeding condition, within all loss possibility.

4.2 Risk changes American crude oil forward market

All above studies the lateral contrast USA crude oil future market risk and other futures sorts has been carried out, we want the change condition analyzing since crude oil price fluctuation leads to USA crude oil future market risk in history underneath. We choose WTI crude oil future market data from 1984 to 2006, figure making use of the history simulation law to calculate out VaR and CVaR, result from every age referring to from Figure 3 to Figure 6.

We can get the following conclusion from four artworks:

(a) As for the long range, the risk holding the paying and hold the selling is equal basically.

(b) The risk change displays cyclist, the figure above is it can be seen, from 1984 to 1992, VaR and CVaR have experienced from small to big then to small, also be from big to small from 1992 to now , this cyclists change trend and American economic cycle are well-balanced basically. When the conclusion that we get therefore is to think that economy raises high, crude oil futures risk also rises, crude oil futures risk can't reduce while the economic situation gets lost low.

(c) We can see that the age having two VaR abnormally composes in 1990 and 1986, which brought about by the Gulf War occur in1990, the international crude oil marketplace piles up in excess of requirement in 1986 and price drops by large margins. Since existence all affects significant petroleum price event in this two in age, fluctuations in prices is therefore very acute.

(d) We contrast VaR by CVaR, it is very different between VaR and CVaR in 1991. The cause lies in that exceeding risk condition has appeared in 1991. USA has unfolded the large-scale code name air raid action for the "desert storm" to Iraq in the morning of January 17 , 1991, that very day USA crude oil marketplace has just dropped after opening quotation 23%, only returning to normal in the business day following. This fluctuation extent in history is very rare in crude oil futures , even the '9.11' only can cause oil price undulates less than 8% , "desert storm" action can be called exceeding condition.

This example has been testified while exceeding condition happened, the value of VaR having weakened obviously, having calculated out VaR insists to low VaR magnanimity risk effect obviously. At this time if using CVaR have been able to calculate out the marketplace risk truly, have testified therefore also the necessity using CVaR under exceeding situation.

5. Conclusion

In this article we have introduced VaR and CVaR which are methods of measuring the risk of future market. Then we narrated the history of fluctuations in prices of international crude oil. After that we use VaR and CVaR method to compare USA crude oil and other main international future sorts' risk, and analyzed the change of VaR and CVaR of USA crude oil in history and its cause. We can see that the risk of WTI oil is larger than other futures sort; its risk fluctuation displays certain cyclists, and more sensitive compare to others.

Price of international crude oil still is in high position linger, it is very important now for relevant enterprises to know the risk of futures. Because of wide crude oil price fluctuation, some enterprises such as petroleum, chemical industry have making use of crude oil futures to carry out a hedge. In the process of participation international crude oil future market, only can we know risks in this market, and take appropriate measures evading risk, we have the ability reaching the expected effect in avoiding dangerous.

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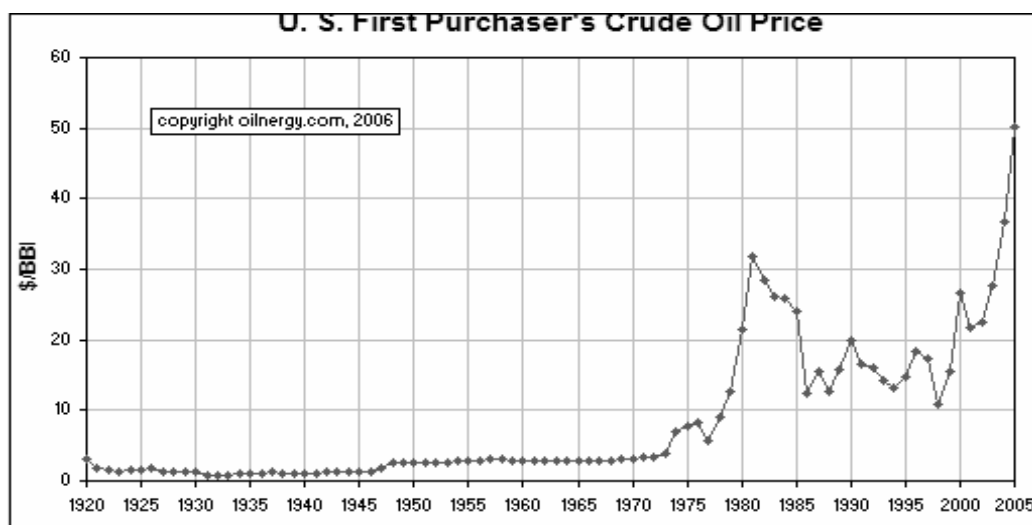
Figure 1. USA crude oil price(1920-2005)
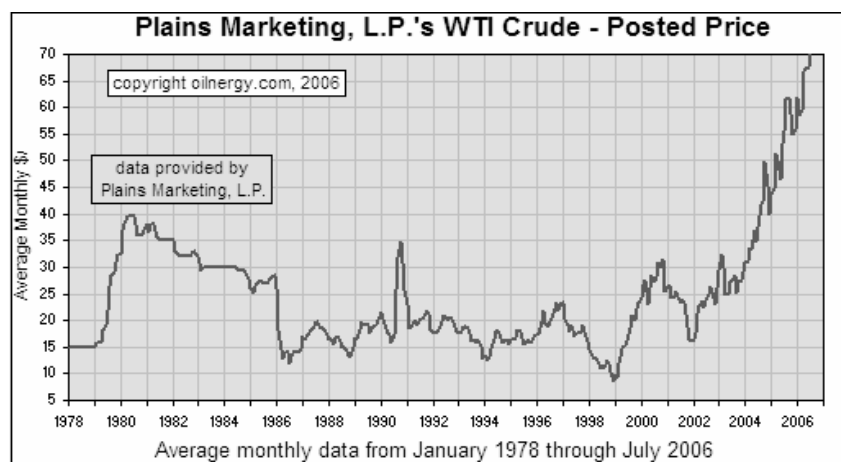
Figure 2. USA crude oil price (1978-2006)
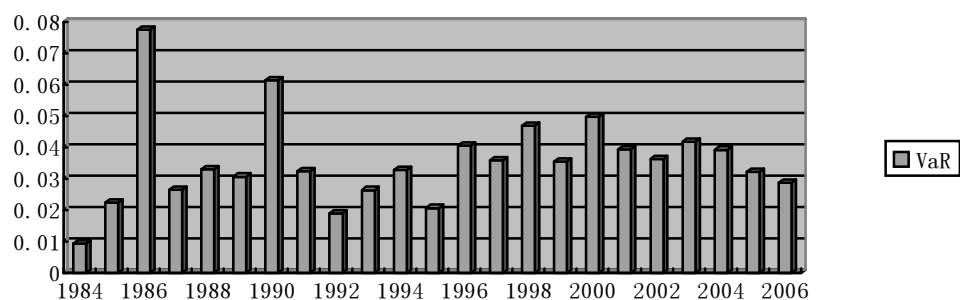
Figure 3.1984 holds VaR purchasing to 2006 over the years
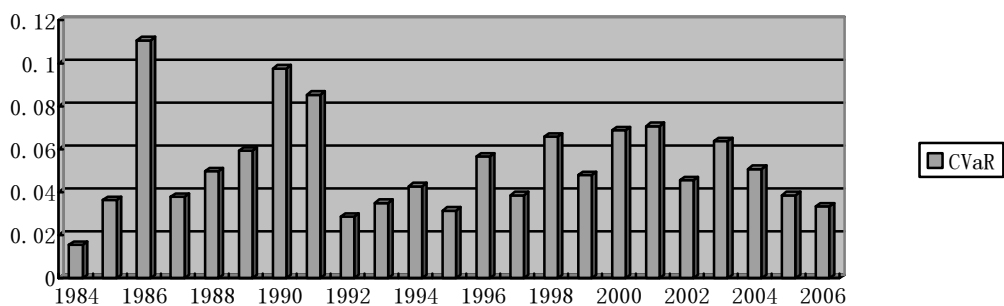
Figure 4. 1984 holds CVaR purchasing to 2006 over the years
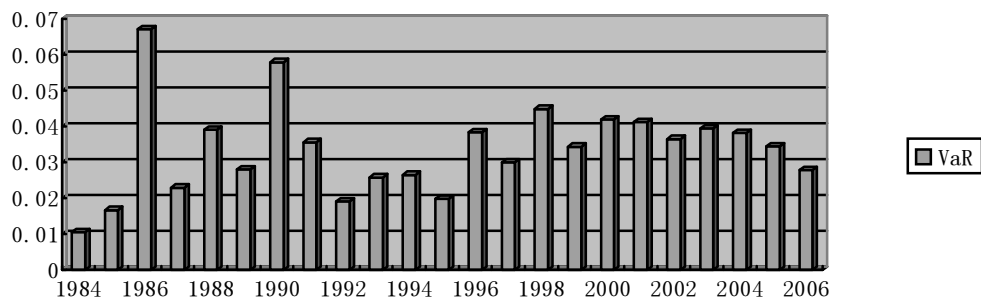
Figure 5. 1984 holds VaR selling to 2006 over the years
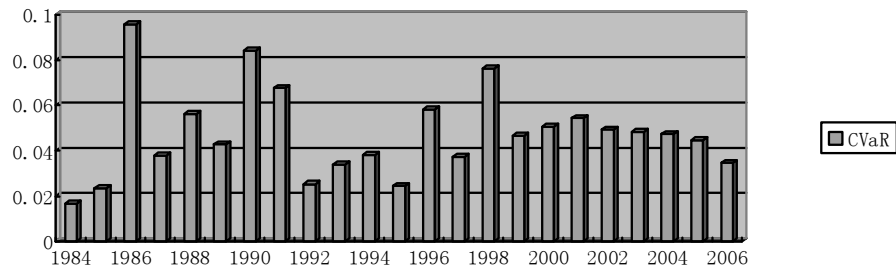
Figure 6. 1984 holds CVaR selling to 2006 over the years
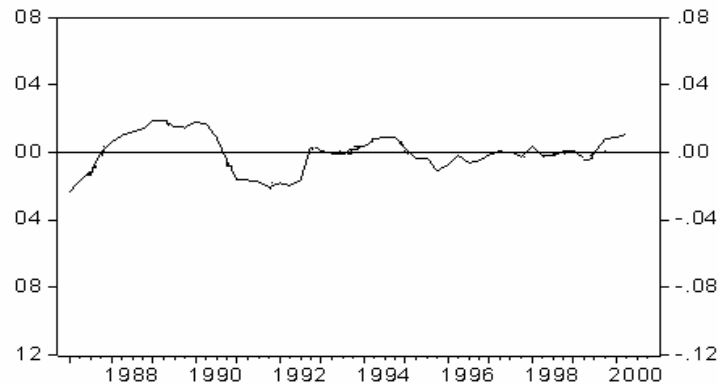
Figure 7. The USA economic cycle getting rid of the price trend (Qin, Jin, Bu)

Table 1. Use history simulation method gains data

series	VaR(buy)	CvaR(buy)	VaR(sel)	CvaR(sell)
WTI oil	0.02845	0.03790	0.03791	0.04629
USA gold	0.01710	0.02803	0.02272	0.03043
LME copper	0.02338	0.03157	0.02841	0.04588
SHFE copper	0.02313	0.03664	0.03130	0.04171
SHFE oil	0.02265	0.03278	0.02404	0.03102
CBOT bean	0.02482	0.03516	0.02558	0.03456
CZCE cotton	0.00908	0.01250	0.01138	0.01495
NYCE cotton	0.02349	0.03578	0.03127	0.04349
DCE bean	0.01461	0.20957	0.01782	0.02286

Table 2. Use Monte Carlo simulation method gains data

series	VaR(buy)	CvaR(buy)	VaR(sell)	CvaR(sel)
WTI oil	0.02830	0.03816	0.03157	0.03821
USA gold	0.02087	0.02748	0.01523	0.02070
LME copper	0.02338	0.03295	0.02427	0.03835
SHFE copper	0.02783	0.04772	0.02812	0.04572
SHFE oil	0.02365	0.03010	0.02802	0.03478
CBOT bean	0.02294	0.03134	0.02921	0.04424
CZCE cotton	0.00795	0.01772	0.00860	0.01098
NYCE cotton	0.02871	0.04250	0.02557	0.03548
DEC bean	0.01557	0.01976	0.01328	0.01875

Insolvency Prediction Model Using Multivariate

Discriminant Analysis and Artificial Neural

Network for the Finance Industry in New Zealand

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Abstract

Models of insolvency are important for managers who may not appreciate how serious the financial health of their company is becoming until it is too late to take effective action. Multivariate discriminant analysis and artificial neural network are utilized in this study to create an insolvency predictive model that could effectively predict any future failure of a finance company and validated in New Zealand . Financial ratios obtained from corporate balance sheets are used as independent variables while failed/non-failed company is the dependent variable. The results indicate the financial ratios of failed companies differ significantly from non-failed companies. Failed companies were also less profitable and less liquid and had higher leverage ratios and lower quality assets.

Keywords: Corporate insolvency, Financial ratios, Multivariate discriminant analysis, Artificial neural networks

1. Introduction

The year 2006-2007 was a turbulent period for the finance industry in New Zealand during which 10 non-bank financial companies went into receivership or failed, leaving debts of more than NZ$1.14 billion owed to about 52,000 investors (Kiong & Bennett 2007). There are more than one thousand finance companies in New Zealand, offering a wide variety of investment options to investors. Given this wide variety of choice and increasing bad publicity around failed investment companies, financial advisors are facing a daunting task of prudently investing their client's hard-earned money. Thus, models of insolvency prediction that help identify   future business failures or provide early warnings of impending financial distress are important tools for financial advisors.

Models of insolvency prediction will also help a manager to keep track of a company's performance over a number of years and will help identify important trends. The models may not specifically tell the manager what is wrong, but it should encourage them to identify problems and take effective action to minimize the incidence of failure. A predictive model may warn an auditor of a company's vulnerability and help protect them against charges of 'negligent of duties' in not disclosing the possibility of insolvency (Jones 1987). In addition, lenders may adopt predictive models to aid in assessing a company defaulting on its loans (Jones 1987). Regulatory agencies are concerned whether a monitored company is in danger of failing. A company may be made exempted from antitrust prohibitions and permitted to merge under the Failing Company Doctrine if it can be demonstrated that it's in danger of insolvency or failure,

The purpose of this study is to develop a theoretical model that will accurately predict failure of financial companies including those in New Zealand via posing and solving the following research questions:

(1) Are some financial ratios significantly better at detecting the immanent failure of New Zealand's finance companies than others?

(2) Which financial ratios are the most important for detecting potential insolvency of New Zealand's finance companies?

(3) Is the Artificial Neural Network (ANN) model superior to the Multivariate Discriminant Analysis (MDA) model

for predicting failures amongst New Zealand's finance companies?

2. Background

Leading causes of corporate failure can be classified into economic, financial, neglect, fraud or disaster (Anderson 2006). Economic factors include industry weakness and poor location while financial factors include excessive debt and cash flow problems. Often financial difficulties are result of managerial neglect.

In this study, 'failure' is defined as a registered company which is insolvent, under receivership or has been liquidated. The word insolvent can have several meanings. Prior to 1985, the crucial method for determining solvency was the 'cash flow test' (Milman & Durrant 1999). Here a company that could not pay debts as they fall due was deemed insolvent even though it could realise sufficient assets to pay all the debts. After 1985, the 'cash flow' test was supplemented by the 'balance sheet test' where a company was deemed insolvent if its liabilities exceeded assets, even when it could pay its debt on time. This study limits itself to registered company insolvency and not to the issue of bankruptcy, i.e. personal insolvency which applies to sole traders and partnership.

2.1 Financial ratios

Considerable attention has been devoted to financial ratio analysis for classifying failed and non-failed companies or for assessing the business performance of a company, summarised in Figure 1.

2.2 Models predicting insolvency

Early models of predicting insolvency employ financial ratios using univariate and multivariate statistics. A univariate approach explores the relationship between individual financial ratios and insolvency (Zavgren 1983). The multivariate approach employs pooled ratios for predicting insolvency. However to construct an optimal multivariate predictive model, one must determine which ratios are best at detecting potential failures, and how the model weights should be established for each. Artificial Neural Networks have more recently been used to predict insolvency as they remove the need for identifying appropriate ratios, before a model is constructed. Given the variety of techniques now available for insolvency prediction, it is not only necessary to understand the uses and strengths of any prediction model, but to understand their limitations as well.

2.3 Multivariate approach

Beaver (1966) pioneered experimental designs for examining corporate failures using financial ratios. Beaver's univariate approach adopts 'paired sampling' for assessing the accuracy of a variety of ratios. His published sample contains 79 companies which failed during the years 1954 to 1964 from 38 industries. Beaver concludes that cash flow to debt ratio is the single best predictor. However, models which focus on a single ratio are simplistic and unable to capture the complexity of financial failure, given that the financial status of a company is multidimensional and no single measure is able to capture all dimensions (Zavgren 1983).

Beaver's (1966) univariate approach was followed by Altman's (1968) use of Multivariate Discriminant Analysis (MDA) to examine corporate failures. Altman selected 33 publicly-traded manufacturing companies that failed between 1946 and 1965 and matched them to 33 companies using a stratified random sample based on their assets and industry. His MDA results (Z-score) using five financial ratios (WCTA, TATURN, RETAINTA, EBITTA and MKTCAPTL) correctly differentiated 94% of failed companies and 97% of the non-failed companies with data one year out from failure. Other studies that utilize the MDA approach include Deakin (1977) and Blum (1974). These studies inspired other researchers to utilize multivariate techniques to predict corporate failure including: logistic regression analysis (Ohlson 1980) and recursive partitioning analysis (Frydman, Altman & Kao 1985).

2.4 Multivariate Discriminant Analysis (MDA)

Discriminant analysis characterizes an individual, or a phenomenon, by a vector of variables which constitute a multivariate density function. The discriminant function maps the multidimensional characteristics of the density function of the population's variables into a one-dimensional measure, by forming a linear combination (Zavgren 1983). The linear discriminant function is as follows:

$$Z_i = XA = a0 + a1X1 + a2X2 + ... + anXn$$

Where; Z = discriminant score for the company $_i$

X = vector of n independent variables or characteristics

A = vector of discriminant coefficients

MDA computes the discriminant coefficients and selects the appropriate weights (cut-off score) which will separate the average values of each group, while minimizing the statistical distance of each observation and its own group means (Altman 1993). By using the Z score and cut-off score, a company is classified into failed or non-failed

categories.

2.5 Logistic regression analysis

Logistic regression analysis is equivalent to two-group discriminant analysis. The logistic procedure fits linear logistic regression models for binary or ordinal response data using Maximum Likelihood estimations and compares the estimated samples using Wald chi-square. The Maximum Likelihood procedure is used in an iterative manner to identify the most likely estimates for the coefficients. The Wald statistic is used to test the hypothesis that a coefficient varies from zero (Hair et al. 1998).

2.6 Recursive Partitioning Analysis (RPA)

Recursive Partitioning Analysis is a nonparametric technique, which minimizes the expected cost of misclassification by a univariate splitting procedure (Altman 1993). However, RPA does not provide the probabilities of group membership, or a means for evaluating the significance of variables.

2.7 Artificial Neural Networks (ANN)

An artificial neural network system (ANN) is a computer algorism which can be 'trained' to imitate the cellular connections in the human brain (Hertz, Krogh & Palmer 1991). It consists of a large number of interconnected elementary processing units to compute data. The network's processing results are derived from the collective behavior of its units and are dependent on how the units interact with each other (Altman, Marco & Varetto 1993). By processing and evaluating the interactions in a complex set of prior data, a neural network attempts to assign proper weights to the respective inputs to allow for the correct deduction of the ultimate outcome. These input weights are aided by a 'genetic algorithm' optimization procedure, which simulates the model's predictive power under a large number of scenarios and allows the best weighting schemes to survive and reproduce from one generation to the next (Dorsey, Edmister & Johnson 1995).

Typically, prediction (forecasting) in ANN software involves a three-stage process where:

(1) Decisions are made about what the input variables and learning parameters will be.

(2) The network is trained using a subset of the data until the average error between the forecast and an actual value is reduced to a minimum.

(3) The "trained" neural network is used to test new variables and make improved forecasts.

The commonly used architecture of neural network systems used in insolvency prediction are:

(1) Multi-layer perceptron (MLP) with a 'back-propagation' algorithm: The most popular ANN architecture used in insolvency prediction (Perez 2006). This architecture deals with classification problems via a sigmoidal or 'squashing' activation function:

$$OUT = F(X.W) = F(NET) = 1/(1+e^{-NET})$$

Where OUT = the final output of a neuron in the output layer

X = the input vector

W = weight vector 'w' between neuron 'i' in layer 'k' and neuron 'j' in layer 'k+1'

(2) Kohonen's self-organising mapping: Unlike the MLP (above) which reacts in terms of forecast (i.e. which class the company belongs to), the Kohonen's map responds in terms of classification (Perez 2006). For example, the map will determine a certain number of classes and cluster them to set up some groups on its own.

(3) Perceptron: is a single-layer neural network with binary outputs. It is similar to a 'back-propagation' but does not contain hidden layers (Rahimian et al. 1991). The model utilizes supervised learning and a nonlinear threshold unit: If NET output $\geq$ Threshold, OUT = 1

Otherwise   OUT = 0

2.8 Multivariate approach versus ANN as predictors of insolvency

MDA is one of the most popular techniques used for analyzing insolvency (Perez 2006). The main advantage of the MDA approach to predict corporate failure is its ability to reduce a multidimensional problem to a single score with a high level of accuracy. However, MDA is subject to a number of restrictive assumptions. First, MDA requires the decision set which is used for distinguishing between failed and non-failed companies be linearly separable. Second, MDA does not allow a ratio's signal to vacillate depending on its relationship with another ratio, or set of ratios (Ticehurst & Veal 2000). In practice, a ratio may signal financial distress if it is higher or lower than normal. These problems together with issues such as, bias of extreme data points, the multivariate assumption of normality and equal group variance, may ensure MDA is unsuited to the complex nature, boundaries and interrelationships of

financial ratios (Coats & Fant 1993).

Recursive Partitioning Analysis eliminates many of the statistical problems attributed to discriminant analysis, such as the distribution assumptions associated with the independent or dependent variables. When prior probabilities and the costs of errors are specified, the method will seek to minimize the costs of misclassification. The key assumption for RPA are that the variables describing the group of observations are discrete, non-overlapping and identifiable (Altman 1993). There is evidence that the RPA models are superior to the MDA models although variations in accuracy were not marked (Frydman, Altman &Kao 1985).

Logistic regression analysis has the advantage of being less affected than discriminant analysis,when basic assumptions, such as the normality of the variables are violated (Altman 1993). However, similar to   discriminant analysis, their predictive power is time-sensitive. Using linear discriminant analysis and logit analysis, Hamer (1993) recorded misclassification rates lower than would be expected by chance, for each of the three years prior to company failure. In the fourth and fifth year these models yield high rates of misclassification.

The advantages of Artificial Neural Networks is they do not require the prespecification of a functional form, or the adoption of restrictive assumptions about the characteristics of statistical distributions of the variables and errors in the model. By their nature, ANN systems are able to work with imprecise variables and with model changes over time. They are also able to adapt to the appearance of new cases which represent changes in the situation (Altman et al. 1993). However, reviews on the accuracy of neural networks are mixed. Dorsey et al. (1995) argue that ANN is more accurate than RPA. Nag (1991) observes that while the ANN's prediction error was less than with multiple regression models, the residual autocorrelations of the neural networks were higher, indicating that performance may not necessarily be superior. However, Odom & Sharda (1990), Wilson and Sharda (1994), Altman (1993) and Trippi and Turban (1996) all found ANN to be superior to MDA.

As with any system, ANN has its limitations. These include (Altman et al. 1993):

(1) The learning stage can be very long.

(2) The system might not achieve a stable absolute minimum configuration but might lock on local minimums without being able to move to the optimum.

(3) The system might give rise to oscillating behavior in the learning phase.

(4) When the actual situation changes significantly compared with the situation implicit in the training examples or when the set of examples is not representative of the reality, it is necessary to repeat the learning phase.

(5) The analysis of the weightings is complex and difficult to interpret. There is little network transparency in the examination of the systems logic, making it difficult to identify the causes of the errors/defective responses.

Despite the long heritage of corporate failure prediction modeling, there are disagreements over which ratios and methods (multivariate analysis or ANN or hybrid) are appropriate for predicting corporate failure and the accuracy of results have varied considerably (Appendix 1).

This logically leads onto our three research questions framed by the following hypotheses:

Hypothesis I: Financial ratios do have significantly different predictive abilities for detecting failures of New Zealand finance companies.

Hypothesis II: The predictive accuracy of Altman's five ratios is superior to other financial ratios.

Hypothesis III: The predictive accuracy of ANN's are superior to the MDA models.

3. Conceptual model

The successful completion of an analysis of insolvency involves more than the selection of the correct methodology. This study's focus is on the approach to model building, rather than simply the specifics of each technique to provide a broader base for model development, estimation, and interpretation. This approach to model building is shown in Figure 2 while the conceptualized model for insolvency prediction is presented in Figure 3. Basically, this study recommends a combination of both MDA and ANN to improve the accuracy of corporate insolvency prediction.

The lack of a comprehensive theory of insolvency has resulted in the selection of a variety of financial variables in insolvency prediction. There are disagreements on whether accrual financial ratios are appropriate for predicting corporate failure because it lacks of theoretical justification (Scott 1981; Sharma 2001). Since insolvency is both a cash flow and balance sheet phenomenon, the use of variables based on cash flows is theoretically appealing. However, Visclone (1985) argues that cash flow measures can be misleading because of management's ability to manipulate the timing of the cash flows, such as not paying bills on time or reducing inventory below desired levels.

Alternately, management may inflate the cost of inventory to increase the measure of cash flows from operations reported in the income statement. Such distortions arise more often in companies in financial distress (Sharma 2001; Visclone 1985). Additionally, cash flow measures do not contain any significant information over accrual accounting information (such as accrual earnings) to discriminate between insolvent and viable companies (Watson 1996). By contrast, accrual earnings have information content (ability to predict corporate failure) over and above cash flow measurements.

Financial ratios that are proven to predict insolvency using MDA then become the input to the ANN. The MLP (back-propagation) ANN's architecture was chosen because it has been successful at predicting insolvency (Flecher & Goss 1993; Odom & Sharda 1990; Trippi & Turban 1996) and the means for implementing it are readily available.

Given that there is evidence that prediction models are sensitive to time period and distress situations other than those originally developed for (Perez 2006), the conceptualize model allows for flexibility of data input and a wider selection of ratios to improve insolvency prediction or enhancing precision in the coefficient estimates (MDA) of a failed company as demanded for specific situations. It is not suggested, however, that managers should focus solely on the results of financial ratios when making decisions on the viability of a company. Managers should also consider macroeconomic variables that are known to influence corporate insolvency. These macroeconomic variables can serve as input to the knowledge base of the neural network systems to improve their predictive power and include the rate of inflation, the annual growth rate in real GDP and the unemployment rate. In addition, strict corporate governance systems and strict conformation statutory reporting should be in place. Effective corporate governance systems foster transparency and accountability by ensuring their shareholders receive quality information about the company's performance and the directors' stewardship of their assets. This ensures that shareholders are able to exercise their powers to hold directors to account.

4. Methodology

This study uses secondary data and hypothesis testing to assess the relationships in a pattern of financial ratios of failed and non-failed companies.

4.1 *Sample*: Data were collected from companies that filed for receivership or failed during 2005-2007 (extracted from the New Zealand registrar of companies). Data from non-failed companies were derived from New Zealand investment company's financial statements over the accounting period 2004-2007. The various corporate financial statements were collected from their respective websites/brochures. Getting the needed transparency from financial reports was not easy due to different company reporting practices and changing regulations during this period. As of 2006, New Zealand migrated to the international accounting standard. Overall, data were collected from 10 known failed companies and 35 non-failed companies. The failed company's financial data was classified into one year $(t–1)$, two years $(t–2)$ and three years $(t–3)$ prior to a failure.

To reduce the number of independent variables from the list of 36 financial ratios (Figure 1), this study follows the method suggested by Leshno and Spector (1996) being to:

(1) Include all variables used in Altman's (1968) Z-score model. However, one of Altman's ratio's (Sales/Total Assets) was not selected because of its inappropriateness to financial companies.

(2) Retain only one variable from each pair of variables with a correlation coefficient >0.9.

(3) Exclude the variable with the greater number of missing values from each highly correlated pair of variables.

(4) If both variables have an equal number of missing values, exclude the one that is intuitively identified as less relevant to insolvency.

4.2 *Estimation of the discriminant model and assessing overall fit:* This study employed a stepwise regression to develop an optimal MDA model. The overall fit of the discriminant function involves three tasks: (i) calculating discriminant Z scores for each observation, (ii) evaluate group differences in discriminant Z scores, and (iii) assesses the accuracy of the predictions for group membership (Hair et al. 2000).

4.3 *Assessing group membership prediction accuracy:* To determine the predictive ability of the discriminant function, a cutting score and classification matrix or hit ratio were predetermined. The samples are divided into two groups to validate the discriminant function through the use of a classification matrix. One group, the analysis sample, is employed for computing the discriminant function. The other group, the holdout sample, is retained for developing the classification matrix. The individual discriminant scores for the holdout samples are compared with the critical cutting score and classified as follows:

An individual is classified into group A if $Zn < Zct$, and

An individual is included in group B if Zn > Zct

where, Zn = discriminant Z score for the nth individual

    Zct = the critical cutting score

4.4 Measuring predictive accuracy relative to chance: The formula for this criterion is: $C_{PRO} = p^2 + (1-p)^2$

where, p = proportion of individuals in group 1

    1-p = proportion of individuals in group 2

4.5 Comparing the hit ratio to chance-based criteria. The accuracy of classification should be at least 25 percent greater than chance. For example, if the accuracy of chance is 50 percent, the accuracy of classification should be 62.5 percent (i.e. 1.25 x 50%) (Hair *et al.* 1998).

4.6 Analysis: Data analysis in this study involved two stages: The first deals with testing of hypothesis I and II while the second stage deals with hypothesis III. Hypothesis I was developed to determine the variables which are most suitable for constructing an efficient model for predicting insolvency. To achieve this outcome, data was analyzed using the SPSS statistical software package, where the individual discriminating ability of financial ratios was tested by comparing the equality of group means using Wilks' lambda and associated *F*-test. This test compared the difference between the average values of the ratios in failed and non-failed groups. The test also compared the variability of values within each group (μ). The smaller the Wilks' lambda, the greater the differences between the average values of the ratios in failed and non-failed groups.

   H_o: $\mu_1 = \mu_2 = \ldots = \mu_k$

   H_1: $\mu_1 \neq \mu_2 \neq \ldots \neq \mu_k$

where, μ_1 = mean of ratio 1 across the failed and non-failed groups

    μ_2 = mean of ratio 2 across the failed and non-failed groups

    μ_k = mean of ratio k across the failed and non-failed groups

If the value of the calculated *F* statistic is significant (F<0.05), the null hypothesis is rejected because there are differences in the means of ratios across the failed and non-failed groups.

4.6.1 Testing of hypothesis II: F values are used for interpreting the discriminating abilities of the independent variables. This is accomplished by ranking the significant *F* values. Large *F* values indicate that an independent variable has superior discriminatory power (Hair *et al.* 1998).

4.6.2 Second stage (testing of hypothesis III): Hypothesis III considers whether ANN is more accurate than MDA. Initially, classifier of Alyuda Neuro Intelligence software (variation of the 'back propagation' algorithm) was used to identify failed and non-failed companies in ANN and its average accuracy recorded. The testing procedure for hypothesis III was as follows:

   H_o: *P*MDA = *P*ANN

   H_a: *P*MDA ≠ *P*ANN

where, *P*MDA = the average accuracy of MDA

    *P*ANN = the average accuracy of ANN

    (Note: the average accuracy figures are expressed as percentages)

The test of hypothesis III was conducted (using SPSS) by comparing the *t*-test with the critical value of the *t* statistic. The null hypothesis would be rejected if the absolute value of the *t*-test exceeded the critical value.

5. Results

5.1 Stage I (test of hypothesis I and II): After examining variability in the ratio means, many variables were found to be significant at the 0.05 level, indicating substantial differences in variables between groups. This shows there is significant variety in the ratios of failed and non-failed companies. These findings indicate that *Hypothesis I: Financial ratios do have significantly different predictive abilities for detecting failures of New Zealand finance companies (* H_1: $\mu_1 \neq \mu_2 \neq \ldots \neq \mu_k$) should be accepted as the means across all groups are not equal. So there is strong evidence to support the view that financial ratios have different predictive abilities for detecting financial failures amongst New Zealand finance companies.

As early warning signals; four out of Altman's (1968) five financial ratios derived from financial statements one year prior to failure, are the most accurate (largest F-values) for predicting corporate insolvency (Figure 4, in bold). This provides evidence to support hypothesis II that the Altman's ratios are more superior in predicting corporate

insolvency in New Zealand. Other ratios that are able to discriminate between failed and non-failed finance companies in New Zealand were found to include DARATIO, INTERAT, ROA and QUIRATIO.   It was also found that DERATIO and FAEQLTL (*in italic*) are not good predictors of corporate insolvency in New Zealand.

This study also found that prior to failing companies tend to have the following:

(1) Low profitability, as indicated by their significantly smaller EBITTA, RETAINTA and ROA.

(2) Higher leverage ratios, as indicated by their significantly larger DARATIO and INTERAT.

(3) Less liquidity, as indicated by smaller QUIRATIO.

(4) Lower asset quality, as indicated by lower WCTA.

5.2 Stage II (Test of hypothesis III): Preliminary findings suggest that satisfactory results (62% accuracy of classification) were achieved with a MDA model using those four of Altman's (1968) five financial ratios which were found earlier to be effective in predicting insolvency in New Zealand, namely: working capital/total assets, retained earnings/total assets, EBIT/total assets and market value of equity/total liabilities. Currently, this study is in the process of optimizing the MDA model and 'pruning' the ANN model (phasing out of neurons that achieve similar performances to provide a simpler model) to achieve greater efficiency of prediction. This indicates that adopting ANN for insolvency prediction is more thorough and a creative process than earlier models .

6. Limitations of this study

This study has several limitations which may affect the accuracy of ANN and MDA including:

(1) Only data on a relatively small sample of failed companies and non-failed companies was available. Hence, there is some risk that the results have been affected by sample size.

(2) The companies were not selected at random.

(3) The data analysed in this study was obtained from public financial statements which may subject to creative accounting. Companies facing failure may distort their published accounts and this will skew the results of the model.

(4) Some corporate financial statements did not disclose figures on cash flow or operating expenses. This study was restricted to balance sheet and income statements.

(5) The MDA methodology violates the assumptions of normality for independent variables.

7. Implications for further study

Future studies could use quarterly rather than annual data, or analyse changes in the size of ratios over a number of time series. While this study's adoption of a stepwise regression analysis to reduce the number of variables to prevent over-fitting of data in the derivation sample, has been effective, factor analysis could be used in future research. Further research is needed to develop and understand the model's full potential. This is likely to include using different neural network architectures such as the ID3-assisted neural network and the SOFM-assisted neural network. An alternative method of estimation is the 'jackknife' method to produce unbiased estimates for the probability of misclassification. This method involves holding one example out of the training set and using the estimated discriminant function to predict the extracted example.

8. Summary

This study employed financial ratios for differentiating between failed and non-failed financial companies (non-bank) in New Zealand. These financial variables were derived from the financial statements of both failed and non-failed companies. Methodologies adopted included univariate tests, MDA (stepwise regression) and ANN (back propagation algorithm). The univariate tests indicate that failed companys' financial ratios differ significantly from non-failed companies. Failed companies were less profitable and less liquid. They also had higher leverage ratios and lower quality assets. The results of the optimal MDA model indicate that the models are more accurate with data one year prior to failure.

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Name of financial ratio	Definition	Symbol
Leverage		
1) Equity market value to total debt	Market capital/total liabilities	MKTCAPTL
2) Equity market value to total assets	Market capital/total assets	MKTCAPTA
3) Equity market value to total equity	Market capital/equity	MKTCAPEQ
4) Debt to equity ratio	Total liabilities/equity	DERATIO
5) Debt to total assets	Total liabilities//total assets	DARATIO
6) Financial leverage multiplier	Total assets/equity	TAEQ
7) Fixed assets to equity & long term liabilities	PPE/(equity + long term liability)	FAEQLTL
8) Retained earning to total assets	Retained earnings/total assets	RETAINTA
Profitability		
9) Return on assets	Net income/total assets	ROA
10) Return on equity	Net income/equity	ROE
11) Gross profit margin	(Sales- Cost)/sales	GPMARGIN
12) Net profit margin	Net incomes/sales	NPMARGIN
13) Operating profit margin	EBIT/sales	EBITSALE
14) EBIT to total assets	EBIT/total assets	EBITTA
Turnover		
15) Working capital to sales	(Current assets -current liabilities)/sales	WCSALES
16) Inventory turnover	Cost of sales/inventory	INVETURN
17) Fixed assets turnover	Sales/PPE	FATURN
18) Total assets turnover	Sales/ total assets	TATURN
19) Equity turnover	Sales/equity	EQTURN
20) Inventory to sales	Inventory/sales	INVSALES
21) Receivables turnover	Sales/account receivables	RECETURN
22) Quick assets to sales	(Cash + account receivables)/sales	QUISALES
23) Current assets to sales	Current assets/sales	CASALES
Liquidity		
24) Working capital to total assets	(Current assets - current liabilities)/total assets	WCTA
25) Cash ratio	Cash/current liabilities	CASHCL
26) Cash to total assets	Cash/total assets	CASHTA
27) Cash to sales	Cash/sales	CASHSALE
28) Current ratio	Current assets/current liabilities	CCRATIO
29) Current assets to total assets	Current assets/total assets	CATA
30) Current liability ratio	Current liabilities/equity	CLEQUITY
31) Quick ratio	(Cash + account receivables)/current liabilities	QUIRATIO
32) Quick assets to total assets	(Cash + account receivables)/total assets	QUITA
33) Inventory to current assets	Inventory/current assets	INVECA
Others		
34) Interest expense rate	Interest expense/total assets	INTERATE
35) Interest coverage ratio	EBIT/interest expense	INTERCOV
36) EBIT Per share	EBIT/ no. of shares	EBITSHAR

Figure 1. Financial ratios for prediction of corporate failures (business performance)
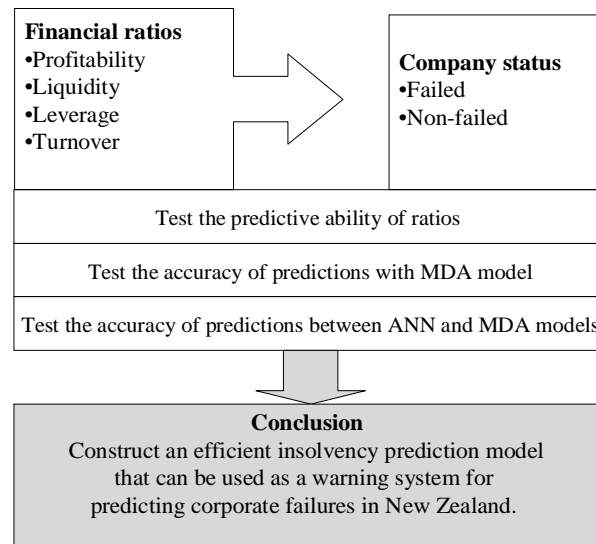
Figure 2. Approach to corporate insolvency prediction: MDA and ANN
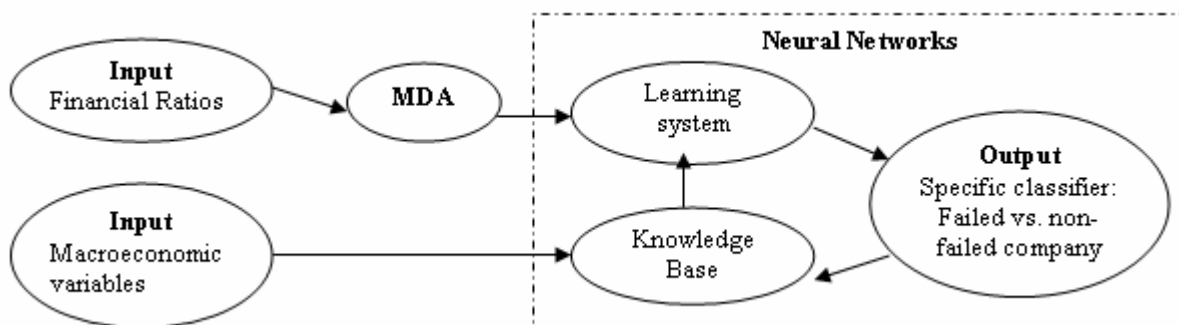
Figure 3. Conceptual model of insolvency prediction for New Zealand financial companies

Financial Ratio	Wilks' Lambda	F-ratio	Significance
Earnings Before Interest and Tax/Total Assets (EBITTA)	0.58	51.03	0.0000
Retained Earnings/Total Assets (RETAINTA)	0.61	49.29	0.0000
Working Capital/Total Assets (WCTA)	0.70	24.67	0.0002
Market Value of Equity/Total Debt (MKTCAPTL)	0.73	18.36	0.0073
Quick ratio	0.76	16.33	0.0004
Interest rate expense (INTERAT)	0.79	13.55	0.0087
Debt to total assets (DARATIO)	0.81	15.10	0.0097
Return of Assets (ROA)	0.82	14.43	0.0124
Debt to equity ratio (DERATIO)	*0.94*	*2.86*	*0.1921*
Fixed asset to equity & long term liabilities (FAEQLTL)	*0.98*	*1.37*	*0.2321*

Figure 4. Top and worst predictors of corporate insolvency in New Zealand

Appendix 1. Empirical results of prior studies

Researcher	Model	% of correctly classified
Altman (1968)	MDA	95%
Deakin (1972)	MDA	97%
Altman, Haldeman and Narayanan (1977)	MDA	93%
Ohlson (1980)	LOGIT	96%
Nittayagasetwat, Tirapat and Withisuphakorn (1997)	MDA, LOGIT	65%, 85%
Khunthong (2000)	MDA, LOGIT, PROBIT	95%, 91%, 92%
Odom and Sharda (1990)	ANN, MDA	81%, 59%
Rahimian et al. (1991)	ANN, MDA	82%, 75%
Coats and Fant (1993)	ANN, MDA	95%, 88%
Altman, Marco and Varretto (1993)	ANN, MDA	95%, 96%

Advantages of Chain Business and Countermeasures of

Small- and Medium-Sized Manufacturers

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Abstract

Along with the development of market economy in China, chain business has been turned into a guiding ring from the last ring in the supply chain. Chain business' economy of scale, economy of scope, and advantages of information and integration becomes more prominent. Under this condition, small- and medium-sized manufacturers can adopt more flexible production and diversified marketing strategy by means of combining with retailers directly.

Keywords: Chain business, Small- and Medium-sized manufacturer, Guiding effect, Marketing strategy

According to statistical researches by the Department of Commercial Reform and Development, Ministry of Commerce of China, and China Chain Store & Franchise Association, in 2006 the sales achieved by the top 100 China chain business reached 855.2 billion Yuan, realizing a year-on-year increase of 25 percent. That is greatly larger than the 13.7 percent increase of social consumption sales. The development of chain business makes its position in social production circulation improve constantly. And its strength in market is enhancing gradually. Especially comparing with other retailing modes, chain business has special advantages in operations. All these factors will exert deep effects on small- and medium-sized manufacturers' production activities.

1. Advantages of chain business

1.1 The circulation value possessed by chain business show its guiding effects in the supply chain.

The circulation value of chain business chiefly focuses on the value of time and the value of customer relationship. Generally speaking, in the whole process of commodity from production to consumption, the time period in production is about 10 percent and that in circulation is about 90 percent. According to the law of time and value, the circulation process is more important than the production process. As far as the supply chain was concerned, it was dominated by producers. Along with the development of market economy, over-plus becomes a common phenomenon and circulation becomes the master. In the whole supply chain, the past was big production and small circulation. But now it is big circulation and small production. In a sense, production becomes a part of circulation. From 2001 to 2004, Wal-Mart is always No.1 in the list of world top 500 companies. It indicates the powerful advantages of chain business.

Under the background of more severe market competition, chain business possesses guiding advantages due to their closeness to the final customers. They can make best use of the advantages to connect with customers directly, attracting special customer groups, mastering rich customer resources, and constructing long-term customer relationship. By this way, it can create favorable conditions for chain business to create customer values. With the pre-condition of demand-driven dominance, chain business becomes the guiding ring instead of the last ring in the supply chain.

1.2 Advantages of economy of scale and economy of scope for chain business

Retailers can obtain not only advantages of economy of scale but also that of economy scope by turning themselves into chain business. On one hand, centralized purchasing and distribution can reduce the out-of-stock possibility as much as possible. Unified advertising and marketing in the market can help to construct the nice credit of stores and brands that contribute to the decrease of costs. By this way, economy of scale is realized. On the other hand, chain business can satisfy customers' needs by their separated shops. The facilities and equipments in the shops are shared by all commodities. For example, costs of renting, hiring, and training can be apportioned by many products in the shops. That is the economy of scope in a sense. Customers can buy different products at the same store, which can save time and costs. And customers can feel more convenient. China Chain Store & Franchise Association

respectively takes ten domestic and foreign-funded chain stores whose sales exceed 2 billion Yuan as samples and compare their scale of operations. According to the data, the domestic chain companies can realize an average of sales of 5.5 billion Yuan, and have 73 stores and 420 square kilometers in average. In contrast, foreign-funded chain companies can realize an average of sales of 11.7 billion Yuan, and have 52 stores and 620 square kilometers in average. Apparently, considering the economy of scale and the economy of scope, foreign-funded chain companies have more advantages over domestic chain companies.

1.3 Chain business' advantages in information and capabilities in integration

Chain business acquires effective information by different means and channels. After being chosen, processed, integrated, stored, transmitted, and outputted, the effective information will generate values and form a flow of information values. With this base, chain business can integrate all business resources, such as stores, suppliers, consumers, human resources, and logistics. Therefore, they can choose the most proper way to send the right product to the right consumer at the right time and right place. That is the chain business' advantages in information mining and integration. This advantage needs support of hardware and software, namely information technology (supply chain management technology, spot arrangement, commodity display technology, type management technology, and other electronic and internet information technology) and management experiences (business idea, culture, training and evaluation system, organizational structure, etc.). Take the chain supermarket for example. Information and Internet technologies are widely used in its orders, purchases, storages, and operations. It also has auto information system, such as Point of Sale (POS), Electronic Data Inter-change (EDI), Electronic Order System, and Efficient Consumer Response technologies, improving the circulation efficiency greatly. From the experiences of chain business in Japan, the introduction of POS does not necessarily mean a great increase of sales but the stock has a decrease of 10 percent. Efficient Consumer Response system expands stores' internal information system over stores, realizing a wider labor division and cooperation, achieving an overall management from producers to consumers, and improving the flexibility to a great degree.

Diversification, individuation, and convenience are the most important factors that impact consumers' purchases. By integrating the arrangement of stores, the display of products, the purchasing environment, the service modes, the types of commodities, and the business hours, chain business can form a business mode that is right for people's life style. Chain business tries to meet consumers' needs with a flexible and effective organizational mode, realizing the direct contact between retailers and consumers.

1.4 Advantages of chain business' brand and image

Chain business usually has unified forms in arrangement, employees' dresses, services, advertising, brands, and logos. Along with the increase of scale and quantity, the unified image of chain business will affect the mass gradually, which serves as a favorable social public base for stores cultivating the common recognition, repeated purchases, and brand loyalty. Under the condition of imperfect market economy, fake or bad products prevail at present. Chain business must especially pay more attention on their guaranteed credit and promise in order to sustain their image and fame in consumers. Studies show that why Chinese consumers choose to purchase in chain business is for their reliable quality and guaranteed credit originated from their large scale. Especially as they want to buy some daily goods, such as milk power, biscuits, drinks, and batteries. Comparing with small retailers, large- and medium- sized chain business has relatively a smaller possibility for customers buying fake or bad goods. Fake goods in any store will impact the whole chain business system negatively. All the chain stores will face up with greater costs and risks than non-chain stores. Therefore, chain stores are more attractive in the public due to their image and credit system.

2. Small- and medium-sized manufacturers' marketing strategy

Under the traditional industrial-capital-dominated condition, production plays a guiding role in the market. However, today it becomes a commercial-capital-dominated market. Chain stores become the most energetic business mode in competition. This business mode can exert profound effects on manufacturers. (1) The life cycle of products is shorter. The rapid development of information technology and the changeable needs of consumers shorten the term of new products' research and development to a great degree. (2) The types of products increase at an air speed. (3) The requirement for delivery, quality, and price is higher. (4) The expectation for products and services is higher. At the same time, in the uncertain market competitive environment, the enhancing business competition cuts down the proportion of profits shared by manufacturers. Facing these changes and considering chain business' advantages, small- and medium-sized manufacturers must adapt to the changes of marketing environment, adjusting their marketing strategies, and seeking more spaces for their existence and development.

Classify the operational modes of chain business according to their price of products, services, and places and identify the characteristics of different modes (Table 1).

Small- and medium-sized manufacturers have to take these characteristics above into consideration and adopt the

right marketing strategies, if they take chain stores as their objects in marketing. Generally speaking, small- and medium-sized manufacturers usually adopt a low-price strategy. Besides, as common or inferior suppliers, small- and medium-sized manufacturers should make careful analysis on their products, prices, packages, merits, and channels and that of their competitors. If information fails to reach the right users, the stock will stop at different channels. As a result, channels can not send the right goods at the right time and right place effectively. And manufacturers will lose the chance. Therefore, as small- and medium-sized manufacturers try to acquire valuable information of the market, they should pay more attention on chain business and adopt their marketing strategies to meet the needs of different operational modes in chain business.

2.1 Construct a co-operative supply chain with chain business and achieve mutual trust, information share, and flexible production

Supply chain management, namely fast (customer) response chain, is a kind of integrated management thinking way based on the common value chain of manufacturers and retailers. It is realized by the competition-cooperation-coordination mechanism. According to Harry, an American scholar, it is a functional network structure that connects supply, manufacture, sale, retail, and customers together. In China, the relationship between manufacturers and retailers is stepping into a stage of competition and cooperation from that of "one wins and one loses". They depend on each other to a great degree. Retailers demand for lower purchasing costs and faster order-responses. Manufacturers demand for timely and effective market information and support from retailers, in order to arrange production and marketing scientifically. The supply chain is not based on one short-term transaction but long-term cooperation and it pursues the general effect. In a supply chain system, partners can exchange and share information, transfer technologies, develop new products in cooperation, and integrate logistics resources, which can help to decrease transaction costs and improve efficiency. The supply chain can facilitate companies to cooperate closely and create more added values for customers, which will enhance companies' competence in industries.

According to a research on the commercial and industrial relationship in China performed by China Chain Store & Franchise Association and Price water house Coopers, retailers have different stresses on the timely, exact, and right delivery of orders, and the timely callback of returned goods. The degrees are respectively 97 percent and 85 percent. Investigations show that most domestic small- and medium-sized production companies are not good at supply chain management. Problems in retailing companies coordinating supply chain management are extremely serious.

In China, industrial and commercial companies have many serious problems in information exchange and share. Inefficient information exchange causes an increase of stock in channels, which will break the close connection between sales and production. As a result, production and sales can not deliver the right goods at the right time and right place effectively. And manufacturers will lose the chance and the needs of customers can not be satisfied. It indicates the important position of information share in production and marketing. In such a sale-production business pattern that focuses on retailers, although retailers possess information of customers, it does not necessarily mean they prefer to share the information with others. Practices show that the production information provided by manufacturers is also vital. Therefore, manufacturers and retailers can share the information of sales, stocks, and design by electronic data interchange (EDI). By this way, it may help to generate new valuable commercial information that benefits both.

Generally speaking, manufacturers are at an inferior position. From the angle of manufacturers' interests, small- and medium-sized manufacturers should discard the idea of "conflict interests between industrial companies and commercial companies", and trust in retailers, trying to adapt themselves to market changes with their flexible manufacturing system by cooperating with retailers.

2.2 Adopt diversified strategy considering the characteristics of chain supermarkets that usually locate at different regions and have multi-level customers.

Chain supermarkets chiefly have two development modes, namely the scale development and the individualization development. Large-scale chain supermarkets pursue the scale development. Small- and medium-sized chain stores focus on flexible and diversified individualization. They are different in allocation of regions, target customers, prices, and logistics. As far as the small- and medium-sized manufacturers are concerned, it is impossible for them to meet the requirement of retailers. In order to gain more spaces for existence and development, they have to take different customers' preferences (including spaces, tastes, and incomes) in chain supermarkets into consideration, and use combined marketing strategies and flexible diversified business strategies to adapt themselves to the requirements and changes of chain supermarkets.

2.3 Reduce middle rings of circulation and try to connect with retailers directly.

In more than one decade years, although China keeps on reforming the circulation system, problems of more rings in wholesale, long circulation time, and high costs still exist. According to the W/R ratio (the ratio of wholesale to

retailer) that can be used to evaluate the length of circulation path, it was 4.65 in 2001, exceeding many times of the number in developed countries. To simplify the circulation is the trend. In recent years, the number of wholesalers is decreasing in America and Japan. The worsen business environment serves as a great challenge for the existence of wholesalers'. At the same time, the development of information technology questions the information advantages of wholesalers. Manufacturers and retailers choose to contact and cooperate with each other in transaction directly. In order to decrease costs and stocks, retailers push the development of logistics, which changes the traditional relationship between wholesalers and retailers. Physical distribution becomes more and more important in circulation. The market is under the control of retailers. Statistical data show that 80 percent of wholesalers are engaged in both retail and wholesale. And their wholesales merely account for 20 percent of their income. Therefore, it is an important way for the small-and medium-sized manufacturers to reduce rings in circulation and contact with retailers directly.

3. Conclusion

Chain business has a gradually-improving position in the social production and circulation field. Its market power is enhancing. Comparing with other business modes, it has more prominent advantages. In detail, the chain business has been turned into a guiding ring from the last ring in the supply chain. Its advantages in the economy of scale and the economy of scope become more significant. Its information advantages, capabilities of integration, general images, and brands are more attractive for customers. It is a must for small- and medium-sized manufacturers to adopt flexible strategies to seek for existence and further development in front of the powerful chain business.

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Table 1. Chain business' operational modes and the marketing strategies

Operational mode	Product				Service	Price	Place
	Width	Length	Depth	Association			
Super market	Medium	High	Medium	Medium	Less	Low	Medium
Discount shop	Medium	High	Low	Low	Less	Low	Far
Storage shop	Medium	Medium	Low	Medium	Less	Low	Far
Convenient shop	Medium	Low	Low	High	Medium	Medium	Near

A Comparative Study on the Competitiveness of
China's High Technology Enterprises of Different Regions

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Abstract

Based on the date from China's high technology statistics, this paper compares the competitiveness of high technology enterprises of three different regions in China from the three angles for judging the competitiveness of enterprises, respectively, the indicator values of the competitiveness of sizes of enterprises, the indicator values of the competitiveness of management of enterprises, and the indicator values of the competitiveness of innovation of enterprises, analyzes the reasons from the perspective of regional economic development, enterprise innovation strategies, and human resources, and put forwards measures to buildup the competitiveness of high technology enterprises in China, which are to implement the strategy of utilizing knowledge to create fortune, to enhance the cooperation among industry, academia and research, to improve policies and regulations, and to set up service system supporting the growth of high technology enterprises.

Keywords: High technology enterprises, Competitiveness of enterprises, Regional comparison

1. The comparison of the competitiveness of high technology enterprises of three main regions in China

The tractive function of high technology industries in regional economic innovation capacity is increasingly prominent. By comparing the differences of the holistic competitiveness of high technology enterprises in various regions, the reasons for the generation of the differences will be found out and measures will be taken to improve deficiency so as to raise the competitiveness of high technology enterprises in each region. Based on the date from *China Statistics Yearbook on High Technology Industry (2006)* and from the three angles for judging the competitiveness of enterprises, namely, the competitiveness of sizes of enterprises, the competitiveness of management of enterprises, and the competitiveness of innovation of enterprises, the competitiveness of high technology enterprises in three regions, eastern region, middle region and western region, is compared. Please refer to Table One to see the static comparison result of data of the three regions of 2005.

Explanation for the computation of the indicators:

(1) The division of eastern region, middle region and western region: eastern region consists of Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Guangxi and Hainan; middle region consists of Shanxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei and Hunan; western region consists of Chongqing, Sichuan, Guizhou, Yunnan, Xizang, Shanxi, Gansu, Qinghai, Ningxia and Xinjiang.(State Statistical Bureau, 2006)

(2) The computation formula for the second class indicators:

The average gross output of enterprise=the gross output of enterprises of the year/the number of enterprises of the year

The average value added of enterprise=the gross value added of enterprises of the year/the number of enterprises of the year

Sales profit rate=the gross profits of enterprises of the year/the gross sales income of the enterprises of the year

The velocity of fixed assets=the gross sales incomes of enterprises of the year/the average net value of fixed assets of the year

Value added rate=value added of enterprises of the year/the gross output of enterprises of the year

The input intensity of R&D capital=the gross inner expenditure on R&D of enterprises of the year/the gross sales incomes of enterprises of the year

The input intensity of R&D personnel=the converted equivalent time of full time work of R&D personnel of the year/the total number of enterprises of the year

The input intensity of technology introduction=(the expenditure of enterprises on introducing technologies +

expenditure of enterprises on technology transformation + expenditure of enterprises on digesting and attracting technology + expenditure of enterprises on purchasing technology) of the year/the total number of enterprises of the year

The patent application rate=the total number of enterprises who apply for patents of the year/the total number of enterprises of the year

The expenditure rate of new product development=gross expenditure on developing new products of enterprises of the year/the gross sales incomes of enterprises of the year

The expenditure input rate of enterprise on science and technology activities=the total sum of capital of enterprises in the expenditure raised on science and technology by enterprises of the year/expenditure raised on science and technology by enterprises of the year

The output of new products=the gross output of new products of enterprises of the year/the total number of enterprises of the year

The sales rate of new products=the gross incomes of new products of the year/the gross sales incomes of the enterprises of the year

The paten holding rate=the total number of patents created and held by enterprises of the year/the total number of enterprises of the year

The comparison result shows that: in 2005, with regard to the competitiveness of the sizes of high technology enterprises, the eastern region evidently kept ahead of middle region and western region in enterprise number, gross output and value added; among the three second-class indicators of the competitiveness of management of high technology enterprises, except that the velocity of fixed assets of the eastern region kept ahead, the three regions did not vary a lot in sales profit rate and value added rate; as for the innovation capacity of enterprises, the capacity of innovation input of the western region kept ahead of the eastern region and the western region; the eastern region kept ahead of middle region and western region in the capacity of innovation implementation and the capacity of innovation output.

1.1 The competitiveness of the sizes of enterprises

In 2005, the number of high technology enterprises in eastern region was 13721, accounting for 78.3% of the whole nation, and the average annual output per enterprise was 224 million Yuan; the number of high technology enterprises in middle region was 2321, accounting for 13.2 % of the whole nation, and the average annual output per enterprise was 90 million Yuan, for which the eastern region was 2.5 times of the middle region; the number of high technology enterprises in the western region was1485, accounting for 8.5 % of the whole nation, and the average annual output per enterprise was 102 million Yuan, for which the eastern region was 2.2 times of the western region; Seen from the total number of enterprises and the average annual output per enterprise, the competitiveness of high technology enterprises in eastern regions kept far ahead of that in the middle and western regions.

1.2 The competitiveness of the management of enterprises

The sales profit rate of the eastern region was 4.1%, the middle region 5.3%, and the western region 4.3%, in which the middle region was better than the western and eastern region. The velocity of fixed assets of the eastern region was 4.87 times/per year, the middle region 2.31 times/per year, the western region 1.96 times/per year, in which the eastern region was evidently faster than the middle and western region, and the eastern region was respectively 2.1 times and 2.48 times of the middle region and western region. The value added rates of the eastern, middle and western region were respectively 22.5%, 33.1% and 33.2%, in which the western and middle region were higher than the eastern region.

Analyzing from the three second-class indicators of the competitiveness of management of enterprises, except that the velocity of fixed assets of the eastern region was evidently faster than that of the middle and western regions, the high technology enterprises in middle and western region was better than that in the eastern region in the other two indicators. Analyzed from the three indicators of the competitiveness of management of enterprises as a whole, the high technology enterprises in eastern, middle and western regions varied little in this aspect.

1.3 The competitiveness of the innovation of enterprises

1.3.1 The technology innovation input of enterprises

The competitiveness of high technology enterprises is mainly determined by whether this enterprise possesses technology resources of high level, human resources who are of high intelligence and innovation capacity, and solid capital source. (Huang, 2002) The innovation capacity of enterprises is determined by the enterprises' input in innovation. Under the same condition, the more the enterprise inputs in technology innovation, the more the output

may be. The technology innovation capacity includes the capital input intensity in R&D, the input intensity in R&D personnel and the expenditure input intensity on technology introduction, etc. With regard to the capital input intensity in R&D, the western region was 2.1%, middle region 1.3%, and eastern region 1%, in which the western region was evidently higher than the eastern and middle regions. The capital input intensity in R&D of Shanxi and Sichuan respectively accounted for 41.3% and 38% of the gross input of the western region and the summation of Shanxi and Sichuan accounted for 79.3% of the gross input of the western region in 2005. As a result, the input of Shanxi and Sichuan was in leading position in the western region and the capital inputs in R&D in provinces in the western region were severely imbalanced.

The input intensity of R&D personnel in eastern, middle, and western regions were respectively 8.65 persons per year per enterprise, 12.62 persons per year per enterprise, and 17 persons per year per enterprise, in which the western region was almost 2 times of the eastern region. The input of R&D personnel in Shanxi and Sichuan together accounted for 75.6% of that in the western region in 2005. The expenditure input intensity on technology introduction in 2005 in the eastern, middle and western regions were respectively 1.5 million Yuan /enterprise, 1.6 million Yuan/enterprise and 2.3 million Yuan/enterprise, in which the western region was far higher than the average value of enterprises in the middle and eastern regions. The expenditure input on technology introduction in Shanxi, Sichuan and Chongqing altogether accounted for 75% of that in the western region.

To sum up, to analyze from the date of the capacity of innovation input in the three regions, high technology enterprises in the western region were evidently higher than those in the middle and eastern regions in the input intensity of R&D capital, R&D personnel and the expenditure on technology introduction, but the input levels of the provinces in the western region were severely imbalanced. The input in the western regions concentrated in Shanxi, Sichuan and Chongqing.

1.3.2 The capacity of innovation implementation of enterprises

The capacity of innovation implementation of enterprises is the capacity of enterprises under the premise of guaranteeing innovation input, to transform the innovation assumption into design principles, new products and production prototypes, including research and development capacity and production capacity, etc. (Ge, 2005) , whose specific indicators include patent application rate, expenditure rate of new product development, expenditure input rate of enterprises on science and technology activities, and the bringing into production rate of completed projects. The patent application rates of the eastern, middle and western regions were respectively 1.06 item/enterprise, 0.5 item/enterprise and 0.73 item/enterprise, the number of which in the eastern region was more than that in the middle and western regions. Considering that the total number of enterprises in the eastern region accounted for 78.3% of the whole nation, the absolute amount of patent application by enterprises in the eastern region was far higher than that by enterprises in the middle and western regions. The expenditure rates on new products development in the eastern, middle and western regions were respectively 1.2%, 1.5% and 2.2%, in which the western region was evidently higher than the middle and eastern regions, while the expenditure on new products in Shanxi and Sichuan altogether accounted for 75.2% of that in the western region.

The expenditure input rate of enterprises on science and technology activities demonstrates the positions and functions of enterprises in science and technology activities. In developed countries in the west, the main body of technology innovation is enterprise and in expenditure input and use, enterprises occupy absolute superiority. This indicator can examine and check the marketization of innovation of enterprises. In 2005, the expenditure input rates of enterprises on science and technology activities in eastern, middle and western regions were respectively 89.6%, 77.5% and 62.4%, which decreased in turn and among which the eastern region was the highest, 17.2% higher than that in the western region. This shows that the high technology enterprises in the eastern region implement knowledge innovation production mode which can directly create fortune, centering on the creation of patents (the absolute amount and comparative indicators of patent application in the eastern region were far higher than that of high technology enterprises in the middle and western regions). The mode in the eastern region is evidently different from those of the middle and western regions who implement knowledge innovation modes which pursues the leading international level centering on the creation of thesis papers internationally embodied. (Zhao, 2005) The bringing into production rate of completed projects incarnates the level of enterprises in the capacity of innovating production. In 2005, the bringing into production rates of completed projects in the eastern, middle and western regions were respectively 45.91%, 45.43% and 37.56%, which shows that eastern region and western region were equal in the capacity of innovation implementation and were both higher than that of high technology enterprises in the western region.

To sum up, in the indicator of the capacity of innovation implementation, except that the western region kept ahead in expenditure input rate of new product development (but imbalanced within the region), the eastern region evidently kept ahead of the western region and the middle region in paten application rate, expenditure input rate of

enterprises on science and technology activities and the bring into production rate of completed projects. What is more, through comparison and analysis, we can find that the eastern region implements knowledge innovation production mode which can directly create fortune, centering on the creation of patents, which is evidently different from those of the middle and western regions who implement knowledge innovation modes which pursue the leading international level centering on the creation of thesis papers internationally embodied.

1.3.3 The capacity of innovation output of enterprises

The capacity of innovation output of enterprises refers to the capacity of enterprises to innovate technology so as to decrease costs, create markets and generate incomes and reflects the economic profits and technology advancement brought by the technology innovation.(Ge,2005) It mainly includes the income capacity of new products, the sales capacity of new products, and the market occupying capacity of new products and the specific indicator include the output of new products, sales rate of new products and patent holding rate. The capacity of innovation output is the significant indicator to weigh the capacity of enterprises to create fortune and contribute to society. The innovation capacity of enterprises incarnates itself through the capacity of innovation input and the capacity of innovation implementation and ultimately through the capacity of innovation input. (Yang, 2007) In 2005, the outputs of new products in eastern, middle and western regions were respectively 46 million Yuan/enterprise, 20 million Yuan/enterprise and 30 million Yuan/enterprise. The average output of new products of high technology enterprise in the eastern region was 2.3 times of that of the middle region and 1.53 times of that in the western region. The differences among the three regions were large. The sale rates of new product in 2005 in the eastern, middle and western regions were respectively 20.4%, 13.8% and 30.2%, for which the western region was the highest, the eastern region in the middle position and the middle region the lowest. However, the incomes of sales of new products of Sichuan in the western region accounted for 53.2% of that in the western region and accounted for 78% of the western region together with that of Shanxi. It can be evidently seen that the sales of new products of high technology enterprises mainly concentrate in Sichuan, Shanxi and Chongqing. The patent holding rates of the eastern, middle and western regions were respectively 0.42 item/enterprise, 0.2 item/enterprise and 0.31item/enterprise. Through analysis, it can be found out that the patent holding rates in the eastern, middle and western regions is highly related to the output of new products.

In conclusion, judging from the capacity of innovation output of enterprises, the high technology enterprises in the eastern region were far higher than those in the middle region and western region in the output of new products and patent holding rate, which reflected that the capacities of high technology enterprises in the eastern region in exploring market, creating technology and innovating economic profits were far better than those in the middle region and the western region.

The result of the comparison of the competitiveness of high technology enterprises in the three regions from the 16 indicators of the 3 dimensionalities makes clear that the high technology enterprises in the eastern region were evidently higher than those in the middle region and western region in the competitiveness of the sizes of enterprises and the competitiveness of innovation of enterprises, while the competitiveness of management of enterprises of the three regions varied little. Considering that the innovation capacity of high technology enterprises is the key and core indicator of capacity, the comparatively high innovation capacity of high technology enterprises in the eastern region forms the superiority of the competitiveness of sizes. In the comparison of the three regions, the middle region, except that it was almost equal with the eastern region and western region in the competitiveness of the management of enterprises, fell behind the eastern region and western region in the competitiveness of sizes and the competitiveness of innovation capacity, so the middle region is of the weakest position in the development of high technology enterprises and measures shall be taken in order to keep up with the other two regions.

2. Analysis on the reasons of the differences of competitiveness of high technology enterprises in the three regions

The main reasons for the formation of the differences of competitiveness of high technology enterprises in the three regions are:

2.1 The differences of regional economic development influences the competitiveness of enterprises

From the economic development condition of China, the eastern region possesses comparatively advanced technology and abundant capital basis, while the middle region and the western region are weak in these two aspects, for which China implemented imbalanced development strategy of regional economy which gradually developed economy from the east to the west in 1980s and 1990s. Under the instruction of this strategy, China implemented many preferential policies for regional development to the eastern region, resulting that the economy growth speed in the eastern region gradually exceeded that in the middle and western regions. Attracted by better incomes, more opportunities to find jobs, and capital profit, human resources and capital flowed to the west in large amount. As a

result, the economy center of gravity moved towards the east and the high technology enterprises in the eastern region rapidly grew up and developed fast. The fast economic development laid a solid material foundation for the eastern region to carry out technology innovation, provided the eastern region with the capacity to bring into, explore and utilize persons with ability, technology and key equipments to carry out technology innovation, and further enlarged the distance of the eastern region with the middle and western regions.

2.2 From the persons with ability and the key resource that determines the competitiveness of high technology enterprises, there exists certain gap in the storage amount of human resources in the three regions no matter judging from the comparative sizes of education or from professional technicians. Persons with ability are the core in technology innovation activities and the discovery. To grasp innovation chances needs piloting persons with ability and of high makings; the research and development activities need technicians of high makings; the transformation of development fruits need personnel of high makings; successful market exploration needs marketing persons with ability and of high makings; the organization, administration and assisting of innovation activities need piloting persons with ability and management persons with ability and of high makings. The reform of science and technology system in the eastern region is deeper compared with that in the middle region and western region and the prospective of science and technology policies is comparatively stronger. Most of the enterprises in the eastern region can provide loose environment for workers to innovate, can select talents of innovation type and put them in important positions, can share innovation fruits with the innovators, and adopt flexible person using systems; at the same time, inside the enterprises, there forms an open culture atmosphere for innovation which enhances the cohesion power of enterprises towards their workers and the attraction power of enterprises to the outside; these reasons altogether lead persons with high technology levels and administration talents of high makings to continually flow from the middle and western regions to the eastern region, which has accumulated solid human resources for the eastern region to innovate technology and led the middle region and western region go short of innovation talents. Persons with ability are the key for enterprises to realize technology innovation. The lack of persons with ability, particularly the lack of persons with high technology, is the main reason for the deficiency of innovation capacity and weakness of competitiveness of enterprises in the middle and western regions.

2.3 The influence of knowledge development strategy

There are two kinds of knowledge production modes. One is to pursue the leading international level centering on the creation of thesis papers internationally embodied. The other is to directly create fortune, centering on the creation of patents. Whether a region uses its knowledge recourse in knowledge production to pursue the leading international level or to directly create fortune exerts direct influence on the its technology innovation and the industrialization of high technology and further influences its economic growth speed. The direction of the latter knowledge production pays more attention to the marker value of knowledge and through technology innovation; this mode can directly transform knowledge production into market profits for enterprises. The huge superiority of the eastern region in patents is just the result of this kind of knowledge resource collocation. Although there are many science and resource institutes and higher education colleges in the western region (such as Shanxi, Chongqing, Sichuan and Gansu), there lacks cooperation among enterprises. The western region adopts the knowledge production mode which pursues the leading international level, which directly influences the industrialization level of its high technology. The differences of knowledge development strategies lead into such situation that the eastern region is evidently higher than the middle and western regions in the innovation output of high technology enterprises.

3. The countermeasures for raising the competitiveness and innovation ability of high technology enterprises in China

In order to realize the sustainable development strategy, the competitiveness of high technology enterprises in China, especially their innovation capacities, must be raised. The corresponding countermeasures that can be adopted are mainly as follows.

We should implement "directly create fortune" knowledge strategy, urge enterprises to quickly face the markets and to become the innovation main body in exploring markets and pursuing fortune. The details include: first, we should make enterprises the main body of research and development. The innovation and development jobs are mainly carried out in enterprises, so we should encourage and support the qualified high technology enterprises to set up and improve their technology researches and development centers, closely combine industry, academia and research projects with technology centers, reform the existing science and technology system, push enterprises to construct research and development institutes together with science and research institutes, encourage enterprises to cooperate with science and research institutes in multi-channels to participate in science and technology fruits transformation and the industrialization of high technology. Second, we should make enterprises the investment main body in innovation, and establish innovation investment and financing mechanism and system of multi-channels with

enterprises as the investment main body. Third, we should make enterprises the distribution main body in the innovation profits and grant enterprises the right to freely distribute their innovation profits.

The cooperated innovation among industry, academia and research shall be enhanced. Enterprises shall together with high schools and science and research institutes carry out technology transfer, cooperate in research, cooperate in development, entrust in development and construct new enterprises. A new type of cooperation mechanism based on industry, academia and research, supported by enterprises and piloted by government shall be constructed. We should scientifically apply the piloting function of government actions and centralize necessary policies, capitals and persons with ability for the cooperation of industry, academia, and research and provide conditions macroscopically. With regard to cooperation distribution mechanism, we should quicken enterprises to participate in research and development, shoulder expenditure on research and development, and what is more important, we should let the research and development notice the need of industrialization so as to avoid mistakes.

The government shall establish and improve innovation policies and regulation system, enhance the macroscopical piloting and monitoring by the state and accelerate the establishment of technology innovation system and operation mechanism for it. At present, the policies, regulations and various measures for technology innovation in China are imperfect. Therefore, the government can start from doing researches on the actual conditions, problems and obstacles in the innovation encountered by high technology enterprises and then formulates and perfects relevant policies and regulations. In addition, the government shall formulate long-term plans and centralize certain amount of capital to overcome difficulties in innovation and to be applied to key technology of great significance. The government shall further enhance propaganda so as to raise the innovation consciousness of the whole society, plan the innovation system of high technology of the whole nation, push the cooperation among industry, academia, and research, and pilot in the cooperation among enterprises, make use of policies of exemption from tax in tax and equipment renovation, encourage enterprises to invest themselves, set up risk investment funds and encourage the industrialization of high technology.

We shall improve the socialized service system for the growth of high technology enterprises. Through providing high technology enterprises with consulting, information and training, the socialized service system can push the high technology enterprises to carry out innovation activities and drive enterprises to grow. This is a successful experience from the industrialized countries. Since the opening up and reform of China, Chinese government has done many jobs on providing high technology enterprises with consulting, information and training services, but there are still many problems to be solved, such as the lack of general planning, imperfectness of service system, insufficiency of support intensity. Henceforth, governments of various levels shall enlarge their support intensity and further improve the service system for the growth of high technology enterprises.

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Table 1. Table for the General Comparison of the Competitiveness of High Technology Enterprises in Eastern, Middle, and Western China of 2005

First Class Indicators	Second Class Indicators		Eastern Region	Middle Region	Western Region	National Average
The Competitiveness of Size of Enterprises	The number of enterprises: number/%		13721/78.3	2321/13.2	1485/8.5	17527
	Average Gross Output: 100 million Yuan / enterprise		2.24	0.9	1.02	1.96
	Average Value Added: 100 million Yuan/ enterprise		0.51	0.3	0.34	0.46
The Competitiveness of Management of Enterprises	Sales Profit Rate: %		4.1	5.3	4.3	4.2
	Velocity of Fixed Assets: times/year		4.87	2.31	1.96	4.34
	Value added rate: %		22.5	33.1	33.2	23.6
The Innovation Capacity of Enterprises	The Capacity of Innovation Input	The Input Intensity of R&D Capital: %	1	1.3	2.1	1.1
		The Input Intensity of R&D Personnel: person per year/enterprise	8.65	12.62	17	9.88
		The Input Intensity of Technology Introduction: 100 million Yuan/enterprise	0.015	0.016	0.023	0.016
	The Capacity of Innovation Implementation	Patent Application Rate: item/ enterprise	1.06	0.5	0.73	0.96
		Expenditure Rate of New Product Development: %	1.2	1.5	2.2	1.2
		The Expenditure Input Rate of Enterprises on Science and Technology Activities: %	89.6	77.5	62.4	86.4
		The Bringing into Production Rate of Completed Projects: %	45.91	45.43	37.56	44.51
	The Capacity of Innovation Output	The Output of New Products: 100million Yuan/enterprise	0.46	0.2	0.3	0.4
		The Sales Rate of New Products: %	20.4	13.8	30.2	20.4
		The Patent Holding Rate: item/enterprise	0.42	0.2	0.31	0.38

Source: *China Statistics Yearbook on High Technology Industry* (20060, edited by State Statistical Bureau, National Development and Reform Commission and Ministry of Science and Technology, published by China Statistics Press in September 2006 in Beijing.)

Trends and Patterns of Foreign Direct Investment in Lao PDR

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Abstract

Foreign direct Investment (FDI) has played an important role in the development of the economy of Lao Peoples Democratic Republic (Lao PDR or Laos) in recent decades. Economic transition of Laos to a market-driven economy has attracted international investor attention. This paper examines the trends of foreign capital inflows to Laos as they increased since the promulgation of FDI law in 1988.   The paper also describes the sources and types of FDI in Laos.   The sectoral, provincial and legal-type distribution of FDI in Laos are investigated.   Finally, the paper provides an overview of the trends and patterns of Australian investments in Laos.

Keywords: Foreign direct investment, Lao PDR, ASEAN, Australia, Newly industrialising economies

1. Historical Background of Foreign Direct Investment in Indochina

FDI in Indochina (Laos, Cambodia and Vietnam) dates back to the period of European colonial rule. At that time, Indochina opened up for international trade and investment by the countries that colonised them. The European nations were searching for investment opportunities in which to source inputs and invest into new markets. Initially, the European business activity focused on small trading, but industrial revolution made the need for resources in the new markets and foreign investments.   The French was the main investor in Indochina region between 1887 and 1953 (Freeman, 2002) (Note 1)

France's FDI in Indochina prior to 1990 appeared to have been insignificant (Linbald, 1998, p.13).   France's first major FDI in Indochina-Vietnam was in communication, mining activity, followed by trading firms, rubber and tea plantations and processing, and textile companies (Callis, 1942, republished 1976). The French considered Vietnam as a trade link to the huge Chinese market (Murray, 1980).   By 1937, Indochina received a total FDI inflow of US$302 million. In terms of sectors, the services sector was the major investment sector, followed by Agriculture (32 per cent), mining (16 per cent) and others (16 per cent) (Callis, 1942).

The 1920s experienced a boom in the mining activity in Indochina.   With respect to Laos, tin mining was the only business sector that received an interest under the French colonial rule (Stuart, 1995, pp.135-136).   At that time, France was the major investor in Laos.   By 1937, about 97 per cent of all investment in Laos was from France (Linbald, 1998, pp.14-19). Indochina has experienced a rapid change in FDI activity in the mid 1980s when the countries began their economic transitions.

2. Trends in Foreign Direct Investment in Laos

The focus of this section is on inflows of FDI to Laos during the country's economic transition from a centrally planned economy to a market driven economy.   The data on FDI inflows into Laos were obtained from the Department of Domestic and Foreign Investment of Lao PDR (DDFIL) and span the period 1988 to 2004.   The FDI data are recorded in U.S. dollars (Note 2).

At the beginning of Laos' economic reforms FDI inflows to Laos were small.   According to the DDFIL (2004), inflows of FDI to Laos were US$2.7 million in 1988.   Figure 1 depicts capital inflows to Laos during the period 1988-April 2004.   Foreign investment inflows to Laos started to increase in the early 1990s.   According to Freeman (2002), the early 1990s saw a boom in private capital inflows, portfolio investment and commercial bank lending.   In 1994, inward FDI to Laos was US$1.6 billion. Real FDI inflows to Laos appears to have increased in 1995, 1996, 1997 and 1998 when Laos amended its investment law in 1994 (Figure 1).   The rise in FDI in Laos was associated with the global economic boom, which increased FDI worldwide. The Asian financial crisis temporarily impacted on the FDI flows to the Asian countries including Laos.

By December 1997, approved FDI investments in Laos were valued nearly US$1.26 billion (DDFIL, 2004) (See Appendix 1). Attractive investment sectors were mining, forestry, telecommunications, hotel, wood industries, tourism, and hydro-electricity power, petroleum and garment industries. Initially, joint ventures were the preferred mode for foreign investment entry in Laos. In June 1993, wholly foreign owned enterprises were the common mode of FDI, accounting for 57 per cent of FDI licences.   During 1988 and 2004, Laos had received a total inflow of FDI of US$8.012 billion.   Figure 1 shows inflows FDI to Laos were just under US$400 million during 2000 and 2004. While the official figures show a decline in FDI inflows to Laos, it appears that actual FDI inflows have increased significantly during the last several years (Figure 2).   In fact, the regional economy has improved and Laos has made investment more attractive and easier, especially speeding up every step in the processing of documents. It has also improved its investment potential, with a zero import duty on machinery and the investment term of 50-75 years, which was in the past only 20-30 years.   Appendix 1 presents data on approved FDI in Laos by country of origin during 1988 and 2004.   The growing interest in FDI in Laos reflected the country's ability to attract FDI flows over the last decade.   Moreover, Laos had co-operative arrangements with the ASEAN countries and participated in multilateral trade. Laos has benefited from the trade and investment agreements of the ASEAN Investment Area in 1998 and the launching of investment privileges under the Bold Measures announced in December 1998 (ASEAN Investment Report, 1999).   Furthermore, it is anticipated that FDI inflows to Laos continue to rise in the coming years as a result of the ASEAN-Australia and New Zealand agreements on the trade and investment (Normal Trade Relations) signed in November 2004.

It appears that actual FDI in Laos has increased remarkably in the past several years with a growth of more than 30 percent per year on average over the three full years, 2000/2001, 2001/2002 and 2003/2004.   The actual investment was estimated to increase by 20 per cent during the period 2002-2003, to about US$180 million, while the approved FDI rose to about US$503 million during the same period.   Figure 2 shows approved FDI flows and actual FDI flows in Laos during the period 2003-2004.   As shown in Figure 3, the main drivers of the rise in approved and actual FDI in Laos in 2003/04 have been investments in industries and services (WBG, 2004).

ASEAN investment in Laos increased rapidly during the period 1997 to 2004.   ASEAN investors have become the largest sources of FDI in Laos. This may suggest that Laos is becoming a favourable investment location with cultural links with ASEAN investors. European investment in Laos shows a downward trend in recent years as they have been replaced by the Newly Industrialised Economies (NIEs).   The triad countries [Japan, the U.S and the European Union] were traditionally the major sources of FDI flows into the ASEAN region. It appears that the NIEs and intra-ASEAN investment (China, Taiwan, Malaysia and South Korea) have become significant sources of FDI to the Asian region (ASEAN Investment Report, 1999). These countries have become a major source of foreign investment in Laos in recent years. The major developed countries with investments in Laos have been the USA, France, Switzerland, Australia and New Zealand.   The ASEAN countries, Thailand, Singapore and Malaysia have also invested a large amount in Laos (US$200 million in June 1993). The growth in ASEAN and NIE investments in Laos were significant in the period 1992-1994 (Than and Tan 1997).   The trend indicates the importance of Lao integration into the ASEAN regional economy and the international economy (FIMCL, 1997). Thailand has been the dominant investor in Laos since 1988. Between 1988 and 1994, Thai investment in Laos was over six times greater than that of the second largest investor, the USA (US$554 million versus US$86 million) (Far Eastern Economic Review, 1995). In 2004, Thailand accounted for 34.30 per cent of all FDI flows to Laos.   This dominant position of Thailand is expected to remain for many years because of its geographical proximity, cultural links and close trade and economic relations with Laos.

The next largest source of inward FDI in Laos was the USA, accounting for 13.38 per cent, followed by Malaysia (9.72 per cent), France (5.58 per cent) and China (4.25 per cent) (Note 3). The EU FDI has also been significant in Laos.   France is one of the largest EU investors in Laos.   Historical ties had a great deal to do with this development. Laos has become a favoured EU investment destination and a source of exported products to the EU because of the Generalised System of Preferences (GSP) granted to Laos. Wholly foreign owned FDI has been the common type of foreign investment since the amended law in 1994.

In 2003-2004, the main countries with investment approvals in Laos have been Australia (US$293 million), followed by Vietnam (US$63 million), Thailand (US$60 million), Switzerland (US$30 million) and China (US$28 million) (See Figure 4). Other investors are Malaysia, Netherlands, the Republic of Korea, the United States of America, and France. Data on actual investments by country were not available, however, the main investors in 2003/2004 were Australia, China, Malaysia, Thailand, Vietnam, Asian NIEs and several EU members (WBG, 2004). Australia remains an important player in investment in Laos. It is expected that Australian investments in Laos continue to rise as Laos improves its physical infrastructure, economic performance, political stability and continuation of bilateral trade relations with Australia.

3. Patterns of Foreign Direct Investment in Laos

3.1 Sectoral Distribution of Foreign Direct Investment in Laos

The sectoral distribution of FDI in Laos has changed considerably since the adoption of the law on FDI in 1988. In the early 1990s, foreign investment in Laos concentrated on the hydropower sector and the mining sector. Western investors began to explore for potential natural resources, notably in 1990-1993, and in recent years. Foreign investment in the manufacturing sector was significant since 1992. In the manufacturing sector, much of the investment was in labour intensive and low technology industries. Direct investment within the manufacturing sector was spread across a broad range of industries, the most important being textiles. Other important industry groups were beer and footwear. Foreign direct investment flows to Laos by industry sector are shown in Appendix 2.

FDI in the manufacturing sector continued to rise in the mid 1990s. By 1995, Laos exported 80 per cent of garments produced in FDI related factories to the EU nations (Freeman, 2001). The firms of Asian NIEs were attracted to the manufacturing industry, including the production of textiles, garments, footwear and other manufactured goods. Foreign firms have also begun to invest in the services sector during the period 1990 to 1992. The shift in the pattern of FDI in Laos can be explained by two factors. Firstly, the revised law encouraged FDI into export-oriented manufacturing enterprises as well as improvement in infrastructure. Secondly, ASEAN firms were the fastest growing sources of foreign investment in Asia (Freeman, 2001). In addition, Laos is in the process of moving from an agricultural economy to an economy with a small industrial sector focusing on manufacturing activities and tourism (United Nations, 2005).

In 1996, foreign investments in the manufacturing sector accounted for 21 per cent. Wearing apparel and garments accounted for a significant share of investment flows to Laos. According to the ASEAN Investment Report (1999), the USA and South Korea investments in Laos were concentrated in the hydropower industry, while the investments from France, China and Thailand were diversified in all sectors. In 2003, the top four investors in all business sectors were China, South Korea, Malaysia and Thailand. The top four investors in the manufacturing sector were China, Thailand France and Malaysia (Savan-Seno Special Economic Zones Authority, 2003).

The majority of Australian investments in Laos were in the mining, construction and hydropower sectors. Australian investment in the South East Asian region has also been substantial in the mining sector in the second half of the 1990s. This importance of Australian direct investment in the mining sector could be due to the long tradition and experience in Australian firms of exploitation in mining and the development of mining technology (BIE, 1995). In 1996, hydro-electricity projects accounted for about 75 per cent of the total value of investments approved. Mining accounted for 4 per cent, services 17 per cent and energy 73 per cent. Other attractive sectors were garments, manufacturing and agriculture (FIMCL, 1996; DFAT, 1997). This suggests that Australian investors are keen in mineral exploration and are able to bring world-class expertise and technology. This sectoral pattern of investment can be explained by the concept of comparative advantage. Australia has a comparative advantage in expertise and in the activities relating to resource extraction in the mining, energy and mineral industries.

During 1997-1998, about 49 per cent of FDI flows to Laos went to hydropower sector, which was one of the capital-intensive sectors. About 17 per cent of the total FDI flows concentrated in the manufacturing sector and about 34 per cent in services, hotels, agricultural and other sectors (ASEAN Investment Report, 1999). Investment in the mining sector has also increased over the years, representing 1.28 per cent of total FDI flows to Laos. FDI into hotels, restaurants, industries and handicrafts increased dramatically between 1994 and 1996 (see Figures 5 and 6).

Currently, FDI flows to Laos are concentrated in hydropower (67.40 per cent), handicrafts such as weaving silk (3.88 per cent) and industries comprising of labour intensive and low-technology goods such as garments aimed at export markets. Hotels and restaurants (7.18 per cent), telecommunications (8.21 per cent) and services (3.11 per cent) are other sectors that receive FDI in Laos. Although FDI in mining represents 1.28 per cent of total investment by sector in Laos, it appears that actual FDI in mining has grown rapidly since the early 1990s. Australia is the largest foreign investor in mining in Laos. Australian investments in the mining industry in Laos have grown rapidly, notably during the past several years. Figures 4 and 5 present data on investment values according to industry for the period 1988 to April 2004. Overall, most of the investment projects have been in hydropower energy, handicrafts, and wood processing, telecommunications and mining sectors. Appendix 2 shows Annual FDI inflows by sector between 1988-2004.

In 2003-2004, approved FDI in the industrial sector (mining, handicrafts, wood processing) accounted for almost 70 per cent of the total FDI approvals (US$350 million), while agriculture and services made up around 25 per cent of total FDI approvals each (US$76 million). Estimated actual investments in the industrial sector and mining were 86

per cent of the total (about US$150 million, mining estimated at US$130 million or 87 percent), followed by agriculture (around 3 per cent) and services (11 per cent). In sum, most of the approvals of FDI concentrate in natural resources (hydropower and mining) and some in services, but very little in the agricultural sector (WBG, 2004).

3.2 Foreign Direct Investment by Province

The Lao government started to encourage FDI outside Vientiane in the mid 1990s. This was a part of the government's regional development strategy. Latest data are not available on FDI by provinces. Data are only available for the 1992-1999 period. FDI in Laos is unevenly distributed across the regions (See Table 1). The majority of foreign firms are located in the central region of Laos and in the metropolitan area of Laos. These include both manufacturing and services industries. Reasons for this concentration are easier access to transportation, the availability of labour force, and the proximity to government departments and markets. The government recently provided attractive tax and non-tax incentives in recognising the need to promote inward FDI in rural areas.

3.3 Foreign Investment by Legal Types

Joint ventures and wholly foreign owned enterprises have been the common types of FDI in Laos, in terms of capital registered and project implementation (See Table 2). It is likely that 100 per cent foreign owned enterprises exceed joint ventures as government policy encouraged this form of investment (Saignasith and Lathouly, 1995). Following the amendments of the 1988 law, joint ventures and wholly foreign owned enterprises remain. No current data on FDI by legal types are available; the data are confined to the 1990-1992 period. The DDFIL does not have the data on foreign investment by legal types. In relation to Australian investments in Laos, wholly owned and joint ventures have been the preferred modes of entry.

4. Australian Investments in Laos

In this section, the emphasis is on Australian direct investment in Indochina and Laos, and the data were obtained from the DDFIL. This section supplements to the findings from the ASEAN Investment Report (1999), DFAT (1994, 1997), and Freeman (2001, 2002).

Australia's direct investment in Indochina became insignificant since the 1970s. Australian investors represented small interests in Indochina. Political instability and the lack of infrastructure have impacted Indochina's trade and investment (DFAT, 1994). In the past decade, there has been a change in the pattern of Australian investment towards ASEAN countries including Indochina countries. Economic reforms in Indochina in 1986 have expanded trade and investment opportunities for Australian firms. Australian investment in Indochina has been significant in minerals exploration and construction. Cambodia, Vietnam and Laos have emerged as attractive locations for foreign investments in manufacturing industries such as textiles, clothing, footwear and tourism industry (DFAT, 1994).

No data are available on Australian investment in Laos on a year-by-year basis; therefore, this section seeks to describe the general pattern of Australian FDI flows to Laos between 1988 and 2004 (Note 4). Appendix 3 shows the number of projects and values classified by industry in which Australian investors have been investing. Prior to 1988, Australian investment in Laos was insignificant. Following the 1986 open door policy, many Australian firms including mining companies were allowed to conduct mineral exploration in Laos.

In 2004, while the level of Australian investment in agriculture in Laos has remained small, Australian investment has been substantial in the mining sector of which Laos accounted for 25 per cent of total investment, followed by construction (21.84 per cent), hotels (14 per cent), services (10.45 per cent), handicrafts (9.76 per cent) and hydroelectricity power (3.79 per cent). The mining and construction sectors have received more investment applications. However, Australia is not the only new comer to invest in these sectors. The USA, China, France and South Korea have become the largest investor sources in these sectors. In the late 1990s, nearly about a quarter of all approved projects were in the hydropower sector. Other sectors in which Australia has been active include tourism, consultancy, financial, trading and agriculture.

Australian investors are attracted to resources as well as relatively cheap labour that exist in Laos. Australian FDI flows to the mining, hydropower and manufacturing industries indicate that these are resource-seeking investments. This also suggests that Australian firms are investing in locations that provide them with competitive advantages and economies of scale. Thus, it points to the efficiency seeking of FDI. The Lao government progressively relaxed the restrictions to attract more foreign investors in mineral resources. Mining activities are an important source of income for Laos (Freeman, 2001).

The ASEAN Investment Report (1999), BIE (1981,1984,1994,1995), Oyul (2003) and the DFAT (1997) found that

Australian investment in Asia in general is concentrated in several industries including mining, construction, consultancy and services. The leading investors in Asia in mining are the USA and Australia.

5. Conclusion

FDI has contributed to the development of the Lao economy during the transition of the country into a market driven economy. FDI has benefited the country in terms of its contribution to the socio-economic development, foreign exchange earnings, technological advantages, increased gross domestic product, and employment creation. In addition, FDI flows have assisted the Lao economy in poverty alleviation. Laos has been learning to encourage FDI in order to support its economic reforms and achieving significant development. Over the past decade, FDI flows to Laos have gradually grown. The 1990s saw a remarkable increase in the world FDI as a result of liberalisation of FDI regulations in most part of the world. Developing country governments were driven by the need to attract foreign investment by offering investment incentives and removing major obstacles to foreign investment.

South East Asian countries have been attractive recipients of FDI in the 1980s and 1990s. These countries have placed emphasis on the role of FDI played in contributing to the development of their economies. Countries such as Laos that were internationally isolated in the past had experienced shortages of foreign capital flows into the country. Laos, being one of the least developed countries has been successful in attracting foreign capital of multinational enterprises seeking new markets, resources and low cost of production to manufacture products and services. Australian investors have become actively involved in various sectors of the Lao economy. In recent years, Laos experienced a significant capital inflow also from the newly industrialising economies (NIEs).

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Notes

Note 1. Laos was established under the French colony in 1893 and declared independence in 1953. The king of Cambodia placed the country under the French colony in 1863. Cambodia became part of French Indochina in 1887 and declared independence in 1953. Vietnam became part of French Indochina in 1887 and declared independence in 1953 (CIA, 2006a, 2006b, 2006c).

Note 2. Note that the DDFIL only records license approvals rather than project implementations. The WBG and the ADB, on the other hand, record the actual project implementations. Approved investments may overstate or understate the actual investments because not all projects approved are implemented. Similarly, Freeman (2001, p.8) notes that it is difficult to examine the actual FDI flows into Laos. Actual investment may be lower than approved investment, noticeable in the case of manufacturing projects where many projects have not been implemented due to delays in the processing of investment proposals. In addition, several projects involving foreign investors from different countries are involved but the total investment is from the home country of the lead investor.

Note 3. The DDFIL records total inflows FDI (approval) in Laos by country of origin.   Actual FDI data are difficult to obtain due to the inclusion of approved but unimplemented projects in DDFIL. For the purpose of this discussion, the host country (Laos) is excluded since the whole pretext to this research is foreign-based companies investing in Laos. It needs to be a foreign-based company with decisions for FDI out of overseas into Laos. If it's based in Laos no FDI occurs as revenue is generated and spent in Laos - no FDI transfer.

Note 4. Detailed figures from the DDFIL showing the trend and pattern of Australian direct investment in Laos are available only since 1988.   However, because of the dominance of Australian investment in the mining sector, the data in Appendix 3 can be taken as indicative of the industry distribution of Australian foreign investment in Laos.

Note 5. Parts of this paper are included in (Sisombat, 2007).

Appendix 1. Approved Foreign Direct Investment in Laos by Country of Origin, 1988-2004

(US$ Million)

No.	Country	Projects	1988	1989	1990	1991	1992	1993
1	Thailand	285	646,000	36,218,356	3,982,434.00	20,288,878.00	32,812,397.00	42,221,914
2	Laos	24			200,000,000.00		500,000	39,000,000
3	USA	53	2,000,000		639,912,285	874,285	14,752,000	1,020,000
4	Malaysia	34					17,930,000	5,124,000
5	France	112	30,000	320,000	3,337,847.00	2,400,000	1,340,051	3,242,600
6	China	138			2,982,183	5,219,082	19,018,131	19,081,475
7	Vietnam	39				93,243	251,768	1,406,397
8	Korea	88				695,714	5,305,000	157,132,000
9	Norway	5						
10	Taiwan	38			3,100,000	3,561,550	22,050,000	17,200,000.00
11	Singapore	27			277,784	3,000,000	899,600	2,875,000
12	New Zealand	2						
13	Australia	47			170,000.00	525,000	7,520,000	13,312,392
14	Russia	20		337,500	5,469,000	20,595,000.00	330,000	200,000
15	United kingdom	21		1,000,000	35,000		40,000	2,000,000
16	Japan	37			511,000		1,302,200	332,000
17	Canada	17		450,000	30,000		200,000	1,300,916
18	Sweden	8					29,500	217,000
19	Germany	17				600,000	400,000	50,000
20	Switzerland	6						200,000
21	Belgium	7				437,000		
22	Cambodia	3						
23	India	5			350,000			
24	Finland	3						
25	Iceland	3						
26	Italy	4				138,000		
27	Netherlands	4						500,000
28	Denmark	5		100,000		77,000		
29	Indonesia	1			339,102			
30	Austria	3				40,000		
31	Mymmar	2						
32	Luxembourg	1						
33	Ukraine	1						
34	Cuba	1						
35	Bangladesh	2						
36	Other	1						
	Total	1064	2,676,000	38,425,856	860,496,635.00	58,544,752.00	124,680,647.00	306,415,694.00

Appendix 1 Continued..

1994	1995	1996	1997	1998	1999	2000
1,057,020,538	40,847,836	502,465,000	356,572,906	525,905,200	7,350,000	3,334,400
438,000,000		116,400,000	408,500,000	275,000,000	37,750,000	
3,348,500	71,884	277,660,000	1,284,500	1,400,000	114,523,716	
3,430,000	5,000,000.00	211,200,000	458,448,386	3,100,000	14,700,000	3,530,000
3,204,247	1,055,000	1,712,111	3,304,893	387,683,090	1,085,100	2,550,000
26,786,000	10,179,000	3,150,000	3,810,838	7,651,470	42,713,576	10,605,800
706,820			327,331	1,603,000	14,751,250	1,613,000
2,840,000	6,600,000	1,130,000	1,788,810	6,800,000	4,250,000	9,359,750
56,000,000			1,080,000	120,000		
8,180,000	13,200,000	500,000	350,000	1,350,000	500,000	
	200,000	10,000,000	3,300,000		1,650,000	400,000
					50,500,000	
726,200	1,799,270	500,000	5,930,578	1,290,000	50,000	210,000
2,431,000		120,000		487,500		120,000
	4,000,000	14,097,000		285,000	3,634,000	
662,000	5,100,000	2,750,000	6,665,985	2,229,400	1,500,000	2,775,000
160,000	20,637,940		200,000	50,000	100,000	
110,000			634,500			
680,000			1,506,000	140,000		200,000
						2,000,000
	63,000		2,038,352	90,000	100,000	
				100,000		999,500
			230,000		75,000	500,000
		720,000			100000	
				300,000	500,000	
	100,000	100,000				50,000
		70,000		162167	50,000	
			100,000			
		50,000				
			200,000			
200,000						
			100,000	50,000		
			100,000			
1,604,485,305	108,853,930.00	1,142,624,111	1,256,473,079	1,215,796,827.00	295,882,642.00	38,247,450.00

Appendix 1 Continued..

2001	2002	2003	2004	Total	% share
4,036,594	13,934,852	79,773,341	20,600,000	2,748,010,646	34.30%
90,000,000	21,683,000	11,323,999	3,250,000	1641406999	20.49%
3,211,560	8,000,000	2,260,000	2,120,000	1,072,438,730	13.38%
100,000	26,553,000	30,014,493		779129879	9.72%
11,202,916	8,706,400	15,585,000	450,000	447,209,255	5.58%
12,415,000	55,352,796	114853581	6,610,000	340428932	4.25%
273,189,570	6,372,000	5,701,897	1,382,134	307,398,410	3.84%
9,350,000	14,597,000	5,280,000	200,700	225328974	2.81%
		21,800,000		79,000,000	0.99%
300,000	2,620,000			72911550	0.91%
250,000	1,300,000	35,800,000		59,952,384	0.75%
				50500000	0.63%
400,332	1,690,000	5,413,597		39,537,369	0.49%
300,000	950,000	1,500,000		32840000	0.41%
	843,200	4,900,000		30,834,200	0.38%
	811,000	1,000,000	500,000	26138585	0.33%
	500,000	180,000		23,808,856	0.30%
	12,940,000	100,000		14031000	0.18%
1,150,000	300,000	100,000		5,126,000	0.06%
750,000	400,000	350,000		3700000	0.05%
100,000				2,828,352	3.53%
950,000				2049500	2.56%
	399,398			1,554,398	1.94%
	675,065			1495065	1.87%
	1,200,000			1,200,000	1.50%
				938000	1.17%
				750,000	0.94%
				459167	0.57%
				339,102	0.42%
		120000		260000	0.32%
200,000				250,000	0.31%
				200,000	0.25%
				200,000	0.25%
185,000				185000	0.23%
				150,000	0.19%
				100000	0.12%
408,090,972	179,827,711	336,055,908	35,112,834	8,012,690,353	100.00%

Source: Department of Domestic and Foreign Investment of Lao PDR (2004).

Note: Official figures include former Lao citizen now living overseas and small number of investments made by Chinese and Vietnamese companies. The DDFIL records licence approvals rather than project implementation.

Appendix 2. Foreign Direct Investment flows to Laos by Sector (US$), 1988-April 2004

No.	Sectors	No. Projects	1988	1989	1990	1991	1992
1	Power	19			800,000,000		
2	Telecommunications	17			5,000,000	500,000	200,000
3	Hotel-Restaurant	81			535,000	4,685,714	6,138,814
4	Industries-Handicraft	202		3,698,302	2,724,285	4,785,774	19,853,452
5	Services	178			39,040,000	2,340,000	1,910,916
6	Wood Industries	52	446,000	1,854,500	2,011,000	2,171,362	35,152,200
7	Agriculture	122			440,000	9,770,482	15,106,000
8	Construction	50		239,054			18,029,000
9	Mining	53		100,000		4,578,000	3,451,768
10	Trading	145	2,200,000	4,230,000	1,518,320	23,831,000	2,079,428
11	Bank	9		25,800,000			10,000,000
12	Garment	84		84,000	8,900,030	5,722,420	12,680,569
13	Consultancy	52	30,000	2,420,000	328,000	160,000	78,500
	Grand Total	1064	2676000	38425856	860496635	58544752	124680647

Appendix 2 Continued…

1993	1994	1995	1996	1997	1998	1999
195,000,000	1,180,000,000		388,000,000	1,130,000,000	1,100,000,000	151,000,000
740,000	62,800,000		491,840,000	800,000	75,000,000	771,050
6,094,600	280,173,217	500,000	212,540,000	523,971	2,650,000	335,000
29,434,796	10,740,598	54,807,890	19,540,000	9,240,852	6,170,970	45,841,713
2,116,200	2,505,600	10,539,270	5,457,000	7,789,998	7,193,000	8,310,100
4,209,000	20,371,000	577,770	12,000,000	82,130,000	4,095,167	
16,755,872	6,791,890	5,097,000	2,100,000	6,323,152	4,506,300	66,152,479
13,885,512	18,430,000	5,500,000		5,690,000	3,528,900	1,000,000
11,100,000		23,200,000	500,000	4,000,000	8,344,500	4,723,300
5,796,714	7,166,000	530,000	2,206,000	5,577,838	526,200	6,384,000
10,000,000	5,000,000	5,000,000	6,000,000			10,000,000
9,891,000	9,940,000	3,087,000	2,291,111	4,317,268	2,180,000	900,000
1,392,000	567,000	15,000	150,000	80,000	1,601,790	465,000
306415694	1604485305	108853930	1142624111	1256473079	1215796827	295882642

Appendix 2 Continued…

2000	2001	2002	2003	2004	Total	% Share
	360,000,000	22,000,000	72,800,000	2,000,000	5,400,800,000	0.67403
		12,940,000	413,597	7,000,000	658,004,647	0.08212
250,000	539,916	24,050,000	33,808,000	2,600,000	575,424,232	0.07181
11,042,800	4,730,570	64,388,196	22,759,159	1,500,000	311,259,357	0.03885
10,234,000	11,695,560	13,292,967	126,150,447	720,000	249,295,058	0.03111
2,153,000	1,715,000	5,473,000	2,773,669		177,132,668	0.02211
7,778,250	12,838,000	6,395,150	7,270,000	10,000,000	177,324,575	0.02213
	1,350,000	13,698,000	35,996,037	960,000	118,306,503	0.01476
1,704,400	8,900,000	1,830,000	22,474,999	7,782,134	102,689,101	0.01282
985,000	5,501,594	10,337,398	10,450,000		89,319,492	0.01115
					71,800,000	0.00896
3,850,000	300,000	4,700,000	650,000	2,450,000	71,943,398	0.00898
250,000	520,332	723,000	510,000	100,700	9,391,322	0.00117
38247450	408090972	179827711	336055908	35112834	8,012,690,353	1.000

Source: Department of Domestic and Foreign Investment of Lao PDR (2004).

Appendix 3. Australian Investments in Laos, 1988-April 2004

No.	Company's Name	Activity	Lao Capital	Foreign Capital	Capital	National
	Agriculture					
1	Lao Crocodile Ranching Co.Ltd	Crocodile ranching & zoo	245,000	255,000	500,000	Aust/Laos
2	Lao Australia Farmer Co. Ltd	Agriculture	40,420	389,580	430,000	Aust/Laos
3	Vientiane Flower Plantation	Flowers & fruit Trees plantation	50,000	50,000	100,000	Aust/Laos
			335,420	694,580	1,030,000	
	Garment					
1	K.N.L. Pty Ltd	Garment for export	-	120,000	120,000	Aust
2	kingsway (Lao) Factory Ltd	Garment	-	1,450,000	1,450,000	Aust
				1,570,000	1,570,000	
	Industries-Handicrafts					
1	Endeavour Embroidery Co. Ltd	Embroidery service	-	990,000	990,000	Aust
2	Lao-Aust Brick Co. Ltd	Producing bricks, tiles & drains	171,977	974,538	1,146,515	Aust/Laos
3	Techno Development Co. Ltd	Machineries & tools production	21,000	9,000	30,000	Aust/Laos
4	Lao Fancy Co. Ltd	Cutting (diamond) precious stone for export	12,500	237,500	250,000	Aust/Laos
5	King Gall Lao Co. Ltd	Manufactured bocks, bricks & roof tiles	100,000	100,000	200,000	Aust/Laos
6	Lao Fruit Juice Factory	Fresh drinking water & manufactured fruit juice	285,970	857,910	1,143,880	Aust/Laos
7	Sticky Hingeers	Manuf and wholesalers of ice-cream & snacks	591,447	100,000 3,268,948	100,000 3,860,395	Aust

	Mining					
1	Phu Bia Mining Ltd	Gold exploration	-	5,000,000	5,000,000	Aust
2	Lane Xang Minerals Limited	Mining exploration	-	5,000,000	5,000,000	Aust
				10,000,000	10,000,000	

Appendix 3 Continued…

	Trading					
1	Lao-Australia International Co. Ltd	Import-Export	-	300,000	300,000	Aust
2	Chun Siu trade import-export	Import-export	-	100,000	100,000	Aust
3	Lao-Asutral Holdings Co. ltd	Restaurant & sport	6,000	24,000	30,000	Aust/Laos
4	Gateway Enterprise Co. ltd	Construction, trade,		1,500,000	1,500,000	Aust/Sing
		consul, service, import-export	6,000	1,924,000	1,930,000	
	Hotel					
1	Hotel Beau Rivage Mekong Co. Ltd	Hotel & restaurant	-	190,000	190,000	Aust
2	Lao Hotel Plaza	Hotel	1,250,000	3,750,000	5,000,000	Aust
3	Taipan Hotel	Hotel & restaurant	150,000	350,000	500,000	Aust/Laos
			1,400,000	4,290,000	5,690,000	
	Consultancy					
1	Sumshen and Environment Ltd.	Agriculture Development Consultant	120,000	180,000	300,000	Aust/Laos
2	Vienpark Co. Ltd	Training consultancy:	-	300,332	300,332	Aust
		Planning, development evaluation				
3	Earthsystems Lao- Co. Ltd	Environmental consultant	-	100,000	100,000	Aust
4	Guy Investment Pty Ltd	Consultant	-	50,000	50,000	Aust
5	Chintanakanmay	Consultant	-	25,000	25,000	Aust
6	Asia Phatttana Limited	Investment consultant	50,000	50,000	100,000	Aust/Laos
			170,000	705,332	875,332	

	Services					
1	Lao Survey and exploration services	Land surveying, mapping & exploration	-	40,000	40,000	Aust
2	The 21st century school of English	English language teaching	-	100,000	100,000	Aust
		for Lao & foreigner				
3	Asia Gold Media Co. Ltd	Promote service & print for book phone	-	110,000	110,000	Aust
4	ALS (Austr.Laboratorian	Laboratory, analyse &	-	250,150	250,150	Aust

	Services)	screen mining				
5	Arda Language Centre	Language training centre	-	76,000	76,000	Aust
6	Blugrass Design Group	Internet design	-	500,000	500,000	Aust
7	Boart Longyear company	Drilling Services (survey/mining	-	549,120	549,120	Aust
8	Milsearch-BKP EOD Joint Venture Ltd	Collecting & destroying mines and bombs	-	500,000	500,000	Aust
9	Vientiane University College	English language & computer training		34,000	34,000	Aust
	Advanced Training Centre					
10	Kevron Lao Co. Ltd	Servey & design of mapping by airplanes	-	216,200	216,200	Aust
11	Asia Vehicle Rental Co. Ltd	Vehicle for rent	216,500	216,500	433,000	Aust/Laos
12	Indochina Medical Services	Production service of audio	33,000	77,000	110,000	Aust/Laos
13	Tong and company	Business service	15,000	35,000	50,000	Aust/Laos
14	Survey Mapping Service Co.	Survey mapping service	300,000	700,000	1,000,000	Aust/Laos
15	Planet Computers Co. Ltd	Build install computers & after sale service		164,063	164,063	Aust/Sing
			564,500	3,568,033	4,132,533	

Appendix 3 Continued..

	Construction					
1	Lao thesis Construction Co.	Construction	-	2,500,000	2,500,500	Aust
2	John Holland Lao	Construction	-	2,000,000	2,000,000	Aust
3	Tha Ngone Bridge Company	Tha Ngone bridge construction	2,067,756	2,067,756	4,135,512	Aust/Laos
			2,067,756	6,567,756	8,635,512	
	Telecommunications					
1	Lao Westcaost Helicopter co.	Air transport by helicopters	-	313,597	313,597	Aust
				313,597	313,597	
	Hydropower					
1	Nam Theum	Hydro electricity	-	1,500,000	1,500,000	Aust
				1,500,000	1,500,000	
Total						
47			5,135,123	34,402,246	39,537,369	

Source: Department of Domestic and Foreign Investment of Lao PDR (2004).

Table 1. Annual Foreign Direct Investments by Province, 1992-1999

	Disbursement by province (US$ Million)							
	1992	1993	1994	1995	1996	1997	1998	1999
Total of Provinces	66.71	88.56	107.30	132.35	92.43	93.58	92.44	182.78
Northern								
Luang Parabang	2.59	7.53	4.90	4.04	3.51	4.40	4.57	14.50
Sanyabury	2.68	2.58	3.24	2.85	2.84	1.08	4.69	6.38
Houaphanh	1.56	1.90	2.36	2.35	3.99	0.53	0.37	2.20
Oudomxay	0.01	0.03	8.83	0.04	0.11	0.53	0.67	3.54
Phongsaly	0	0.06	0.04	0.10	0.94	2.75	3.07	6.98
Luang Namtha	0.13	3.63	1.53	4.41	5.28	4.12	4.79	2.84
Bokeo	1.46	3.70	4.00	2.98	4.55	1.46	1.10	1.56
Central								
Savannakhet	8.18	11.75	27.96	26.83	13.77	2.64	2.86	8.95
Vientiane Province	34.18	43.24	41.79	73.59	39.63	47.62	37.79	33.54
Vientiane Capital								24.06
Khammouane	0.13	0.00	0.92	4.19	3.20	4.20	0.85	2.77
Xiengkhouang	1.12	1.29	4.45	4.96	3.50	2.18	12.17	29.67
Borikhamxay	0.29	6.84	0.32	1.12	2.33	2.32	0.14	20.34
Saysomboun	0.97	1.04	0.64	0.52	0.11			
Southern								
Champassak	1.36	1.05	0.91	0.88	3.67	17.66	16.87	20.22
Saravane	0.33	0.06	1.26	0.29	0.33	0.26	0.78	1.02
Attapeu	11.46	3.70	4.00	2.96	4.55	1.46	1.09	0.61
Sekong	0.28	0.16	0.17	0.24	0.12	0.38	0.65	2.21

Sources: UNDP (2002, p.188).

Table 2. Foreign Investment by Legal Types (US$ Million), 1990 –1992

	1990	1991	1992	Total (1990-92)
Total				
Number	48	70	103	221
Value	96.70	161.79	160.24	418.73
Legal types Contract				
Number	4	2	6	12
Value	10.98	10.88	22.09	43.95
Joint venture				
Number	22	33	38	93
Value	10.39	131.13	58.64	200.16
Wholly owned				
Number	22	35	59	116
Value	65.42	29.78	70.51	165.71
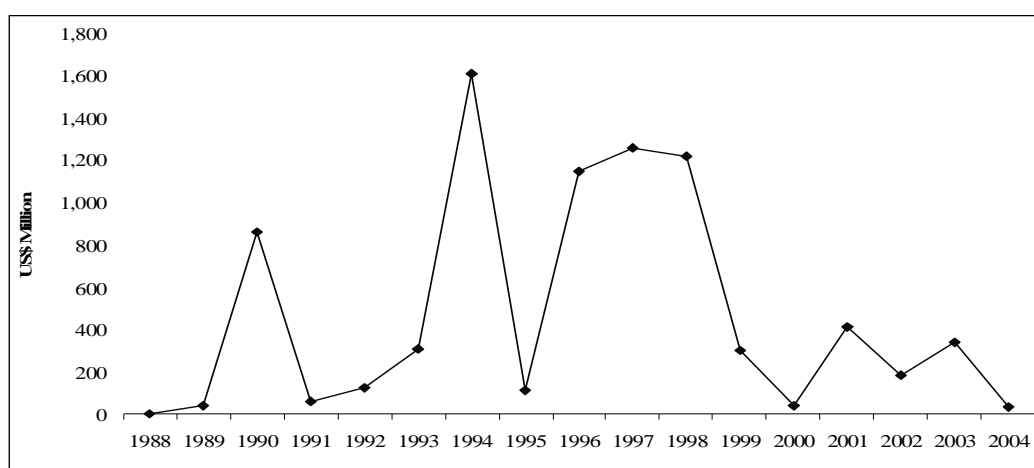
Figure 1. Capital Inflows to Laos, 1988-April 2004

Source: DDFIL (2004).
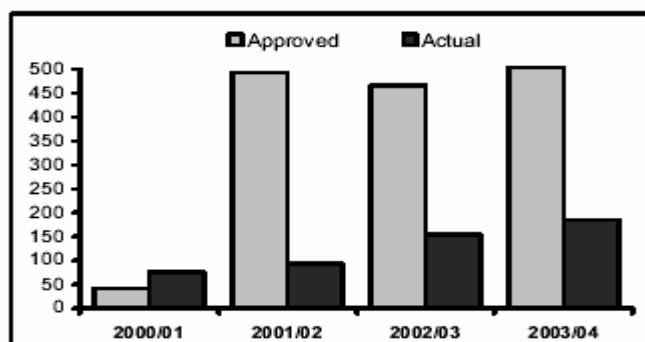
Figure 2. Approved and Actual Foreign Direct Investments in Laos (US$ Million), 2000/01- 2003/04

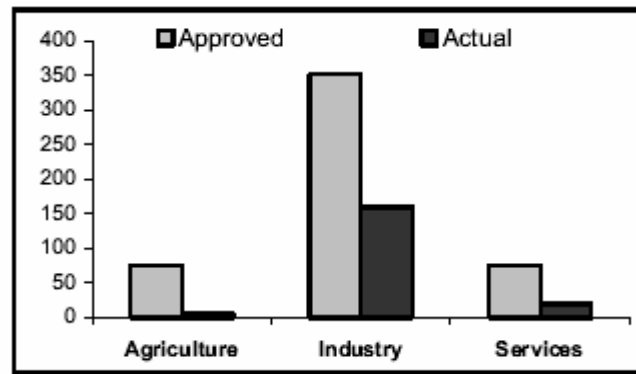Source: Original source: Lao authorities and World Bank staff estimates, Cited in WBG (2004).

Figure 3. Approved and Actual Foreign Direct Investments by Sector (US$ Million), 2003/2004

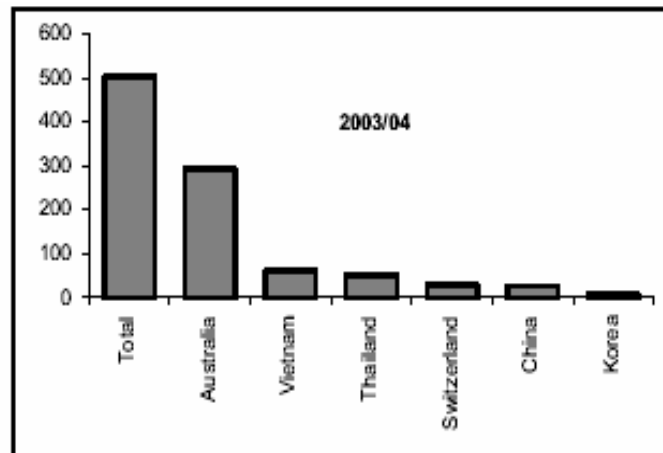Source: Original source: Lao authorities and WBG staff estimates, Cited in WBG (2004).

Figure 4. Approved Foreign Direct Investment in Laos by Source Country (US$ Million), 2003/2004

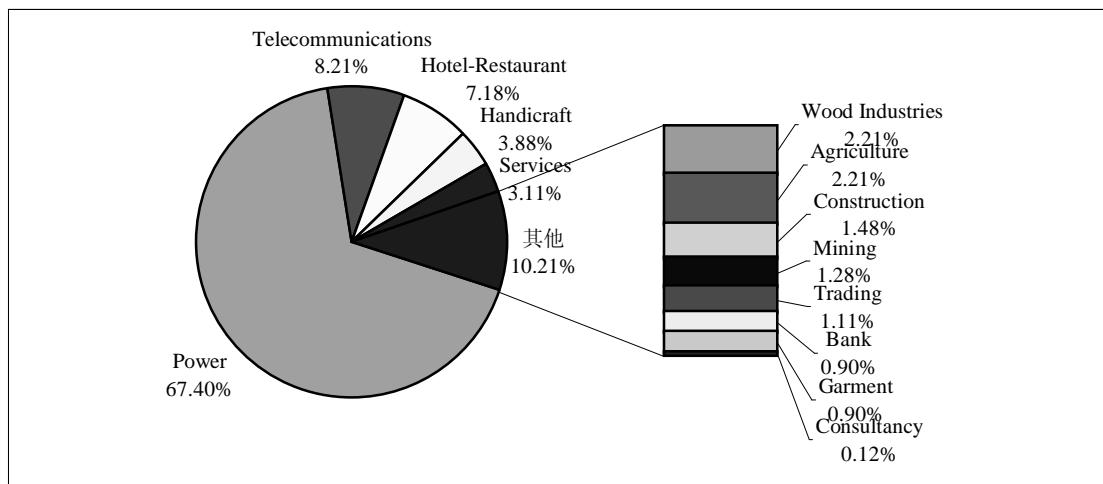Source: Original source: Lao authorities and WBG staff estimate, Cited in WBG (2004).

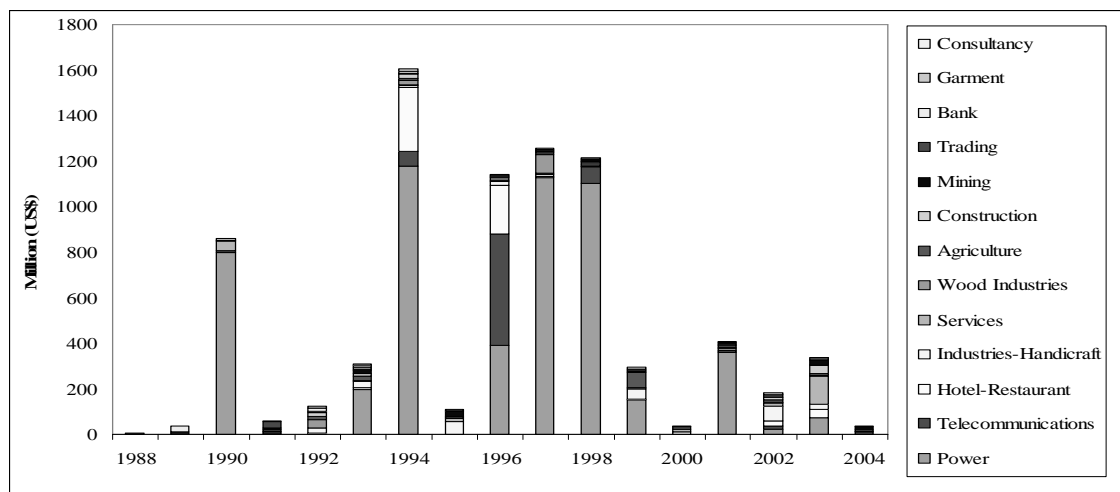Figure 5. Composition of FDI Inflows to Laos by Sector, 1988-April 2004

Figure 6. Annual FDI Inflows to Laos by Sector, 1988-April 2004

Source: DDFIL (2004).

Logistics Service Quality Analysis

Based on Gray Correlation Method

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Abstract

Logistics belongs to service industry, starting with customer demand, ending with customer satisfaction, but the level of logistics service quality determined the customer's satisfaction .Because logistics service quality is a multi - objective evaluation which contains qualitative and quantitative factors, it is very hard to calculate, so article use Gray Correlation Method to analyze logistics service quality evaluation outcome, this method is a quick and simple analysis method. At last, use an example detailed introduces this method application.

Keywords: Gray Correlation Method Analysis, Logistics service quality, Evaluation

The logistics service quality is the foundations of logistics enterprises, understanding and realizing the service quality deeply, which has important meanings to develop the activity of marketing as to logistics enterprises, level of service quality directly influence customer satisfaction, and customer satisfaction determine enterprise's success or failure.

1. Logistics Service Quality

The foreign scholar has done much research about the impact on customer satisfaction of logistics service quality. The most traditional one is 7Rs theory based on time, place utility. Later proposed "theory taking meeting customer's needs, guaranteeing customer satisfaction and getting enterprise's praise as the activity of the purpose "(Tian, 2001, pp. 4-6).At present, custom-made logistics serve quality research is studied both at home and abroad in recent years, the customer's evaluation is the most basic measurement of the logistics service quality:

The logistics service quality is the target, which the customer perceives. Logistics service quality cannot determine only by enterprise, it must meet the customer's demand and hope, in addition, it is not totally made by objective method, but is mostly customer's subjective understanding.

The logistics service quality is not away from produce and trade course. The output of the logistics serve is a part of logistics service quality which the customer realizes; it is both parties' mutual mechanism.

2. Logistics Service Quality Evaluation

We are discussing the logistics service quality mainly on the basis of customer's appraisal on enterprise's logistics service quality, this article mainly considers on the basis of 6 following respects:

Personnel's quality. Personnel quality means logistics enterprise's marketers could offer the personalized service through the good contact with the customer. Generally speaking, attendants instructive or not and showing understanding customer situation influence the appraisal of service quality.

Information quality. Mean logistics enterprise offer the amount of relevant products information. The information includes the catalogue, products characteristic, etc..

Order the course. Mean efficiency and success rate when logistics enterprise accept and treat the customer order.

Intact intensity of the goods. Mean the intensity that the goods are damaged in the course of providing and delivering. If damage, then logistics enterprises should look for the reason and remedy in time.

The error is dealt with. Mean the treatment after the order carries out mistake. If customer receive wrong goods or goods quality problematic, will demand and correct to the logistics supplier. The wrong treatment of logistics enterprise directly influence appraisal of service quality.

Timeliness. Mean whether the goods reach the appointed place as scheduled. It include the length of fall, book order finish, influence of factor from customer transportation time and error(Wang & Wang, 2004, pp.27-28).

3. Carry on gray related analysis to the result of evaluation

Getting gray systematic theory think people understanding of objective things have a extensive one getting gray, i.e. information incompleteness and uncertainty. The customer is influenced by many kinds of factors to the reflection of the logistics enterprises service satisfaction, and the connection between every factor is not totally fixed. That means customer's understanding of these services is gray too, so literary grace this getting gray related analytic approach to customer evaluation result analyze with a getting gray in the systematic theory.

Gray related analysis is a multifactor statistics analytical method; it is based on sample data of every factor to describe the power, size and order of the relation among the factors with gray related degree. If the sample data tabulate to reflect the situation that two factors change is basically identical, related degree then between them is relatively big; On the contrary, related degree is relatively small.

In evaluation to the logistics service quality, gray related analysis employs and includes the following step six:

3.1Confirm the array of analyzing

On the basis that to qualitative analysis of the problem studied, confirm one because variable and a lot of independent variables. Set up dependent variable to composite reference sequence $X'0$, every independent variable data composite comparison sequence $X'1,n+1$ data sequence, as the following matrix:

$$(X'0,X,1\ldots\ldots X,n)=\begin{bmatrix} X'_0(1) & X'_1(1) & \Lambda & \Lambda & X'n(1) \\ X'_0(2) & X'_1(2) & \Lambda & \Lambda & X'n(2) \\ \Lambda & \Lambda & \Lambda & \Lambda & \Lambda \\ X'_0(N) & X'_1(N) & \Lambda & \Lambda & X'n(N) \end{bmatrix}_{N\times(n+1)}$$

Among them, $X'i=(x'i(1),x'i(2),\ldots\ldots x'i(N))T$ i=1,2,……n,N is the length of the variable array

3.2 Have dimensionless method to the variable array

Generally speaking, The primitive variable array has different dimensions or order of magnitude, in order to guarantee the dependability of the analysis result, need to have dimensionless method to the variable array, then every factor array form the following matrix:

$$(X0,X1,\ldots\ldots,Xn)=\begin{bmatrix} X_0(1) & X_1(1) & \Lambda & \Lambda & Xn(1) \\ X_0(2) & X_1(2) & \Lambda & \Lambda & Xn(2) \\ \Lambda & \Lambda & \Lambda & \Lambda & \Lambda \\ X_0(N) & X_1(N) & \Lambda & \Lambda & Xn(N) \end{bmatrix}_{N\times(n+1)}$$

Available initial value France has dimensionless method: $Xi(k)=X'i(k)/X'i(k)$

3.3 Ask difference array, greatest difference and minimum difference

Calculate and consult several with other absolute difference of corresponding to one of comparative array, then form the following matrix:

$$\begin{bmatrix} \Delta_{01}(1) & \Delta_{02}(1) & \Lambda & \Lambda & \Delta_{0n}(1) \\ \Delta_{01}(2) & \Delta_{02}(2) & \Lambda & \Lambda & \Delta_{0n}(2) \\ \Lambda & \Lambda & \Lambda & \Lambda & \Lambda \\ \Delta_{01}(n) & \Delta_{01}(n) & \Lambda & \Lambda & \Delta_{01}(n) \end{bmatrix}_{N\times n}$$

$$\Delta_{0i}(k)=\left| X_0(k)-X_i(k) \right|$$ among them I=1,2,……,n   k=1,2,……,N

Absolute difference array most heavy until decimal most difference and minimum difference more the most.

3.4 Calculate related coefficient

Data make as follows varying to absolute difference burst:

$$\delta_{0i}(k) = \frac{\Delta(\min) + \rho\Delta(\max)}{\Delta_{0i}(k) + \rho\Delta(\max)}$$ Receive related matrix $\begin{bmatrix} \delta_{01}(1) & \delta_{02}(1) & \Lambda & \Lambda & \delta_{0n}(1) \\ \delta_{01}(2) & \delta_{02}(2) & \Lambda & \Lambda & \delta_{0n}(2) \\ \Lambda & \Lambda & \Lambda & \Lambda & \Lambda \\ \delta_{01}(N) & \delta_{02}(N) & \Lambda & \Lambda & \delta_{0n}(N) \end{bmatrix}_{N \times n}$

Type distinguish coefficient ρ in (0, 1) fetching value inside, generally speaking according to the matrix situation of related coefficient, it is more in 0.1 to 0.5 fetching value, ρ little to can improve difference of related coefficient, related coefficientδ0i (k) is a positive number under 1, the smaller Δ 0i (k) is, the bigger δ 0i (k) is, It reflect the i one a comparative array Xi with consulting the array X0 in NO. k related intensity.

3.5 Calculate related degree

Comparative array with consult array related intensity of X0 to come, give through n related coefficient Xi, it can

get related degree of Xi and X0 equally to ask: r0i= $\dfrac{1}{N}\sum_{k=1}^{n}\delta_{0i}(k)$

3.6 Arrange in an order in accordance with related degree

Arrange in an order every comparative array and related degree which consult the array from great to small, related degree heavy, prove comparative array with consult whom array change the more identical situation(Lu & Tan, 2004, pp. 20-21).

Forth. Application of embodiment

Logistics final purpose is to analyze factor influencing customer satisfaction according to result received to evaluation, enterprises improve to these factors, thus improve customer's satisfaction to the logistics service quality. Because of objective reality of difference, in the same to evaluate index can receive different customer satisfaction. Through getting gray related analytic approach can make further analysis to these factor influencing customer satisfaction. Can choose optimum sample data as the array of consulting. On the other hand, because enterprises do not exist in the market isolated, its every activity is closely related to other competitors, the customer gave a mark after comparing other competitors to the judgments of every index of enterprises, so when the result of evaluation of satisfaction to customer carry on gray related analysis, the supreme value of satisfaction, as consulting arrays on every index of choosing every enterprise.

Table 1 4 different enterprise in the the same trade, customer appraise to 6 satisfaction of factor and through calculate getting gray related coefficient finally

Table 1.Gray related coefficient form

enterprise	Personnel's quality	Information quality	Order the course	Intact intensity of the goods	The error is dealt with.	timeliness
δ01	1	1	0.56	0.59	1	1
δ02	0.35	0.59	0.56	0.59	0.42	0.42
δ03	0.2	0.59	0.56	0.33	0.42	0.42
δ04	0.62	0.42	1	1	0.59	0.42

Get gray related degree through calculating: r01=0.879   r02=0.56   r03=0.503   r04=0.72

Related degree can have to arrange from great to small: r01> r04> r02> r03

It combine the gray sizes of degree related it arranges in an order to be and the gray analyses further of coefficients related can see enterprise of 4 pieces have at the test and assessment of one's own advantages at the index for Table 1 With the existing problem: enterprise 1 more outstanding personnel's quality, so has won the customer's approval, customer satisfaction is the highest; enterprise 4 order the course, the intact intensity of the goods is very good, but some other respects should be further improved; enterprise 2 and 3 the problem is more serious, enterprises must take the effective measure to improve, establish the images of enterprises in the market again at once.

It can be found out through the foregoing, carrying on gray related analysis to logistics service quality   easy and simple to handle, necessary few and announcing the clear advantage of the question data with high efficiency. In addition can appraise and analyze to a large number of enterprises through the computer, this is a simple and convenient analytical method that can be popularized.

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A Study on Relationship between Foreign Openness

Degree and Inbound Tourism Development in China

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Abstract

Foreign Opening Degree is an important factor impacts the development of inbound tourism. In this paper, a demonstration analysis is made from the view of time serial, regional difference and case study, the results are follows: with the higher degree of opening door policy from 1985 to 2005, China's inbound tourism has been growing and dependence of 5 key indicators are all over 0.79 and showed very good relevance at several turning points; furthermore, with the statistics of 2002, the relationship between the opening degrees of 31 provinces and their inbound tourism market shares are positive relevance, of which, Guangdong, Beijing, Shanghai, Fujian, Zhejiang, Jiangsu, Shandong and Liaoning are both inbound tourism advanced and economy exotic provinces; finally, a comparison study of 15 years of Shaanxi and Shandong Provinces is made to retell the same result.

Keywords: Inbound tourism, Foreign opening degree, Time serial, Region difference, Case study

Introduction

As the saying goes, "open your door to welcome the guest." China used to be a nation that closed her door to outside world before 1978, had few foreign tourists and thought little of cost or profit, the government took it as a kind of political and foreign affair. Since the implementation of open door policy in 1978, inbound tourism has been developing very quickly, the changes of 28 year's statistics has been seeing the synchronizing growth of China's contemporary inbound tourism and her more opening to the world, which could be indicated from inbound tourists, foreign visitors, the visitors from HK, Macau and Taiwan, the overnight tourists, tourist foreign currency receipts and their orders in the world. What's more, the tourism statistics of 31 provinces shows that from 1978-1995, China was a tourist destination of sightseeing affected more by tourist resources and their accessibility (Sun Gennian, 2003); from 1995 to 2005, China turns its tourism image to a business destination, consequently the inbound tourism strongly affected by foreign trade dependence and openness degree, and showed the phenomenon of "resource curse" (XU Kangning, 2006). Many writers has discussed the relationship between openness degree and Chinese economy growth, XU Helian, GUO Yan noticed Chinese gross economy as time changes (XU Helian, etc. 2003; Guo Yan, 2004), LAN Yisheng studied the regional differences of economic growth among the 31 provinces (Lan Yisheng, 2002), many leaders talked about the importance of open door policy to tourism development (Shao Qiwei, 2006), but the corresponding temporal study was little mentioned. In the fact, inbound tourism is a kind of typical export-oriented industry, restricted not only by resources and tourist service, but openness degree as well. Herein a temporal analysis of timetable and regional difference in China has been made to provide more information.

1. The resource of data and research method

Foreign Openness Degree (FOD) is a complicated system that involves politics, economy, science, education, history and culture and hard to measure. To make it available for research, based on economical openness, the opening degree is calculated by foreign trade dependence and foreign investment dependence as follows (Hu Zhi, Liu Zhixing, 2005):

FOD= [Foreign Trade Dependence (FTD) + Foreign Investment Dependence (FID)]/2   (1)

Of which,

Foreign Trade Dependence (FTD) = [Gross Foreign Trade / GDP] ×100%   (2)

Foreign Investment Dependence (FID)=[Gross Foreign Investment/GDP]×100%   (3)

According to *China Statistics Yearbook 1986-2005*, 3 suites of foreign openness degree have been counted as follows: a. Chinese foreign openness degree 1985-2005; b. Mainland China's 31 provinces' foreign openness degree of 2002; c. Shaanxi and Shandong Provinces' foreign openness degree 1985-2005.

For the development level of inbound tourism, 5 most important performance indicators would be collected as total inbound visitors (TV), foreign visitors (FV), visitors from HK, Macau and Taiwan (HMTV) and overnight visitors

(OV). Then, time serial analysis is done based on the 5 indicators to work out the relationship between foreign openness degree and inbound tourism, cross-section analysis is made based on the market share of visitors (or tourist receipt) of 31 provinces to find out the relationship between foreign openness degree and inbound tourism, of which, market share of visitors (MSV)=[Provincial market share of visitors / National total visitors]×100%, market share of tourist receipt (MSTR)=[Provincial market share of tourist receipt / National total tourist receipt]×100%, finally, a case study of Shaanxi and Shandong provinces is to confirm the result. All the inbound tourism statistics are collected from *China Tourism Yearbook 1986-2005*.

2. The relationship between foreign openness degree and inbound tourism in the past 20 years

Table 1 is the statistics figures of Chinese foreign openness degree and inbound tourism 1985-2004 where shows that China's foreign trade dependence degree and foreign openness degree have been turning higher, consequently the same trend of inbound tourism as inbound visitors, foreign visitors, visitors from HK, Macau and Taiwan, overnight visitors and tourist receipt, thus pushing the order of China's inbound tourism in the world forward.

Foreign trade dependence degree and foreign openness degree are explaining variables to discover the relevance to inbound tourism as shown in table 2. It's easy to find that inbound tourism goes very close with foreign trade dependence degree, as seen from the correlation coefficient of 5 indicators being over 0.916, that of overnight visitors even over 0.944; well, it's not that high with foreign openness degree (including foreign investment dependence degree), that of 5 indicators being over 0.796, that of overnight visitors over 0.831, indicating that foreign trade is an important inducing factor.

2.1 The Relationship between Foreign Trade Dependence Degree and Overnight Visitors

Overnight visitors are those who stay in China at least 24 hours, besides sightseeing, they do eating, staying, traveling, shopping and pleasuring, thus spending more and bringing about more tourist receipt and reflecting more of the development level of inbound tourism. Figure 1 is the changes of time serial between overnight visitors and foreign trade dependence degree where we could see that the latter advanced wave upon wave since 1985, from 1985 to 1994 is the 1st pull-up period, from 1998 to 2005 is the 2nd, correspondingly, overnight visitors also advanced significantly at the same time: from 7.13 Million person-time to 21.07 Million person-time at the 1st period and 25.07 Million person-time to 46.81 Million person-time at the 2nd.

Besides the long-term trend, good corresponding relationship could be found at several turning points: there was a "downward valley" in 1989 due to "6.4 Incident" (Sun Gennian, 1998), another valley in 1998 due to Asian Finance Crisis and the 3rd valley in 2003 because of SARS Crisis.

2.2 The Relationship between Foreign Trade Dependence Degree and Tourist Receipt

Tourist receipt is the most direct accountant indicator for tourism development. For most developing countries, tourist foreign currency is the main driving force of inbound tourism. Figure 2 shows the changes of time serial between tourist receipt and foreign trade dependence degree. As tourist foreign currency is a complicated system and hard to count, so the correlation is not that high as seen above, but the phases were still easily found: 1985-1994 is the 1st pull-up period of FTD, and that of tourist receipt appeared in 1989-1997, the dislocation of time lies in two reasons: the even tourist spending was pretty low before 1989 and the statistic caliber changed a lot in 1994; well the 2nd pull-up period for both existed between 1998-2004. As we see the turning points, the downward points of both appeared in 1989, 1993, 1998 and 2003; well the upward points of them are 1994, 2000 and 2004.

3. The Analysis of Spatial Differences of Inbound Tourism Market Share and Openness Degree among the 31 Provinces

Time and space is an interacted unity and the spatial differences would eventually reflect the time changes. Herein based on the inbound tourism market share and foreign openness degree among the 31 provinces to discuss the effect of foreign openness degree on spatial differences of inbound tourism as shown in Table 3.

3.1 The Analysis of Spatial Differences of Tourism Market Share of Inbound Visitors and Foreign Trade Dependence Degree

Tourism market share of inbound visitors involves many factors as tourist resources abundances, traffic accessibility, visitors' priority, besides, the provincial differences of foreign trade dependence degree (including foreign openness degree) due to economic contact and business tourism works the most. Let's look at figure 3, except for Guangdong and Tianjin, foreign trade dependence degree and tourism market share of inbound visitors of other 29 provinces has a fairly close relationship as the formula implies:

$$MSV = -0.7311+0.1524×FTD \quad r = 0.9348 \tag{4}$$

As Guangdong province locates by HK and Macau, also serves as visitors from Taiwan's main entrance to Mainland

China, so its FTD is as high as 150% and shares 35.6% of inbound visitors' market, thus running the No. 1 in China; Beijing and Shanghai are the most prosperous metropolitan in China and their FTD are over 80% thus occupying over 6.9% of the market where foreign visitors take the lion's share, they are the 2nd array of China's inbound tourism market; Fujian, Jiangsu, Zhejinag, Liaoning and Shandong are all seaside developed provinces whose FTD are between 47-27% and take 2.4-5.6% of the market, obviously they are the 3rd array. The above 8 provinces have 71% of the whole market, over 2/3 of all. Tianjin City, on the other hand, although its FTD is 86.7%, she lies under the shadow of Beijing tourism (Yang Zhenzhi, 2003) and takes only 1.29% of the inbound visitors' market.

For other 22 provinces, FTD and MSIV are both low and could see two types: Guangxi, Yun'nan, Hubei, Shaanxi, Helongjiang and Hu'nan are abundant in tourist resources whose MSIV are between 3.48-1.4%; well others have fewer resources and MSIV are less 1.0%.

3.2 The Analysis of Spatial Differences of Tourism Market Share of Tourist Receipt and Foreign Trade Dependence Degree

As the average staying nights and tourist expenses differ, the market share of tourist receipt and visitors are not always the same. Based on the market share of tourist receipt and FTD of 2002, figure 4 implies that there exits a very close relationship as OLS formula tells:

$$\text{MSTR}= 0.51529+ 0.07987 \times \text{FTD}, r = 0.88407 \tag{5}$$

Of which, Guangdong shares 27% of China's inbound receipt market; Beijing and Shanghai takes 6.96% and 7.93% of the inbound visitors' market and 16.8% and 12.2% of the receipt's respectively; Fujian, Jiangsu, Zhejinag, Liaoning and Shandong takes 2.4-5.6% of the inbound visitors' market and 2.5-5.9% of the receipt's. The above 8 provinces have 78% of the total receipt market, over 3/4 of all. The tourism of Tianjin, still under the shadow of Beijing and takes only 1.84% of the inbound receipt's market, it is exception.

The other 22 provinces' FTD is lower than 17.5% and shares less than 2.3% of China's inbound receipt's market. Of which, Yun'nan, Shaaxi, Guangxi, Hu'nan, Helongjiang, Hubei, Chongqing and Sichuang's FTD are between 6.7-11.9% and they take more than 1% of receipt's market; well, other 14 provinces like Hebei, Inner Mongolia, He'nan, Anhui, Xinjiang takes less than 1% of the market.

4. A comparison analysis of Shaanxi and Shandong

Shaanxi and Shandong have the similar quantity of population and area. Shaanxi lies in the middle of Mainland China, far from the ocean, with the major tourist resources of cultural relics, and its capital, Xi'an, is a famous historical and cultural city with world fame who's Terracotta Warriors and Horses Museum is regarded as the 8th Wonder of the World. Shaanxi is a typical big tourism province with a long history of inbound tourism but develops pretty slow; Shandong, on the contrary, stands by the sea with both cultural and natural tourist resources, Mount. Taishan is the No. 1 of "5 Holy Mounts" and Confucius' Temple in Qufu is the sacred land of Confucianism. Shandong is a newly developed big tourism province with a shorter history of inbound tourism but develops fairly fast. Now a case study to reveal more details is in Table 4.

Before 1994, both the quantity of inbound visitors and tourist receipt of Shaanxi are higher than that of Shandong, in middle 1980s, the order that of Shaanxi was No. 5-6 in China and that of Shandong was only No. 13-14, well in early 1990s, that of Shaanxi turned No. 8-9 and that of Shandong became No. 12-13. After 1994, Shandong runs much faster on the two factors thus in later 1990s, she caught up with Shaanxi; in the early years of new century, that of Shaanxi back fell to No. 12-13 and that of Shandong went up to No. 8-9.

On the background of fast-developing inbound tourism in China, the comparison of Figure 5 and Figure 6 would reveal the reason of the changes of the two provinces. Since 1995, the FOD of Shaanxi has been gradually going down and pushing her market share of inbound tourism and its order going downward; on the contrary, since 1991, the FOD of Shandong has been gradually going up and pushing her market share of inbound tourism and its order going upward. Although FOD does not synchronize with market share of inbound visitors, the impression is still strong enough to tell that the difference of FOD is the most important factor to differentiate the development of inbound tourism of the two provinces.

To quantitatively measure the above relationship, based on the statistics of 1991-2005, the formulas are shown as follows, due to the lagged time, the FOD of one year earlier was used to explain the market share of inbound tourism of one year later:

$$\text{Shaanxi:} \quad \text{MSV}(t)= 0.4871 + 0.27326 \times \text{FOD}(t\text{-}1), r = 0.6956 \tag{6}$$

$$\text{MSTR}(t)= 0.5361 + 0.21816 \times \text{FOD}(t\text{-}1), r = 0.7379 \tag{7}$$

$$\text{Shandong:} \; \text{MSV}(t)= 0.9816 + 0.10696 \times \text{FOD}(t\text{-}1), r = 0.7951 \tag{8}$$

$$MSTR(t)= 0.6316 + 0.11116 \times FOD(t-1), r = 0.8430 \tag{9}$$

Formula 6-9 reveals that FOD necessarily bound up with inbound tourism. Since 1995, the FOD of Shaanxi has been gradually going down and pushing her market share of inbound tourism and its order going downward; on the contrary, since 1991, the FOD of Shandong has been gradually going up and pushing her market share of inbound tourism and its order going upward.

Conclusion

Welcome guests sincerely, friends are all over the world. Inbound tourism is an extro-oriented industry, although the tourist resources, accessibility, tourists' priority, etc affect it; the foreign openness degree is always one of the key driving factors. Chinese modern inbound tourism started her history from the implementation of open door policy since 1978 and as China opens wider to the outside world, the competitiveness of her inbound tourism in the world goes stronger. Herein from the perspectives of time changes, regional differences and case study, the relationship was discussed to reveal the fact. During 1985-2005, China's inbound tourism is closely related to foreign openness degree, the correlation coefficient of major key factors are over 0.79, that of foreign trade dependence degree are over 0.91; the regional differences of inbound tourism of 31 provinces tell the same, 8 coastal provinces own the largest FOD and take 71% of inbound visitors and 78% of inbound tourist receipt; a comparison study of Shaanxi and Shandong provinces may reveal more details of the same conclusion. In short, FOD is always a basic presupposition for Chinese tourism to go in for international or regional competitiveness.

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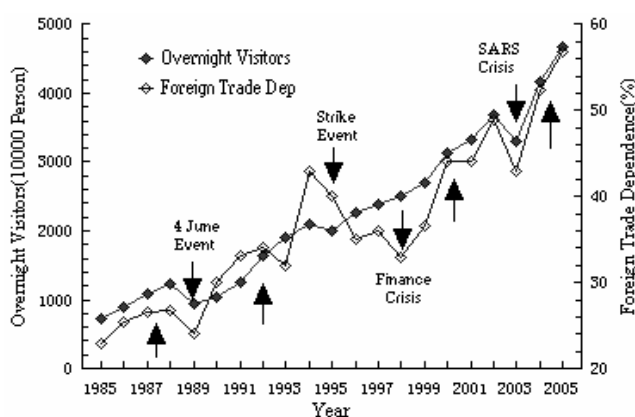
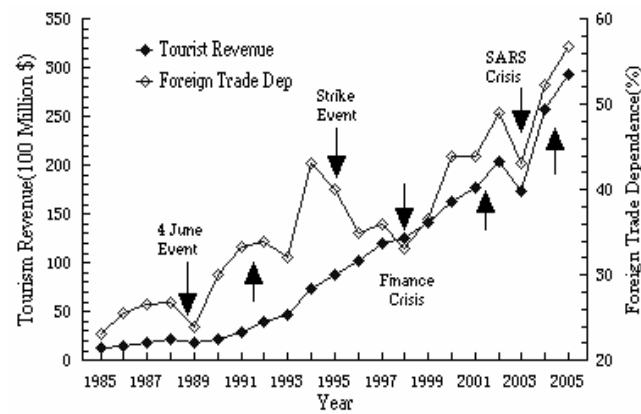Figure 1. Changes of overnight visitors and FTD for 20 years.

Figure 2. Changes of tourism receipt of inbound and FTD for 20 years.
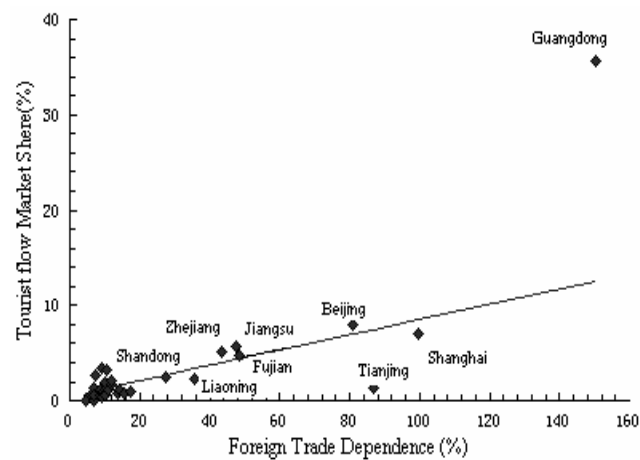

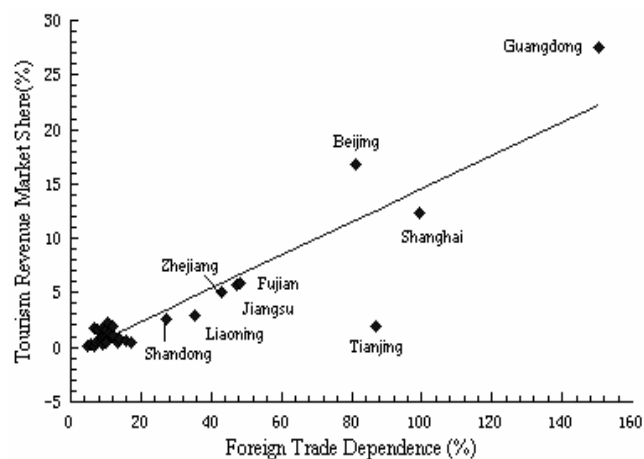Figure 3. Relation between market share of visitors and FTD

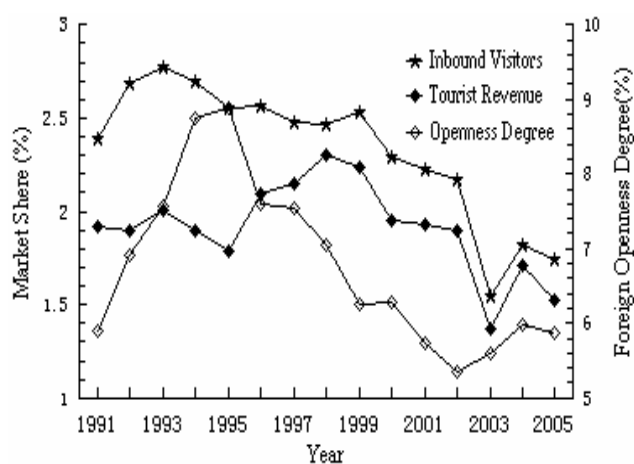Figure 4. Relation between market share of receipt and FTD

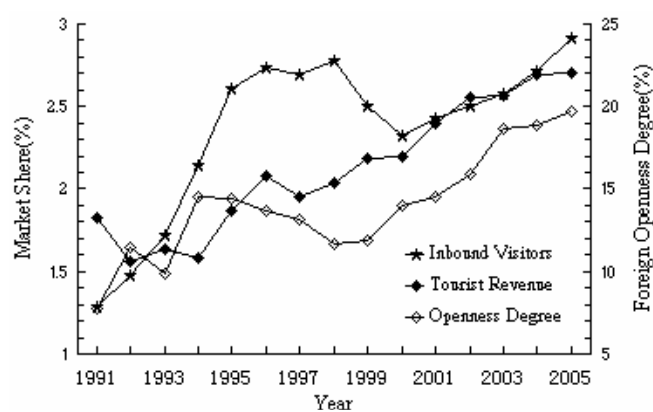Figure 5. Change of inbound tourism and openness degree in Shaanxi

Figure 6. Change of inbound tourism and openness degree in Shandong

Table 1. Statistics of Chinese foreign openness degree and inbound tourism 1985-2004

Year	Inbound visitors /10,000	Foreign visitors /10,000	HMT Visitors /10,000	Overnight visitors /10,000	Order of Inbound Visitors	In. Tourist Receipt /100M. US $	Order of Tourist Receipt	Foreign trade dependence Degree /%	Openness degree /%
1985	1783.3	137.1	1646.3	713.3	13	12.50	21	23.0	11.4
1986	2282.0	148.2	2133.7	900.1	12	15.31	22	25.5	12.5
1987	2690.2	172.8	2517.4	1076.0	12	18.62	26	26.5	18.4
1988	3169.5	184.2	2985.3	1236.1	10	22.47	26	26.7	18.8
1989	2450.1	146.1	2304.0	936.1	12	18.60	27	24.0	18.8
1990	2746.2	174.7	2571.5	1048.4	11	22.18	25	30.0	22.3
1991	3335.0	271.0	3064.0	1246.4	12	28.45	21	33.2	22.9
1992	3811.5	400.6	3410.9	1651.2	9	39.47	17	34.0	23.5
1993	4152.7	465.6	3687.1	1898.2	7	46.83	15	32.0	22.5
1994	4368.5	518.2	3850.2	2107.0	6	73.23	10	43.0	24.9
1995	4638.7	588.7	4050.0	2003.4	8	87.33	10	40.0	23.4
1996	5112.8	674.4	4438.3	2276.5	6	102.00	9	35.0	20.9
1997	5758.8	742.8	5016.0	2377.0	6	120.74	8	36.0	21.6

1998	6347.8	710.8	5637.1	2507.3	6	126.02	7	33.0	19.6
1999	7279.7	1112.6	6167.1	2704.7	5	140.99	7	36.5	20.9
2000	8344.4	1334.5	7009.9	3122.9	5	162.24	7	44.0	24.7
2001	8910.3	1131.6	7778.7	3316.7	5	177.92	5	44.0	24.1
2002	9790.8	1344.0	8446.9	3680.3	5	203.85	5	49.0	26.7
2003	9166.2	1140.3	8025.9	3297.1	5	174.06	5	43.0[*]	24.0[*]
2004	10903.8	1693.3	9210.6	4176.1	5	257.39	5	52.3	36.9
2005	12029.2	2025.5	10003.7	4680.9	5	292.90	5	56.8	39.8

Note: Statistics from *China Tourism Yearbook* and *China Statistics Yearbook*. Of which, the figures of 2003 are only from Jan.-Oct due to SARS impact.

Table 2. Correlation between inbound tourism development and foreign openness degree in China

Items	Total Visitors	Foreign Visitors	HMT Visitors	Overnight Visitors	Tourist Receipt
FTD	0.9215	0.9263	0.9167	0.9446	0.9232
FOD	0.8036	0.8233	0.7960	0.8316	0.8134

Table 3. Statistics of inbound tourism market share of TV, TR and FOD of 31 provinces in 2002

Province	MSV /%	MSTR /%	FTD /%	FOD /%	Province	MSV /%	MSTR /%	FTD /%	FOD /%
Beijing	7.927	16.804	81.0	43.3	Hubei	2.616	1.532	7.5	4.7
Tianjin	1.292	1.847	86.7	46.3	Hu'nan	1.446	1.678	6.7	4.1
Hebei	1.210	0.901	8.9	5.0	Guangdong	35.616	27.467	150.4	80.1
Shanxi	0.633	0.404	14.1	7.6	Guangxi	3.482	1.734	9.2	5.7
Inner M.	1.122	0.806	14.1	7.4	Hainan	0.995	0.496	17.4	12.2
Liaoning	2.374	2.969	35.6	19.6	Chongqing	1.179	1.176	10.8	6.2
Jilin	0.751	0.466	13.5	7.5	Sichuan	1.704	1.08	11.8	6.4
Heilongjiang	1.832	1.603	10.2	5.5	Guizhou	0.583	0.429	7.1	3.7
Shanghai	6.961	12.277	99.5	52.6	Yun'nan	3.329	2.262	8.7	4.3
Jiangsu	5.686	5.676	47.5	26.9	Xizang	0.363	0.279	9.2	4.6
Zhejiang	5.213	5.005	43.2	22.7	Shaanxi	2.171	1.894	11.9	6.7
Anhui	1.173	0.668	10.0	5.4	Gansu	0.633	0.293	5.8	3.2
Fujian	4.720	5.936	48.5	27.9	Qinghai	0.111	0.054	6.9	3.5
Jiangxi	0.615	0.386	8.6	4.8	Ningxia	0.015	0.009	11.6	6.1
Shandong	2.495	2.549	27.4	15.2	Xinjiang	0.703	0.536	15.7	7.9
He'nan	1.047	0.785	5.0	3.0					

Table 4. Comparison of inbound tourism development and FOD of Shaanxi and Shandong during 1991-2005

Year	Shandong Province					Shaanxi Province				
	Inbound Visitors /10,000	Market Share ratio /%	Tourist Receipt /Million US $	Market Share ratio /%	Foreign Openness /%	Inbound Visitors /10,000	Market Share ratio/%	Tourist Receipt /Million US $	Market Share ratio /%	Foreign Openness /%
1991	17.2	1.29	51.9	1.59	7.79	32.0	2.39	54.8	1.92	5.89
1992	24.1	1.47	62.0	1.56	11.50	43.8	2.68	75.4	2.18	6.91
1993	28.4	1.72	72.3	1.63	9.90	45.8	2.78	89.0	2.26	7.56
1994	34.9	2.15	112.3	1.58	14.50	43.9	2.70	113.0	2.16	8.17
1995	45.1	2.61	153.8	1.86	14.37	44.2	2.56	139.4	2.17	8.24
1996	53.2	2.73	196.5	2.07	13.64	50.0	2.56	198.2	2.20	7.60
1997	58.5	2.69	203.8	1.95	13.16	53.9	2.48	224.6	2.15	7.53
1998	60.8	2.77	219.5	2.04	11.69	54.0	2.46	247.2	2.30	7.05
1999	62.2	2.50	265.3	2.18	11.89	63.0	2.53	271.8	2.24	6.26
2000	72.3	2.32	315.1	2.20	13.95	71.3	2.29	280.3	1.96	8.28
2001	82.9	2.43	382.4	2.39	14.56	75.9	2.22	308.7	1.93	5.42
2002	97.7	2.50	472.5	2.55	15.87	85.0	2.17	351.0	1.89	5.36
2003	77.7	2.58	370.0	2.57	18.62	46.6	1.54	198.0	1.37	5.61
2004	119.3	2.72	567.0	2.69	18.86	80.0	1.82	361.0	1.71	5.98
2005	155.1	2.91	780.0	2.70	19.69	92.8	1.74	446.0	1.52	5.86

A Discussion on the Crisis Management of Small Scale

Thermal Power Plant Basing on Sustainable Development

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Abstract

The strategy of sustainable development is one of the two important strategies for Chinese economic development. The present small scale thermal power plants cause much pollution, and consume too much energy, so they are being confronted with the crises of existence and management. Accordingly, it is urgent for small scale thermal power plants to carry out study on the crisis management about their own existence and development. Starting with the deficiencies of small scale thermal power plants, this paper found out the reasons for the difficulties in small scale thermal power plant management and put forward corresponding countermeasures.

Keywords: Sustainable development, Small scale thermal power plant, Crisis management

In 1987, the United Nations Conference on Environment and Development put forward the concept of sustainable development of human society; briefly speaking, sustainable development means the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The economic development of China depends on the strategy of prospering the nation with science and education and sustainable development, in the process of vigorously advancing "Two fundamental changes", the small scale thermal power plants meet lots of difficulties. The electric elasticity coefficient is increased owing to the macro-control of Chinese economy, so electric power supply no longer falls short of demand, but balances demand even exceeds demand. Now, more and more large-scale power generation units are being used, the small scale thermal power plants are being confronted with great existence crisis, because of their low efficiency, high energy consumption and the severe environmental pollution.

1. Small scale thermal power plants are being confronted with existence crisis

In 2006, Chinese National Development and Reform Commission delivered the Notice of Doing Well the Investigation about Closing down the Small Thermal Power Generation Units. The notice required that local government should inspect the situation of shutdown of small scale thermal power plants since 1999, and the notice listed 700 small scale thermal power plants that should be closed down during 1999 and 2010, the total capacity is up to 16.01256 million kilowatt, which accounts for 3.2% of the national gross power generation capacity. Besides, more small scale thermal power plants will be closed down because Chinese government has decided to put things straight about the small scale thermal power plants.

On August 15th, 2005, Chinese National Development and Reform Commission issued the fiftieth bulletin of 2005, and publicized the first group of small scale thermal power plants that should be closed down. The content of the bulletin is as follows:

According to the demand of National Development and Reform Commission, the small scale thermal power plants that should have been closed down should be shut down immediately, the newly studied out 64 small scale thermal power plants will be shut down at different stages. The capacity of small scale thermal power plants closed down in 2005 would be 286.5 thousand kilowatt, and that of 2006, 2007, 2008, 2009 and 2010 will be 1.003 million kilowatt, 1.921 million kilowatt, 1.1 million kilowatt,　530 thousand kilowatt, 505 thousand kilowatt respectively (Figure 1). The purpose of closing down the small scale thermal power plants is to save energy, promote the regulation of power supply structure, and transform the economic growth mode, and it is important to solve the problems of high

energy consumption, low efficiency and severe pollution in the present small scale thermal power plants.

In the beginning of 2007, National Development and Reform Commission began to make more effort in closing down the small scale thermal power plants.

After the State Council approved the Several Opinions on Accelerating Closing down the Small Thermal Power Generation Units of National Development and Reform Commission and National Energy Office, the National Meeting of Electric Power Industry, on January 29th, 2007, which mainly focused on encouraging the big ones and controlling the small ones, energy conservation and emission reduction, put forward the following objectives: during the Eleventh Five Year Plan, the power of small scale thermal power plants closed down will be more than 50 million kilowatt, 50 million tons of standard coal will be saved, and over 160 tons of sulfur dioxide will be reduced. Accordingly, large scale and efficient power plants that can save energy, and use reproducible and clean energy should be constructed.

In the following four years, small scale thermal power plants, whose power is over 50 million kilowatt, will be closed down, and no more small scale thermal power plants will be constructed. The newly planned thermal power plants should adopt electrical machines that are over 600 thousand kilowatt. Specifically, the following small scale thermal power plants will be closed: the general thermal electrical machines in which the capacity of a single unit is less than 50 thousand kilowatt; regular power generation units that are used for 20 years, in which the capacity of a single unit is less than 100 thousand kilowatt, electrical machines whose life-span has expired, and in which the capacity of a single unit is less than 200 thousand kilowatt; and the electrical machines that consume too much coal and don't measure up to environmental protection standard.

According to statistics, when kilowatt-hour of electricity is generated, the difference of coal consumption between large scale electrical machine that is 600 thousand kilowatt and small scale electrical machine that is lower than 100 thousand kilowatt is 100 to 150 gram. In 2005, the total capacity of small scale electrical machines that are lower than 100 thousand kilowatt is up to 0.115 billion kilowatt, so more than 0.4 billion tons of coal are consumed every year, and 5.4 million tons of the sulfur dioxide are discharged. If all the present small scale electrical machines are replaced by large scale ones, 90 million tons of standard coal will be saved, accordingly, 2.2 million tons of sulfur dioxide will be reduced, and 2.2 hundred million tons of carbon dioxide will be reduced, accounting for 16.6% and 10% of the total discharge of power industry in 2005 respectively. The trends of the capacity of the small scale thermal power plant that will be closed down in the future four years are shown in figure 2.

At present, the supply of electric power exceeds demand, that's why the small scale thermal power plants should be closed down. Chinese government is strengthening the macro-control on small scale thermal power plants, so small scale thermal power plants should take up some measures and accelerate the technological reform to face up to the existence crisis. It is urgent for small scale thermal power plants to thoroughly bring the function of old power generation units into play, fully utilize the present assets, and distribute the staff, so as to meet the need of market economy.

2. Problems in small scale thermal power plants

2.1 The energy consumption of small scale thermal power plants is high

The capacity of a single power generation unit in small-scale thermal power plant is small, and the energy consumption of small scale thermal power plant is high, usually, the energy consumption accounts for 70% of the total cost. The Chinese average coal consumption is 370 gram per kilowatt-hour, while the world average coal consumption is 335 gram per kilowatt-hour. If the difference of coal consumption between small scale power generation units and large scale ones is 100 gram, 60 million tons of stand coal will be excessively consumed when generating 6000 hundred million kilowatt-hours if the small scale electrical machines that are lower than 100 thousand kilowatt are used. It can be seen that the small scale power generation units will increase the coal consumption of China. So Chinese National Development and Reform Commission pays much attention to energy saving and emission reduction in power industry.

2.2 Small scale thermal power plants severely polluted the environment

Thermal power plant is one of the major air pollution sources. The three main air pollution problems are acid rain, greenhouse effect, and the damage of ozonosphere, and two problems have close relationship with thermal power plant. The smoke discharge from the chimney of coal-fired thermal power plant includes power, sulfur dioxide, carbon monoxide, carbon dioxide, nitrogen oxide and few heavy mental particulates. Owing to that small scale thermal power plants have no good equipment for dust removing, and it consumes much coal, more smoke and dust will be discharged into the air when the same amount of electricity is generated. A 35ton/hour spreader stoker will discharge 400 tons of power and dust every year even when the dust removing efficiency is over 95%. The

discharged dust severely influenced the quality of air.

Sulfur dioxide and nitrogen oxide are also important air pollution sources. The amount of sulfur dioxide discharged is in proportion to the gross coal consumption in the situation of rated evaporation, and the gross coal consumption is in proportion to the coal consumption in power generation. The amount of sulfur dioxide discharged into the air by small scale thermal power plant is large because of the large amount of coal consumption in electricity generation. So it is urgent to restrict the emission of dust and control the area of acid rain. But in a long period of time, coal will still be the most important one-off energy, only in large-size or oversize boilers (over 1000t/h), can coal be burnt completely, that is to say, 99% of the sulfur, nitrogen will be removed. But it is difficult for small and media scale thermal power plants to do so (less than 1000t/h).

It can not be neglected that the sewage will also pollute the environment. Large amount of sulfur dioxide in the water from dust catcher, and the acid and alkaline liquid used to regenerate the water treatment equipment will destroy the environment to a great extent.

2.3 It is difficult for small scale thermal power plants to solve the problem of low exergy efficiency

According to the Second Law of Thermodynamics, in order to improve the exergy efficiency, the steam parameter should be increased, which can reduce the energy cost introduced by temperature difference inside the boiler. Another important approach to improve the exergy efficiency is thermoelectricity generation. Insufficient thermal load will impede the energy saving effect of heat supply machines.

3. Countermeasures for small scale power plant to face up to the existence crisis

Small scale thermal power plants used to play important roles at certain historical period. In the present time, the combined heat and power generation unit still has strong life-force. The laws and regulations for public utility management in the United States prescribe that thermoelectricity factory is entitled to sell the superfluous power to the Power Company, and Power Company should unconditionally buy the power with avoidable cost. As a developing country, China should save resources and energy, for the sake of the welfare of the offspring.

3.1 The boiler of spreader-stoker consume too much is the fundamental reason for environmental pollution

The granule of raw coal is small, and the sulfur content is high. At present, most boiler users, including the small scale thermal power plants, pay much attention to the reconstruction of equipment, for example, the coal hopper is changed to layered coal feeder, the hearth and dust separator are also reconstructed, but all these changes don't lead to obvious effect. The correct way is that additive should be added into the coal to get briquettes. Further more, calcareousness should be added to briquettes to absorb the sulfide because the sulfur dioxide discharged will directly influence the production, data showed that, the above method will decrease 50% to 90% sulfur dioxide and 50% to 70% nitrogen oxide. The use of briquettes will not only be good for the decrease of dust, but also is good for the aeration of coal bed, so the coal will be burnt thoroughly, which will improve the thermal efficiency of boiler. In addition, the proportion of coal preparation should be increased. Thermal power plants use pulverized-fuel boiler, the comminution will cost much electricity, while the layer combustion boiler will waste too much coal because the granules of coal don't measure up to standard.

3.2 Developing thermoelectricity generation is an important way for small scale thermal power plant to exist and develop

Thermoelectricity generation will save more energy. The theoretical thermal efficiency of thermal power plant is 41%, but the practical thermal efficiency is only 36% to 39%. The thermal efficiency of thermoelectricity generation is over 45%, and the practical efficiency is about 60%. The efficiency of gas-steam combined cycle power plant is 50% to 52%, but the thermal efficiency of the whole gas-steam combined cycle power plant can reach 70% or more. In thermoelectricity generation, heat-electricity ratio is increased, and the thermal efficiency can reach 80%, which can lead to good economic benefit and social benefit. Chinese government established preferential policy in this aspect; using the central heating system and closing down some small boilers will save energy and reduce pollution. Data showed that the ratio of thermoelectricity generation machines to thermal power plants units with the same capacity is over 60% in German, England, Denmark and Holland.

The thermoelectricity generation should accord with two basic indexes; on the one hand, the average thermal efficiency per year should be over 45%, on the other hand, average heat-electricity ratio of thermoelectricity unit that is lower than 50 thousand kilowatt should be over 100%, the average heat-electricity ratio of thermoelectricity unit that is between 50 and 200 thousand kilowatt should be over 50%, and heat-electricity ratio of thermoelectricity unit that is larger than 200 thousand kilowatt should be over 50% in the heating period.

Small thermal power plants make great contributions to central heating and the development of power industry in China. The concept of small thermal power plant should be distinguished from the small heat & power plant,

because the small thermal power plants will be closed down while the heat & power plant, not matter it is large or small, are encouraged by Chinese government.

In recent year, Japan, the United States, European countries and Taiwan of China established a series of policies to encourage the thermoelectricity generation, so thermoelectricity generation develops at great speed recently. China has established some preferential tax policies, for example, the investment regulation tax is exempted, and products that make full use of ash are exempted from value added tax.

Considering of the preferential policies, small thermal power plants should carry out study on how to reconstruct themselves to become heat & power plants. And there are some advantages to do so, firstly, the capacity of power generation unit is relatively low, which doesn't measure up to the demand of power industry development in China if it only generates electricity; secondly, these small power plants are also providing heat, so they have advantages to be reconstructed as heat & power plants.

3.3 Small thermal power plants should be changed through biological way, which accords with the policy of China.

Bio-energy means the energy produced by photosynthesis; bio-energy exists in surplusages of agriculture and industry, such as rice hull, straw, bagasse, sawdust and urban garbage. These things are called clean energy because they produce less harmful gases when burned. Bio-energy has been widely used by European and American countries, for example, there are more than 350 bio-energy power plants in the United States.

China is a big agricultural country, more than 5 billion tons of bio-energy is produced every year, which equals to the energy of 2 billion tons of oil. But the bio-energy used only accounts for 0.5% of the primary energy; it has such large potential that China put forward some preferential policies for power generation using bio-energy.

Firstly, the Eleventh Five Year Plan put forward that we should build a resource-preserving and environment-friendly society, energetically develop renewable energy, accelerate developing bio-energy, support and develop straw-fired power generation, build a batch of straw-fired power plants, and realize power capacity of 5.5 million kilowatt.

Secondly, Chinese government encourages and supports the renewable sources connected to power (thirteenth article of Law of People's Republic of China on Regenerable Energy).

Thirdly, power generated by renewable sources will be totally purchased (fourteenth article of Law of People's Republic of China on Regenerable Energy).

Fourthly, it will be provided with preferential loan with financial discount interest (twenty fifth article of Law of People's Republic of China on Regenerable Energy)

Fifthly, preferential revenue (twenty sixth article of Law of People's Republic of China on Regenerable Energy)

Sixthly, electrovalence allowance. 0.25 Yuan per kilowatt will be subsidized on the basis of the electrovalence of desulfured-coal fired power generation machines (seventh article of Tentative Management Measures for Price and Sharing of Expenses for Electricity Generation from Renewable Energy).

Seventhly, Chinese government encourages the technological reconstruction of adding biological substances to regular thermal power generation (Notice Regarding Strengthening Evaluation and Management on the Influence of Electricity Generation from Biological Substances)

The national policies on regenerable energy pointed out a way for the small thermal power plant; it will be encouraged to change the small thermal power plant to bio-energy power plant.

It will be more advantageous to change the small thermal power plant to bio-energy power plant than to build a new bio-energy power plant. Firstly, it will be easy to raise money because less money is needed to reconstruct a power plant; secondly, the stocked assets will be fully utilized, which will save resources and energy; thirdly, the newly built bio-energy power plant is not allowed to burn any regular fuel, but the reconstructed power plants are allowed to use 20% or less regular fuel, it will be easier to carry out regulation; fourthly, the procedure of reconstruction will be much easier than that of building a new power plant.

3.4 Actively carry out the policy of "encourage big ones and control small ones"

"Encourage big ones and control small ones" means that the construction of new power plants should be linked with the closing down of small thermal power plants. When building the power plants that have large capacity, high parameter, low consumption and low emission, some small thermal power plants should be closed down. The construction of big ones will create market conditions for closing down the small ones, while closing down the small ones will vacate capacity spaces for the construction of big ones, so the two of them supplement each other and are cause and effect of each other. To mobilize the enthusiasm of local area and enterprises, conversion according to

proportion is allowed, i.e. if 300 thousand kilowatt power plants will be built, 240 thousand kilowatt small power plants should be closed down, if 600 thousand kilowatt power plants will be built, 420 thousand kilowatt small power plants should be closed down. And if 1 million kilowatt power plants will be built, 600 thousand small power plants should be closed down. It can also be counted according to the amount of coal consumed.

The construction of large capacity power generation system is the development trend of power industry. However, Chinese government established some policies that are propitious to the development of small thermal power plants, so, the small thermal power plants should actively carry out the policy of "encourage big ones and control small ones", increase the capacity of themselves, gradually digest the previous human resources and social resources, and realize sustainable development.

3.5 Other methods

Firstly, if there is natural gas, the small thermal power plant can be changed to heat & power plant or combined heating, cooling and power supply system, in that way, there will be no pollution. Secondly, small coal-fired power plant can be changed to garbage fired power plant. Thirdly, if the equipment is still in good condition, the small thermal power plants can be sealed up for keeping, and it can be used again when in emergency, but countermeasures should be taken to avoid pollution. Fourthly, under the guidance of government, the power amount of the small low-efficiency power generation units can be transferred to large high-efficiency power generation units, so as to realize mutual benefits.

In a word, according to the theory of circular economy, the small power plant should be used thoroughly unless the equipment is too old to be used. Power industry is capital intensive industry, unlike the small coal mine, small paper mill, small glass factory and cement industry, a 50 thousand kilowatt small thermal power generation unit needs 200 to 300 million Yuan, so it must be reconstructed and used thoroughly.

4. Conclusion

The small thermal power plant is facing up to two main tasks; on the one hand, it should try to make itself survive in the disadvantageous environment, on the other hand, it should reduce environmental pollution, improve efficiency and realize sustainable development. So the small thermal power plants are being confronted with existence crisis and development crisis now, they should enhance the consciousness of crisis management, actively look for the methods to solve problems, and try to find their way to exist and develop in accordance with their own deficiency, accordingly improve the crisis management on the basis of sustainable development.

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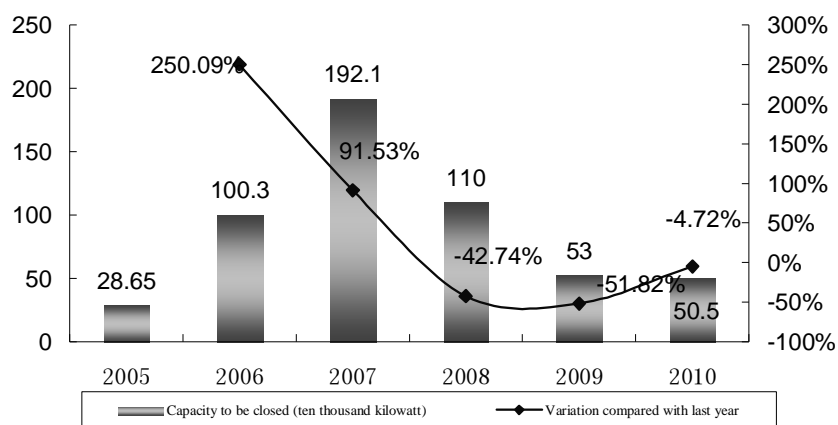
Figure 1. The power capacity of small thermal power plants that are to be closed
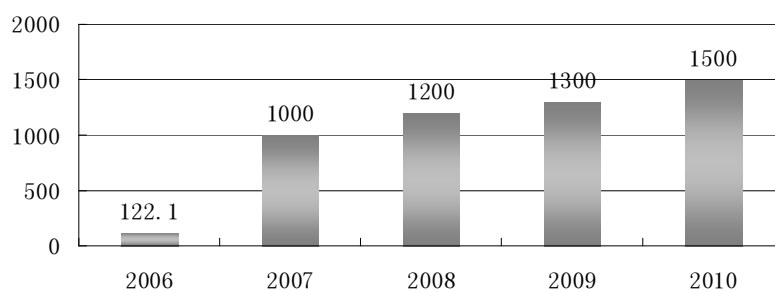down every year from 2005 to 2010 in China.

Figure 2. The power capacity of small thermal power plants that are to be closed
down every year from 2006 to 2010 in China.

Construction of the Quality Evaluation System for

Healthy Urbanization from the Angle of Economics

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Abstract

In allusion to the problems in the present theoretical study and practice about urbanization, this paper elucidated the connotation of healthy urbanization from the angle of economics, and put forward the economic definition of healthy urbanization; further more, it put forward things that should be attached importance to when evaluating healthy urbanization and the framework of quality evaluation system.

Keywords: Healthy urbanization, Equilibrium, Rational growth, Evaluation

Urbanization is developing at great speed in China, accordingly, a series of contradiction come up between the trends of peasants' urbanization and the development of economy and society as well as the carrying capacity of city, for example, the infrastructure construction in the city is behindhand, the life quality is decreasing, the social security system is incomplete, it is difficulty to obtain employment, resources are over consumed, the ecological environment is destroyed, the disparity between urban livers and countryman is becoming larger and larger. So the healthy development of urbanization is of great significance for the social and economic development of China in the 21st century. So it is necessary to clear up the present study on evaluation system for healthy urbanization, find out the problems that should be improved, and provide theoretical basis for further study and provide strong guidance for practice.

1. Status quo of the study on quality evaluation system for healthy urbanization at home and abroad

Scholars who major in programming, economics, sociology, population, ecology and geography etc. have made great effort in studying the evaluation system for urbanization and achieved a lot, some sound evaluation systems have been established, such as the evaluations systems put forward by the United Nations Department of Economic and Social Affairs Statistics Division and English geographer, and the modern evaluation system put forward by American scholar. Besides, there are lots of evaluation systems, such as the social indexed system put forward by the Organization for Economic Cooperation and Development and India, and the "healthy city" launched by 33 European members of World Health Organization. The study on evaluation system for urbanization spreads around the social and economic development theories in most countries. In developed countries, urbanization has been finished, and there is counter-urbanization phenomenon, so there is little study on urbanization, and the selection of many indexes is done according to the actual situation of different countries.

Study on healthy urbanization is a frontier problem in international academic world, and in China, there is no consentaneous cognition about the concept of healthy urbanization. Although there is little direct study on the evaluation system of healthy urbanization in China, much study on the index system that relates to the evaluation of urbanization are carried out indirectly. In recent years, more and more scholars put forward their own evaluation systems and theories; population proportion is no longer the single factor to evaluate the urbanization, and more reasonable and scientific evaluation system and method are established. At present, there are four problems in the study on urbanization: firstly, the scholars who investigate the urbanization are of different majors, so the evaluation systems are also different, further more, the indexes are numerous and jumbled, it is difficult to choose a maneuverable, ideal and acceptable index; secondly, although there are lots of indexes and evaluation systems, they are not combined well with urbanization; thirdly, most scholars evaluated the quality of urban development, but neglected the connotation of healthy urbanization, also, they didn't take the urban and rural area as a whole when evaluating urbanization; fourthly, the evaluation systems have no theoretical basis to clarify the economic running mechanism of urbanization, the indexes are chosen subjectively, the main contradiction in urbanization is not taken into consideration, so the countermeasures to accelerate the urbanization is not convincible.

2. Explanation of healthy urbanization from the angle of economics

2.1 Healthy urbanization should achieve the balance of supply and demand of urban labor force

In economics, city is an efficient economic and social organization; it is defined using labor market, when the

segmentation of labor market is done, the border of city will be established. Hence, the supply and demand of labor market is an important factor that should be considered in urbanization. The balance of supply and demand of urban labor market is the standard to judge whether the industrialization matches the urbanization or not, the development of industrialization, which is the necessary condition of urbanization, will provide labor demand for urbanization, while the improvement of agricultural productivity which is the sufficient condition of urbanization, will supply labor force for urbanization,. That's why whether the industrialization matches the urbanization or not becomes the basic standard to evaluate the urbanization. According to the method of equilibrium analysis in western economics, the objective of healthy urbanization is to realize the balance of supply and demand of urban labor force, and realize the employment of urban labor forces including the surplus labor force from rural areas.

2.2 Healthy urbanization should achieve the balance of supply and demand of urban land and public products

According to the theory of increasing returns to scale and agglomerate economy in spatial economics, large and medium-sized cities are the main carrier to absorb floating population. Urbanization will make the scale of city become larger and larger, which will lead to the deterioration of contradiction between urban land and cultivated land. Agglomerate economy demands that two problems should be taken into consideration in urbanization, the first is the increase of land rent in the city, urbanization and income increase will lead to the outward transition of land rent curve, that is to say, the city will expand, but the expansion shouldn't be the unordered spread. With the progress of urbanization, city will develop at great speed, the related problems, such as food safety, employment, housing, transport, should be solved in the healthy urbanization, and the ultimate objective of urbanization should be the improvement of people's living standard and life quality, so all these aspects should be embodied in the process of urbanization. In the next place, conglomeration will cause equilibrium problem between private products and public products, for example, the objective of employment-habitation equilibrium is to reduce automobiles and relieve traffic jam, severe of employment-habitation unbalance will lead to traffic jam, accordingly, more end gas will be discharged, the air pollution will become worse, government has to spend more money in building and maintaining the road too.

2.3 Healthy urbanization should achieve the rational growth of town

Rational growth demands environmental protection and the construction of inhabitable city, it stresses that the problems brought by the unordered expansion should be solved through developing "inhabitable" city. "Inhabitable" means that urban environment should be of high quality and the natural environment that can influence the life quality should be protected. Rational growth require that the following aspects should be realized: friendly neighbor, high accessibility, less automobile traffic, various traffic manner, reduction of pollution, saving of energy resources, co-prosperity of urban and suburban area. Rational growth advocates that the present infrastructure should be fully utilized when exploiting new district so as to reduce the expense in building new infrastructure, the impost should be kept low and the natural resources should be protected. To realize the objective of rational growth, government should establish specific public policy to manage and regulate the exploitation and usage of land. So the concept of rational growth should be introduced into the evaluation system of urbanization, which will provide theoretical basis for the establishment of improved policy. When evaluating urbanization from the angle of rational growth, the following criterions can be used: accessibility, durative of environment, validity of traffic infrastructure, and the social equity.

It can be seen that healthy urbanization is not just changing the agricultural population to non-agricultural population, but it is the optimal allocation of resources and harmonious development between urban and rural area on the basis of transferring the agricultural population to the city. The development of urbanization will make the function and development of urban and rural area in normal state, so as to promote the harmonious development of society, environment and culture in the city, improve the living standard of people, maintain the high-quality life of urban citizen, and improve the appropriate allocation and usage of urban economic resources, accordingly promote the economic development of both urban and rural areas. The essence of healthy urbanization is that it is a harmonious and mutual process of quantitative growth and qualitative improvement.

3. Emphases in healthy urbanization evaluation

Basing on the theoretical analysis and the main problems in Chinese urbanization, the following problems should be paid much attention to when constructing the evaluation system for healthy urbanization:

3.1 Land consolidation and food safety

If land consolidation is not taken into consideration, no effective information will be provided to the settlement of problems in land usage in the background of urbanization. Evaluation on land consolidation in the process of urbanization should be put forward according to the internal relationship between urbanization and land usage.

The increase of number of city and the expansion of city cause that abundant land resource, especially the cultivated land is expropriated. Hence, cultivated land protection should be strengthened. Evaluation of food safety is an important aspect of land consolidation evaluation.

3.2 The vulnerable group in the city

The vulnerable group mentioned here are mainly the peasants who lose the basic means of production passively because of the urbanization, although they have become townsman, most of them cannot really accommodate the urban life, and become edge population who wiggle between urban and rural area, these people have no capital and no technique, and lead a miserable life. The situation mentioned above will influence the progress of healthy urbanization too. The previous urbanization evaluation didn't reflect the living condition of these people.

3.3 Harmonious development of urban and rural area

Harmonious development of urban and rural area is the ultimate objective of urbanization, the quality of urban and rural development is weighed by the degree of harmonious development of urban and rural area. The over disparity between urban and rural area is caused by the neglect of urbanization quality, so it is necessary to inspect the situation of harmonious development of urban and rural area.

3.4 Urban spatial structure

Certain spatial structure will make the spatial organization cost of certain land be the least, or, the largest utility will be realized at certain spatial organization cost. City is a large labor market and consumption market, an inefficient spatial structure will make the labor market and consumption market become small and inefficient markets, and lead to increase of distance between work place and residence place, accordingly, the quality of people's life will be influenced, the distance of infrastructure supply line will be longer, and the investment and running cost of urban infrastructure will be increased.

3.5 Employment

The present Chinese industrialization speed is faster than the urbanization speed, which is exhibited by the constitutive lack of labor force. The present constitutive lack of labor force is complemented by the floating peasant workers. According to the supply and demand of labor force, the resident population reflects the supply and spatial change of labor force. The demand of labor force has close relationship with economic activities, maybe there are few people dwell in the places where they work, so conglomerate of employment space will influence the investment and cost of transport in the city, and influence the traffic situation. So the density of employed population is better than average density of population to indicate whether the urban spatial distribution is reasonable or not, which it is often neglected by people.

4. The framework of evaluation system for healthy urbanization

The evaluation index system is composed of five subsystem, i.e. urban system, land, economy, comfort degree of the city, and harmonious development of urban and rural area, the candidate indexes are shown in table1.

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Table 1. The framework of evaluation system for healthy urbanization and the candidate indexes

First class index (A)	Second class index (B)	Third class index (C)	Fourth class index (D)
	Urban system (B1)	Number of the city (C1)	Number of city and town, density of the city, number of small and medium-sized city
		Urban scale grade (C2)	Total area of the city, rationality coefficient of urban scale distribution, the proportion of large, medium-sized and small city
		Urban function (C3)	Rationality coefficient of function distribution of cities
	Land consolidation (B2)	Food safety (C4)	Proportion of self-support food, growth index of grain yield per unit, the proportion of decrease of cultivated land
		Scale of urban land (C5)	Land occupation rate of the GDP of per unit land for production, per capita residential land, per capita road and square land, per capita urban green land
		Efficiency of urban space (C6)	Economic output variance per land price in different industries, the proportion of industry land, proportion of residential land, proportion of land for road and square, proportion of urban green land, plot ratio, density and height of buildings, density of employed population
	Economic development index (B3)	Development level (C7)	Per capita GDP, per capita income of families that have no land, the proportion of third industry to GDP, proportion of population who are engaged in third industry, employed peasants who have no land, number of families that have non-agricultural industry, labor force demand
		Development efficiency (C8)	per capita finance income, level of industrialization and urbanization, urban unemployment rate
	Comfort degree of the city (B4)	Life quality (C9)	Per capita disposal income, per capita residence area, per capita power and water, proportion of family that bought a house, average expectation of life, Engel's coefficient, number of private car per 100 families, number of phone per 100 persons, number of family that has internet connection, vehicle kilometers to evaluate the situation of traffic, proportion of population who have a junior college or higher education degree to total population, proportion of scientific research fund to GDP, investment in public education

		Social work (C10)	Rate of unemployment, coverage ratio of social security, number of doctors per thousand people, proportion of peasants who have social insurance
		Environment quality (C11)	Air pollution index, coverage ratio of present urban green land, noise level, unharmful treatment rate of household garbage, treatment rate of urban sewage, rate of reaching the standard of industrial waste water, energy consumption of GDP per 10000 people, proportion of built-up area to the administrative area, investment in environment protection, proportion of unpolluted area, per capita cultivate land area.
	Harmonious development of urban and rural area (B5)	Coordinated development of urban and rural economy (C12)	Difference of per capita income between urban and rural area, urbanization level, the proportion of non-agricultural employment
		Coordinated development of urban and rural life (C13)	Difference of Engel's coefficient between urban and rural area, difference of consumption level between urban and rural area, difference of per capita savings deposit between urban and rural area
		Coordinated development of urban and rural society (C14)	Difference of social security coverage rate between urban and rural area, difference of fixed assets investment between urban and rural area, difference of per capita education years between urban and rural area

Economic Analysis of the Birth-Control Law in China

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Abstract

This paper explores the two approaches of governments' population policy: command-and-control regulation and market-oriented incentive. From both the micro and macro perspective, this paper draws a conclusion that the population market has its own autonomous principles and too much government intervention like the birth-control law in China is harmful. Policy-makers should provide guarantee from the political regime. And in case of market failure, the government should adopt the market-oriented approach to complement.

Keywords: Command-and-control regulation, Laissez-faire,Birth-control law of China, Tradable reproductive rights

1. The Problem of Population Control in China

1.1 Introduction

In the year of 1830, the world population, 1 billion.

In the year of 1930, the world population, 2 billion.

In the year of 1960, the world population, 3 billion.

In the year of 1975, the world population, 4 billion.

In the year of 1987, the world population, 5 billion.

On October 12, 1999, the world population reached 6 billion……

These figures are not only a milestone in the development of civilization, but also the pathetic epitaph for human beings.

Helpless children in Shanghai are wandering the streets. Millions of migrant workers in Beijing are lost in the neon city. Teary mothers in the slums of suburban areas are staring at the empty crock in despair. Faced with this reality, in spite of sentimental feelings, we ought to think rationally. Finally we find all these facts point to one key word: POPULATION!

With the concern and responsibility for the future of human beings, I concentrate on the topic. I have to admit that this paper is still not that precise, and many experts, some of whom are famous economists, have touched upon this kind of research. But I still believe that it is my passion and creativity that can open a new global perspective on population issues, especially in China ------the economic analysis of the birth control law in China.

1.2 The Problem of Command-and-Control (CAC) Regulation

When seeking to maintain the size, structure and balanced geographical allocation of population, policymakers face two choices of approaches: first, "CAC Regulation", which means the government itself, formulates policies to control birth, or regulate the population migration and put them in a mandatory effect just as what is happening in China. This tactic is evident in many provisions of the Birth-Control Law of China, and those couples who give birth to more than one child will be considered illegal and be punished severely by fine and even incarceration. The other is the "Natural evolving" style, allowing the natural evolution of the population. For this style, the so-called "Laissez-faire" is the spirit. The government's population policy would uphold the autonomous character of the population order and intervene as little as possible. There is heated debate on which one is more effective. And as things stand now, they all have their own pros and cons. The Command-and-Control regulation is uniformed and inflexible, which may facilitate enforcement and monitoring. And that is exactly why the Chinese government has chosen it as a regulatory tool and endeavors to expand its use to other arenas. However, this approach may not be as effective as it seems, if we take its obvious drawbacks into consideration.

First of all, it brings bureaucratic rigidity and centralization. Since officials just introduce their own assumptions into the regulation, and impose the uniformed regulatory standard on every family, the command-and-control strategy may make all the regulated citizens suffer. And that brings us to another obvious flaw: the command-and-control approach may provoke resistance from all the people who must follow. This approach also has many other flaws, and they will be discussed in the following chapters.

Contrary to the command-and-control strategy, this paper strongly believes that the number, structure and geographical allocation of population follow a unique, market-like law. That is to say, the population market, like many other kinds of markets, also has a function to adjust the allocation of resources and to restore the balance automatically. There exists a pair of "invisible hands" from micro and macro levels on the market to achieve this "Pareto Optimality".

The basic role of the market in resource allocation was first stated by Adam Smith in "The Wealth of Nations". He pointed out that social optimization will be achieved when individuals seek their largest interest. A public policy, no matter how well-designed, may not be accepted by the market because it is the imposition of government officials. Long ago, Lao-tzu, one of Chinese most famous ancient philosopher said that the best government should "in its regular course do nothing (for the sake of doing it), and so there is nothing which it does not do". The government ought to show respect in an "inaction" way to the law which the market itself forms as soon as it functions. A truly effective and successful public policy not only should, but also must be the summary of market principle. In light of his idea, this paper tries to analyze the birth control law of China economically, and tries to solve the following problems: 1 how does the population market function effectively in its own way? 2 How can we prevent excessive government intervention? 3 In what way does government take measures to intervene in case of market failure?

2. Market Mechanism of Population

2.1 Population Market: Analysis from the micro level

Analyzing from the micro-level, we believe that the population is determined by fertility and mortality. With the advances in technology and the improvement of medical conditions, the mortality rate throughout the history has decreased. For the convenience of analysis, we assume that mortality is on a linear decline. So the determinative factor on population size is fertility.

This paper regards "child" as a special commodity. So from the classical microeconomic theory of pricing model, we draw a conclusion that the quantity and price of any commodity is determined by supply and demand in the market, and in terms of the special commodity-- the "child", it is the same case. Parents should consider the values and the costs of their children, when making a decision whether to give birth or not. That is to say, from an economic perspective, the birth of a child is decided by family's will based on financial situations, so it is completely a matter of economics. In fact, the use of economic analyses of a variety of social issues has become popular, and it is natural to apply this approach to the family planning programs. (Harvey Leibenstein, 1969 pp. 161-170)

First of all, what is the value of children? It is the sum of the contributions that they bring to the family. And the utilities root in the following four aspects: Firstly, children could preserve the species or perpetuate the genetic characteristics, the name, or the memory of the parent(Posner, 2003,pp.148); second, when the children have grown up, they can create wealth for society and families, which is the economic value; third, children can provide financial aid to their parents when they age, which is the protection value; fourth, the delight and sense of achievement parents gain from the process of raising their children, which we call spiritual value, which may not be realistic and easy to measure, but it is an important aspect of the value of a child.(Li Zhongsheng, 2006)

Secondly, what is the cost of having a child? The cost of it consists of mainly two parts: First of all, the expenditures of maintenance, education and medical treatment, which are the real-life costs, so we call it direct costs; secondly, the income that parents give up from work when they decide to give birth, which is the opportunity cost in economics, so we call it potential costs.

"Child", as a commodity, obeys the law of diminishing marginal utility. When we studied the findings Harvey Leibenstein finished in 1974, we drew several conclusions: First of all, the higher the child's birth order is, the lower the couple's desire to have children will be; moreover, with family's per capita income increasing, children's marginal utility will drop. Even though there is not certain, direct link between the value of children and income, the value of the child will reduce along with economic development. But cost of the child rises with economic development. We believe that economic growth and the rise of per capita income lead to the depreciation of a child. Therefore, people do not want to have children. In this situation, people may be in favor of birth control. This is the reality of modern developed capitalist countries.

Whether to have children and how many children to have depended on the balance of the values and the costs, so their decision is economically rational. When the value is higher than the costs, they will decide to have more children; when the costs are higher than the value, they tend to control birth. All these above are the results of the operation of the market, and this result maximizes the utility of every family.

2.2 Population Market: Analysis from the macro level

The size and quality of one nation's population and its economic development are highly interrelated. In fact, it is

confusing to identify which is the cause and which is the effect. On one hand, economy was influenced by population growth (greater labor productivity and regularity at work results in greater economic growth and development); on the other side, current economic conditions determine the quantity and quality of the population. For the sake of simplicity in analysis, we assume that quality of the population is improving in a linear correlation with the level of economic development. So the effect, which the improvement of quality of population has on the economy, can be overlooked and we will focus on analyzing the impact of population growth on economic growth. (Adhikari, Maskay, and Sharma, pp. 57)

Population growth can create two consequences: first of all , in a condition where the economic resources are relatively abundant, population growth will help create economies of scale, promote division of labor and technological progress, and finally impulse the economic growth; secondly, in a condition where the economic resources are relatively scarce, population growth forms the pressure on resources, thus reducing the investment and lower labor productivity, which is not conducive to economic growth. From some historical data, we can have a simple comprehension about the relationship between population growth and economic growth. However, the fact is that economic resources are relatively scarce. So, generally speaking, there does exist a proper degree scale of population, which matches perfectly with aggregate economic resources.

When the population, which is one of the critical production factors, and other production elements, achieve the optimal distribution under the market accommodation, the market reaches equilibrium. At that point, insufficient resources, caused by excessive population, will not happen; on the other side, there will be no further development of the national economy because of insufficient laborers.

To summarize, we believe that the nature and migration of population are to meet certain economic laws from both micro and macro angles. This rule is the basis of our "Adam Smith – Lao-tzu" model, that is, we can achieve double optimal state of the economy, not only from the standpoint of families on micro-level but also from that of society on macro-level, under the laws of the marketplace. And for government, instead of forcing the implementation of the population policy that intervenes in the market laws, its population policy-making ought to follow the law of the market. In summary, the overall laissez-faire policy is the best option to maintain the population balance. In fact, it represents its ascendancy not only in the area of the size of the population, but also in that of the population structure, population movement and other relative issues.

2.3 Laissez-faire: a Better Population Control Strategy

Facts have proven that the harmonious balance of the state of population can be reached if the government does not take any effort beyond the minimum necessary to intervene the direction of population development and if it shows enough respect for the natural law of population. In the following paragraphs, I would like to compare CAC regulation and Laissez-faire policies and their outcomes in a real-world setting.

For example, even though every state of the U.S. has its own population policies and the federal government takes population stationary and population introduction as a goal of population, the United States does not implement national population policies, which directly intervene in population size and growth. The United States show respect to economic laws of the population, which rendered the population of the United States in a relatively suitable and appropriate situation.

Meanwhile, if the government takes significant measures to intervene in population issues, particularly the size of the population, there is always little effect, or there will be other serious problems. For example, strict measures to control the size of the population will usually speed up the age of a population and cause gender unbalance, which has reached a global consensus. From these following examples, which describe their population policies and failures, you may be enlightened how to evaluate and predict the short - and long-term effectiveness of population policies.

In 1960, after the Korean War, Korea experienced a baby boomer era during which the average annual population growth rate was 29 ‰. Therefore, The South Korean government implemented domestic family planning programs, which aimed at declining population growth rate to 20 ‰ until 1970, which led to a sharp drop in the fertility of Korea. And, in the 1980s, when the generation born in the baby boomer period had reached its peak, the government further strengthened its population policy, which required one couple only one child and legislated abortion and sterilization. However, since the beginning of the 1990s, the low fertility and serious imbalance in the sex ratio forced the Korean government to change its policies to encourage birth and balance the sex proportion.

Japan was the first country to implement national limits on fertility and population growth. In 1948, Japanese Congress passed the "Eugenic Protection Law" to deal with the impact of rapid population growth, which was the result of population explosion and the strong decline in mortality due to public health policy. By the late 1950s, Japan's birth rate had dropped to half of that of the 1940s. However, in recent years, the Japanese government

revised its policies that it had sustained for many years, and now is encouraging birth to cope with the rapid aging and its relative socio-economic problems.

India was the world's first developing countries to promote family planning. In the 1970s, the Indian government made several systematic family planning policies. However, when implementing these policies, the government did not fully take India's specific circumstances into account, such as cultural traditions, religious and historical backgrounds. So, eventually, they ended in failure. What is worse is the unexpected result, that the population was growing faster and faster. India's failure reflects, to some extent, that it is not only unnecessary for man to try to dominate the direction of population development but also simply not feasible for doing that.

With the decrease in birth in recent years, to enhance fertility has become an important national policy for German government. To persuade young people to have more children, the German government is "racking their brains". At the beginning, the government introduced a series of incentives policies, one of which is that the woman who gives birth to one child will receive a considerable amount of the monthly subsidies. After that, the government put forward a new proposal, which claimed that the government was planning to establish 230,000 nurseries and extend the hours of schools until 2010, to help working mothers. Disappointedly, Germany's population did not achieve the desired results, and Germany became the world's first country with negative population growth. The natural population growth rate was determined by social and economic development. In the face of this trend, the government is weak and unable to intervene, since it is feasible and will cause a waste of social resources.

Therefore, as I have clarified above, the government should not make excessive intervention in population issues. Instead, we should implement "Adam Smith--Lao-tzu" model, which favors free and inactive population policies, and mainly relies on the market mechanism of population. The government's main responsibility is to ensure good operation of the market principles. As long as we take this idea into consideration, we will find the rigid control of birth in China is superficial and even absurd.

3. Guarantee from Political Regime: how to prevent excessive intervention from government?

After the analysis so far, what we really need to do is to solve the second question raised at the beginning: how to prevent excessive intervention from government on population issues? When Montesquieu proposed the "separation of the administrative, legislative and judicial powers" doctrine, he had demonstrated that there was no kind of power which would not be abused. Thus, to prevent excessive interference from the government in the population market relies on surveillance and balance of the power. "Judicial review of the constitutionality" of the U.S. and some other western countries, as far as I am concerned, can be transplanted as a solution to this problem. We can make the freedom of reproduction a constitutional right, and any act from the president, congress, or other government body, will be declared unconstitutional and therefore invalid as long as it is implemented by government to intervene in population issues. Of course, some countries are not established on the basis of the separation of powers, so there is no room for "judicial review of constitutionality" to survive in the near future. But what cannot be changed is the basic idea to prevent the government from intervening in the population market, and that is what we call the internal surveillance and the balance of the power, not from outside the power system. For example, "Administrative Procedure" can be an effective measure, and therefore excessive intervention of any government branch will be subject to lawsuit.

And now let me emphasize my points again. What I advocate is not that all the government's population policy should be abolished as they violate the right to reproductive freedom. Market is the most efficient operation in the vast majority of cases, but in some cases, it has also failed. In fact, it is possible for population market to be trapped in market failure. And under such circumstances, the government needs to take measures to complement the market. However, it should not intervene in the form of mandatory administrative authority. Although it is a significant participant of the whole market, government should act as a member, not as a commander. Market mechanisms are far better than the command-and-control regime for it introduces the market-based incentive into the regulation.

4. Market Failure of the Population Market

4.1 Characteristics and Reasons of Market Failure

One reason for the failure of the population market is the blind benefit-driven behavior of every individual. As I have mentioned in the previous paragraphs, whether to have children or not is decided by the consideration of their quality and utility of life. In a certain period of time, when individuals all have realized that the benefits outweigh the cost of reproduction through careful calculation and take for granted that what they have found is unique, then every individual will produce babies to pursue more profits. And rapid increase in population in a short period will be inevitable. I can use the example of the stock market to clarify that. When people all have found a high-yield stock with low price, which is of course worthwhile to buy, the demand for this stock will increase dramatically and the stock price will also soar dramatically, so there is not any investment value for it any more. Individual rationality

would result in the non-rationality of the market as a whole and benefit-driven behavior might make population surge or drop sharply in a specific and short period of time.

The other important reason for market failure is seriously asymmetric information which lies between the supply and the demand in population market. The supply comes from family birth. But as a key factor of production, the demand comes from the need of the social and economic development. Every family will make a comparison of the costs and benefits to maximize the utility for their own. However, their prediction of the population size and structure that the society need is not accurate, because they can not catch every detail of the macroeconomic society. In this sense, the population growth, in the short term, is often not an accurate reflection of social and economic operation.

However, the government cannot implement policies replacing the market. So what we should do is to provide additional mechanisms and systems to make it operate better. Such mechanisms and systems will be highlighted in the following.

4.2 Solutions to Dealing with Market Failure: tradable reproductive rights

Uneven geographical allocation of population, sharp increasing or dropping in the short term and the sex ratio imbalance are some performances of market failure in the population market. Now I will focus on how to solve the uneven geographical distribution of population and discuss what measures the government should take to solve the market failure problem. Before explaining this problem, we must distinguish between the short-term and long-term in the population economics. Reproductive decision-making usually takes no less than 30 years, because it is the next generation that is to carry the policies out. Every step of the operation in population market is running relatively slow. As what we mentioned in the previous paragraphs, in countries like Germany, the population is a product of social progress and economic development.

Uneven distribution of the world's population has long been a topic concerned and discussed by population economists. According to the report published by a demographic research institution in France on June 23, 2005, more than half of the global population was in China, India, The United States, Indonesia, Brazil and Pakistan. And in those six countries which are already crowded, the population is still increasing at a considerable speed. On the contrary, some countries, which already have too small a population density to provide enough labor force to sustain the economic development, are still in low or even negative population growth. Russia, for instance, covers the largest area in the world but the population is only 144.5 million. To make things worth, its population is declining at a speed of 400,000 per year. The most critical point is that people in these countries are neither willing to have children nor to accept migrants. So the shortage of labor severely constrains the country's economic development. This is one of important characteristics of market failure in population market. And it raises a difficult task for us, which is how to achieve this equilibrium, in which population can flow cross-border freely like capital and technology. The answer is that we should rely on market mechanisms and property transactions. In the latter part, a model is introduced to illustrate this issue more clearly.

Model One – Government as Intermediate

Assumptions:

A, a country with a larger population, higher population density and people are willing to have more children. A's population form a pressure on economy.

B, another country with a relatively smaller population, lower population density and people are unwilling to have children and boycott foreign immigrants.

So B cannot maintain economic growth because of the shortage of labor.

B has a valuable economic resource which A is in shortage of (such as energy, science and technology).

In this model, the reproductive rights will be initially allocated to the government in country A, and every couple who wants to give birth to more than one child must pay to buy the rights from the government. And with all these money accumulated, the government of country A can buy the economic resource from the government of Country B.

In country B, the reproductive rights will be initially allocated to all the citizens, and the government should buy the reproductive rights from all the citizens in order to encourage them to give birth to more children. Then the government of country B could use the money got from the country A and could give country A the resources it desires.
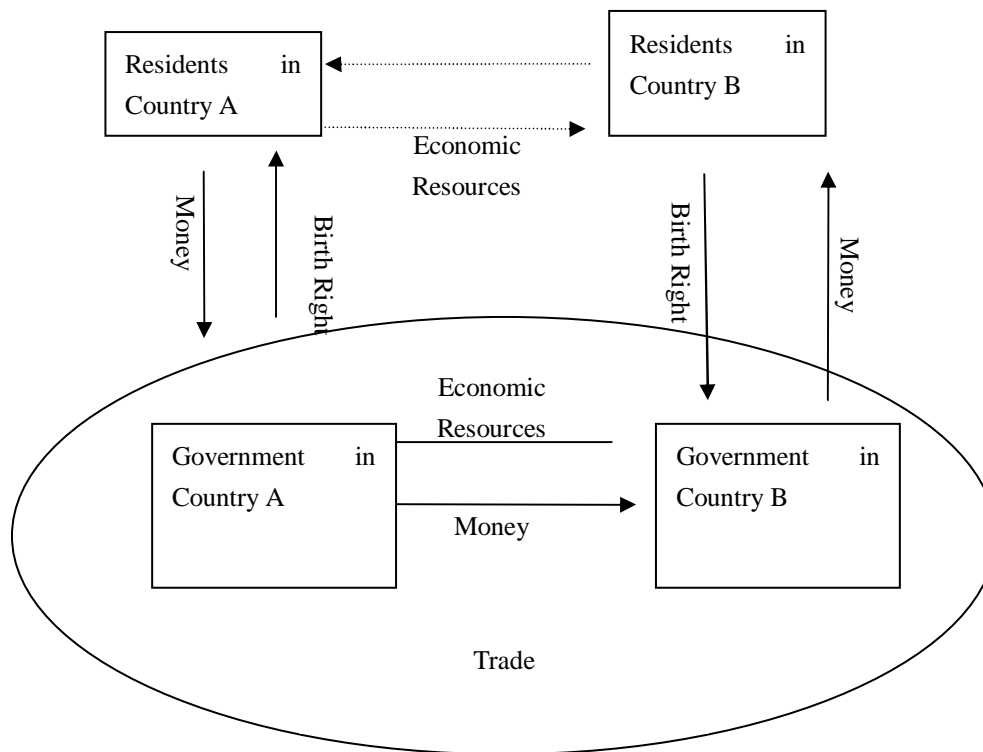
Figure 1. Government as Intermediate

Model Two – YMCIB as Intermediate

Assumptions:

The same as those of model above

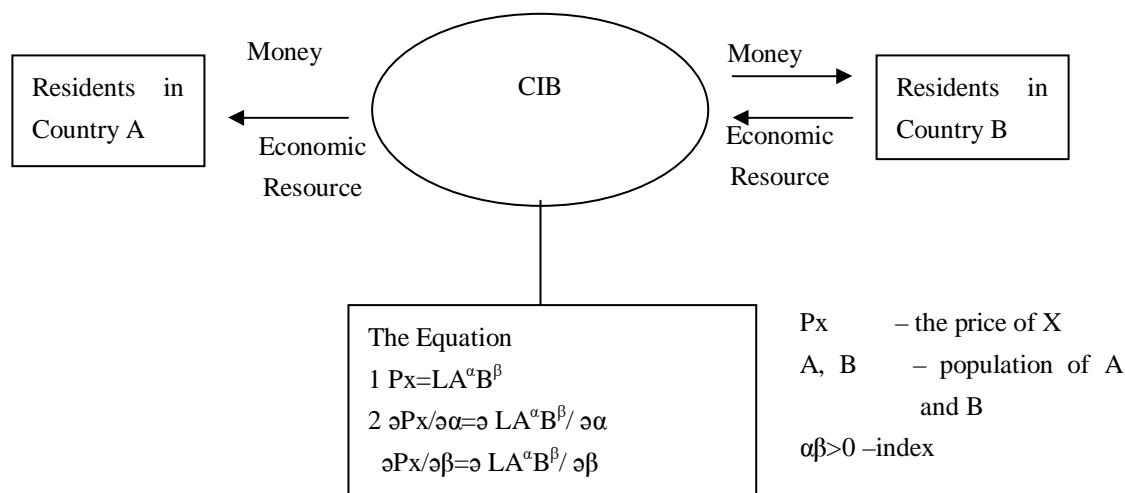We established an agency called "Children Investment Bank" (CIB)

Figure 2. YMCIB as Intermediate

Function of CIB: The CIB functions as an intermediate for country A and B when A imports this economic resource. It prices the economic resource X as Px and makes sure the exchange runs smoothly.

Principle: Px=LAαBβ. Assuming that other elements remain the same, A desires a lower Px because it is the importer; B wants a higher price because it is the exporter. Px means cost to A while benefits to B. So there is a conflict between these two countries. After series of adjustments, it reaches the equilibrium, that is

əPx/əα=əLAαBβ/əα   əPx/əβ=əLAαBβ/əβ and A/B=α/β. This equilibrium is what we want as ideal condition.

5. Conclusion

Compliance with birth control policy is a sensitive issue. It is difficult to compel countries or industries to comply with them unless they are willing to. Penalties, sanctions, and such are hard to implement and can often have negative consequences on the whole society economically. The way to go therefore is to come up with policies that do not counter the flow of the economic order (or even the laws of economics) but to utilize incentives and disincentives at it's fullest. Through economic analysis, we know that we should introduce market-based incentive in the population policy of one country, which will result in both immediate and long term gains.

I know, when explaining my idea of the economic analysis of the Birth-control-law in China, that I have made many assumptions, some of which are impractical, and there are also many shortcomings in my research. Feasible as it is in theory, it is difficult to implement in a short period of time. In fact, the deeper I go into it, the more I feel that it is impossible to find a final solution to this problem without the verification of time and practice. A successful, rational choice of population policy must be formed and perfected in the social practice.

But the reason why I still spare no effort to take my time, my energy, my enthusiasm, my wisdom propose my new perspective, which absorbs ideas of population economics and laissez-faire thinking, is my devout hope that officials and experts are able to deal with the population problem seriously. God bless every person in this world with wealth, health, and happiness.

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Analysis of Industrial Organizational Structure of West China

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Abstract

Comparing with developed areas of Mid-eastern China, the present industrial organizational structure of West China can far from adopt the objective requirements of economical development. In this article, we detailedly analyze the main problems existing in the industrial organizational structure of West China which include low level of scale economy, high proportional state-owned economy, low level of specialization division and collaboration, excessive large and complete, small and complete omnipotent corporations, and put forward the optimized methods of industrial organizational structure of West China.

Keywords: Industrial organizational structure, Optimized method, West China

Industrial organizational structure in modern industrial economics means the structure and relations among enterprises in same industry (or market), which not only includes enterprise scale and scale structure, i.e. respective proportions of large-sized, middle-sized and small-sized enterprises and market competitive relations, but also includes relations of mutual labor division and collaboration among enterprises that produce same variety products. Reasonable industrial organizational structure should not only keep competitive energy under the market mechanism and make enterprises in the industry have enough impetus and pressures to improve management and technology and reduce costs, but also fully utilize scale economy and avoid low efficiency brought by excessive competitions.

1. Main problems existing in present institutional organizational structure of West China

With the development of China market economy and deepening of industrialization, industrial organization conformation of West China has be quite improved, but comparing with developed areas of mid-eastern China, the present industrial organizational structure of West China has not adopted the objective requirements of economical development, and many problems still need to be solved. These problems mainly are the following aspects.

1.1 Low degree of industrial concentration

Industrial concentration degree is one important factor of market structure, which is the common index to measure industrial competition and monopolization and can be represented by shares of some relative numerical values (such as production value, output, sale, employee number, assets amount and so on) which occupy the whole market or industry for several enterprises which scales are the most in a certain industry. The irrationality of market structure of industrial organization of West China is mainly embodied in the industrial departments which should have high concentration degree, but the production proportions of several large-sized enterprises in West China are very low and even can not achieve the normal scale which the technology requires. According to the relative data of "China Industrial Economic Statistical Yearbook in 2004", we primarily calculate the concentration index (CR_4) of market share of sales of the four biggest enterprises in eight industries in West China, and the results are seen in Table 1.

1.1.1 Industry of transport equipment manufacturing

The industry of transport equipment manufacturing is the industry with remarkable benefits of scale economy, and the production scales of the enterprise is larger, the production efficiency is higher. So the specialized production must be organized by the principle of scale economy, and which is the interior requirements to develop transport equipment manufacturing industry. But to our worry, at present, the concentration of foreign auto production is continually enhanced, and the ten biggest auto corporations in the world have 80% of the world output, but the proportion of auto output of three factories which have the most outputs in China auto industry can not achieve 50% in total output of China, and the auto production in West China is more extremely dispersed, which can be proved by the data that the market concentration degree (CR_4) of transport equipment manufacturing is only 16.6%.

1.1.2 Industry of production and supply of electric power and heat

Industry of production and supply of electric power and heat is one of industries which have weak competition and remarkable scale benefits. The production concentration degree of this industry is very low and the decentralization

and repetition in this industry are serious in West China. For a long time, there has not formed a passel of large-sized enterprises or enterprise groups which occupy biggish market share and can represent industrial level. In 2003, the market concentration degree (CR_4) of this industry in West China was 39.4% which was lower than the national level.

1.1.3 Industry of tobacco processing

There are abundant tobacco resources in West China, but there lack tobacco enterprises with large scales. Even some provinces have no enterprises with scales or over scales. In 2003, the concentration degree (CR_4) of tobacco processing industry was 41.7% in West China.

1.1.4 Industry of petroleum and natural gas extraction

Though China resources of petroleum and natural gas are centralized in West China, but in 2003, the concentration degree (CR_4) of petroleum and natural gas extraction industry was only 14.5%.

1.2 Low level of scale economy

Another predominant problem existing in the western industrial organization is the low level of scale economy, unreasonable scale structure of enterprise and the miniaturization tendency of enterprise scale. The enterprise scale structure is the proportional relations of composing and quantity for enterprises with different scales (such as the sorts of large-sized, middle-sized and small sized enterprises). The enterprise scale structure reflects the situations of scale economy utilization and technical advancement to large extent, which has important influences to market structure conformation and market operation efficiency. Usually, if the small-sized enterprises with low degree of specialized collaboration have large proportion, the benefits of scale economy are low.

According to the statistic of "China Industrial Economic Statistical Yearbook in 2004", in 2003, the amount of enterprises in West China which entered 500 largest industrial enterprises were only 74 occupying 14.8%, and the amount of enterprises in West China which entered 1000 largest industrial enterprises were 135 occupying 13.5%, and they are lower than the proportion of domestic total production value of western 12 provinces occupying national gross in 2003, which indicated the quantity of large-sized industrial enterprises in West China are less, and as viewed from industries, the western enterprises entering China 500 or 1000 largest industrial enterprises are monopolized industries strictly controlled by the country such as petroleum extraction, electric power, petrifaction, tobacco, steel and other industries, but few industries with strong competition and high technical content belongs to West China. In addition, in 2003, the number of western state owned and non-state industrial enterprises above scale was 24111, where the number of large-sized enterprise was 353 occupying 1.464% of the whole number, the number of middle-sized enterprise was 3092 occupying 12.824%, and the number of small-sized enterprise was 20666 occupying 85.712%. It is obvious that in the industrial enterprises of West China, the large-sized and middle-sized enterprises occupy fewer shares, the small-sized enterprises occupy more shares, and the western industrial enterprises generally have the tendency of miniaturization.

1.3 High proportional state-owned economy

From Table 2, we can see that in the western industrial enterprises, the industrial gross proportion, industrial increase value proportion, assets amount proportion and other indexes of state-owned and state holding enterprises are obviously higher than the whole country and East.

The direct influences of high proportional state-owned economy to the industrial organization are to induce low industrial market performances. Some scholars carried through the statistic analysis to the 170 thousand enterprises in national 20 industrial, and found out that the efficiencies of the privately-run enterprise and the individual enterprise are the highest, and then the three kinds of foreign-invested enterprises, and then the corporate enterprises and the collective enterprises, and the state-owned enterprises possess the lowest efficiencies. The low efficiencies of enterprises induce the low market performances of the whole industry, accordingly which make western economy lack energy and power to develop.

1.4 Low level of specialization division and collaboration among enterprises and excessive large and complete, small and complete omnipotent corporations

After 50 years' developments, though the West China has formed independent and comparatively complete industrial system, but as viewed from the organizational forms and associated methods among enterprises, because they were tied by the planned economy, most enterprises are still staying in the developing stage with self-forming system, and the specialized levels of the enterprises are still very low and the collaborate relation among enterprises is relatively incompact. Especially, the enterprises with industrial association and intense relations in products can not emphasize collaboration and exert their own advantages, but conversely develop each other. In the machine-building industrial enterprises in West China, 80% of them belong to "omnipotent enterprises", enterprises

with self-forging and casting are above 80% and 90% of the whole machine-building industry, but comparing with foreign same variety enterprise, the enterprises with self-forging in US occupy less 40%, and this proportion in Japan is only about 15%. Low specialized level must produce low collaborate level of enterprise, less association of production and technology, which limits the enhancement of the scale economy level and reduces the labor productivity and economical benefits.

Most western small-sized enterprises have the character of "small but complete", but haven't the advantage of specialized collaboration. In western countries with developed market economy, when the large-sized enterprises are developing, the small-sized enterprises are also fully growing up. For example, in Japan, small-sized enterprises with tens of employee occupy 51.3% of the sum of Japanese enterprises, and these small-sized enterprises are established on the base of specialized labor division and collaboration, form organic associations with the whole industrial organizational structure, when the large-sized enterprises enjoy scale economy, they will enjoy the benefits of socialization production and labor division and collaboration. Large-sized enterprises in developed countries usually have thousands of collaborate enterprises to corporate with them, but in China, the specialized collaboration can not deserve emphasis, and most industrial enterprises are "omnipotent enterprises", and which induces the results of undeveloped production technics, small batch production, high costs and low efficiencies.

2. Optimized methods of industrial organizational structure of West China

From above analysis, we can see that the present western industrial organization still has biggish differences in the aspects of industrial concentration degree, specialized division and collaboration comparing with mid-eastern developed areas, which has seriously limited the further developments of western economy. To promote the developments of the western economy, the western industrial organizational structure must be optimized. Aiming at the concrete situations of West China, we think the following measures should be taken.

2.1 Constituting and implementing industrial organizational policies being fit for situations of West China

The industrial organizational policies are the sum of a series of policies which are constituted by the government for solving conflicts among enterprises in the industry, actualizing the benefits of scale economy, developing effective competition, and pursuing the best resource scheme in the industry. The country constitutes and implements industrial organizational policies, actively intervenes in the industrial market structure and market behaviors, which has very important meaning for forming reasonable industrial organizational structure and obtaining perfect market effects. Generally, the industrial organizational policies are divided into two varieties. One is the anti-monopolized policies, and the other is the restrained excessive competition policies. The former usually is adopted in the backgrounds of high economical development level and large enterprise scales, and the later usually is adopted and implemented in the backgrounds of low economical development level and small enterprise scales. Comparing with the actuality of western industrial organizational structure, the main problem is the coexistence of small scale economy and administrated monopolization with low level excessive competition. So, correspondingly the West China should adopt industrial organizational policies with restrained excessive competition and developmental scale economy. That is to say, the market structure with competitive main bodies of few large-sized enterprises should be formed in the enterprises with remarkable benefits of scale economy. In the industry which products are composed by mass components, the reasonable labor division and collaboration among large-sized, middle-sized and small-sized enterprises and market structure with proper scales should be formed, which basic characters are that few large-sized enterprises and middle-sized and small-sized enterprises with quite quantity exist in the market, and the relation of specialized labor division and collaboration exists in the large-sized enterprises and middle-sized and small-sized enterprises, and large-sized enterprises implement high level competitions surrounding the market, and the middle-sized and small-sized enterprises implement low level competitions surrounding large-sized enterprises, and few large-sized enterprises which provide final products possess higher market concentration degree. In the industry without remarkable benefits of scale economy, we should encourage developing large-sized enterprises, and form the coexistence of large-sized, middle-sized and small-sized enterprises and the competitive market structure with more enterprises, which basic characters are that the whole market is divided by numerous enterprises, single enterprise occupies small market share, and the industrial concentration degree and the bulwark of in and out are low.

2.2 Expediting governmental functional transformation and institutional reform

Governmental functional transformation is the important guarantee for the favoring implementation of industrial organizational policies. First, the industrial organizational policies fully embody the active intervening of the government to the evolution of industrial organizational structure, but this intervening must mainly adopt indirect economical measures and legal methods, which naturally needs the economical management functions of the government make corresponding transformations, or else, the active influences of this intervening to the

optimization of the industrial organizational structure will be seriously limited. Second, the first aim of the industrial organizational policies is to actualize scale economy, and the reasonable transformations of governmental functions can relieve various administrational limitations such as the limitation to the scale extension of the enterprises, the limitation to the self choice of specialized collaborate objects, and the limitation to the multiple managements of the enterprises, accordingly favor the full exertion of the scale benefits and the further extension of enterprise scales. The keys to implement the separation of the government and the enterprises and the transformation of governmental functions are to separate administrational functions of the government and the function of state-owned assets owner, and fully define the right boundary of the administrational institutions and owner functional institutions, accordingly establish a sort of new government and enterprise relation only with assets associations but without administrational subject relation. At the same time, to establish a developing oriented government with rationality, democracy, authority and high efficiency, we must fully reform the original institutions, which is the organizational guarantee to transform governmental functions and enhance efficiency. According to the requests of the operation of market economy, the original enterprise administrational departments should be respectively reconstructed to chastening comprehensive management department, state-owned assets operation institution and administrational management institution, and the crossed functions should be simplified and clarified. The personnel management system of the governmental institutions should be reformed, the personnel should be reasonable distributed, the civilian groups should be simplified and the diathesis of the civilian should be enhanced.

2.3 Actively developing enterprise group and enhancing market concentration degree

To develop enterprise group and enhance market concentration degree is the only way to actualize the economical increase in West China. Enterprise with different scales have different choices for enterprise profits (see Table 3), and which will influence the increase quality of the whole economy.

Enterprises with large scale always choose technical innovation and consumption reduction to make profits, but small-sized enterprises excessively consider how to increase market share. In R. Coase's book of "The Character of Enterprises", he put forward that to establish and actualize longitudinal integration of the enterprise can bring saving of trade costs. Coase thought that the market trade needed costs such as searching costs, bargaining costs and supervision costs, and the extension of enterprise scales could effectively reduce the market trade costs, accordingly enhanced the allocation efficiency of social resources. Therefore, at present, the West China should actively establish some large-sized enterprise groups according to the modern enterprise system through assets remnant reorganizations, take "optimized grouping, advantages complement, advantages expansion" as the orientation, fully develop enterprise groups, enhance industrial concentration degree, promote the technical innovation and consumption reduction, and develop industrial economy to the intensive directions with high quality.

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Table 1. Market concentration of 8 industries in West China in 2003

Industry	Market Concentration (CR_4)
Coal Mining and Dressing	0.542
Petroleum and Natural Gas Extraction	0.145
Beverage Production	0.335
Production and Supply of Electric power and heat	0.394
Smelting and Pressing of Nonferrous Metals	0.503
Transport Equipment Manufacturing	0.166
Petroleum Processing and Coking	0.628
Tobacco Processing	0.417

Source: Department of Industry & Traffics of National Bureau of Statistics of China. China Industrial Economic

Statistical Yearbook in 2004. Beijing: China Statistics Press. Where, the total industrial production value adopts the invariable price of 1990, the industrial increase value and the total assets amount adopts the price of the same year.

Table 2. Proportional comparison of state-owned and state-owned holding industrial enterprises in the whole country, East China and West China in 2003 (Unit: %)

Index	Whole Country	East	West
Proportion of enterprise unit amount	17.47	11.10	35.89
Proportion of total industrial production value	33.05	25.46	57.59
Proportion of industrial increase value	44.86	34.43	71.88
Proportion of total assets amount	55.99	44.23	72.88

Source: Department of Industry & Traffics of National Bureau of Statistics of China. China Industrial Economic Statistical Yearbook in 2004. Beijing: China Statistics Press. Where, the total industrial production value adopts the invariable price of 1990, the industrial increase value and the total assets amount adopts the price of the same year.

Table 3. Enterprise scales and choices of profitable method

Scales Grouping	Proportion of profitable method choice (%)				
	Technical innovation	Reducing consumption	Increase market share	Advertisement drumbeating	Enhancing prices
State-owned oversized enterprise	41.2	47.1	5.9	0.0	5.9
State-owned large-sized enterprise	46.1	29.7	21.1	0.8	2.3
State-owned small-sized enterprise	44.2	26.9	23.1	0.0	5.8

Source: Ma, Jiantang. (1993). Structure and Behavior.

The Emergence of a Multinational Corporation

From a Developing Country: A Case Study of

TM Berhad International Expansion

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Abstract

Despite an expensive proliferation and the importance of studies concerning developing country multinational corporations (MNCs), multinational corporations from Malaysia (a developing economy) have received very little academic attention. Most studies have focused on the emergence and international expansion of MNCs from East Asian Newly Industrialised Countries (NICs) namely Taiwan, Hong Kong, Singapore and South Korea. In an attempt to diminish the theoretical and empirical gap, this paper will examine and explain the growth and development of Malaysian pioneer telecommunication multinational corporation – namely – TM Berhad and determine their emergence first as a domestic giant supported by governmental instrumentality, and then as a significant international market player in the telecommunications industry. Using case study research methodology, empirical evidence is presented to justify the firm's developmental and indeed its success in today's frenetic environment, where MNCs jockey for position in a global setting.

Keywords: Developing country, International expansion, Multinational Corporation, TM Berhad

1. Literature review – multinational from developing country

According to Dunning (1995) in his eclectic paradigm theory, the main difference between MNCs from developing countries and those from developed countries lies in the nature of ownership-specific advantages of developing country MNCs. Generally, scholars agree that ownership advantages of MNCs from developed countries are derived from advanced proprietary technology, superior management skills or a large capital base. Ownership advantages of MNCs from developing countries are argued to lie in their lower production costs and lower prices, which can only be exploited in other developing countries with a similar or poorer economic status (see Wells, 1983a; Lall, 1983a). A number of other authors like Cantwell and Tolentino (1990), Tolentino (1993), van Hoesel (1997) and Yeung (1998), Kitchen and Ahmad (2007), have emphasised the capabilities of developing country MNCs to catch up with their developed-country counterparts through the process of technology accumulation. Views on the nature of ownership advantages of MNCs from developing countries differ, and there are two schools of thoughts on the subject as follows.

1.1 Emergence of the MNCs – 1980s: the 'first wave'

In describing his school of thought, Wells (1983b) claimed that there are two pertinent market features in developing countries that force local firms to generate and adapt various innovations to achieve growth. These two features are small market size and the easy availability of low cost labour. Wells put forward the idea that it would be in the best interest of the local firm, as well as the local market, that these firms establish their initial advantages through 'de-scaled manufacturing' or smaller scale of production. This is a process whereby technologies from industrialised countries are adapted to suit smaller markets by reducing scale, replacing machinery with manual labour, and relying on local inputs (Ramamurti, 2004). In this way, the single most important ownership advantage of developing country MNCs will be formed, by capitalising on cost advantages derived from the set-up. Sharing this view were other noted scholars such as Aggarwal (1984) and Lecraw (1977, 1981) who believed that, to exploit these cost advantages, developing country MNCs should concentrate on serving the price-sensitive mass market, not

the niche markets dominated by marketing competition.

Lall (1983b and 1983c), in espousing the second school of thought in developing country MNCs, argued that smaller scales of production in developing countries do not necessarily result in 'de-scaling advantage'. Contrary to Well's propositions, Lall believed that localisation of technological change is the key to the development of developing country MNCs (Lall, 1983a, 1983b). He further asserted that the wealth of resources, assets, and knowledge of the local environment enabled developing country MNCs to develop sustainable proprietary assets that could be effectively utilised in overseas operations. These resources, along with other innovations, differ greatly from those possessed by MNCs from developed countries. Moreover, he emphasised that the lack of high-end technologies among multinationals from developing countries allows them to derive their advantages from widely diffused technologies, and from special knowledge of developing country markets. The technology in most developing countries tends to be almost exclusively of the incremental rather than of the frontier-moving or innovative type. This, while being a little crude, amounts to a significant advantage, and can be carried out on a sustainable basis. This technological development is made possible through the localisation of technological change at the micro level, and the irreversibility of such change. Lall (1983b) theorised that it is more effective to initiate innovations that are more relevant and tailored to the environment and market conditions of developing countries.

Contrary to Well's earlier propositions, Lall (1983a; 1983b) asserted that developing country MNCs ownership advantages lie in the fact that they have indigenous knowledge of local market conditions, rather than in the ability to descale manufacturing technologies to a smaller market *per se*. These inherent advantages, as Lall pointed out, could be further developed and sustained through intensive research and development efforts and continued learning. These and other related conclusions formed the impetus for the second wave of literature that focused on the technological competencies of developing country multinationals.

1.2 Spread and Transformation MNCs – 1990s: the 'second wave'

With globalisation and market liberalisation, the influential factors in international business, such as demand for products, market power, and number of competitors to name a few, have changed dramatically. To the firms, the nature of ownership advantages has changed, as well as geographical direction, segmentation of business, locational advantages, and levels of motivation to move abroad (Dunning et al., 1997; van Hoesel 1999).

In terms of geographic spread, the second wave of outward FDI flows from developing countries has notably not been restricted to other developing countries from the same region. Rather, the corporations have embarked on a new set of challenges by entering even some of the most tenacious markets, such as those of the United States and Europe. Moreover, developing country corporations have likewise embarked on a new sectoral scope, shifting away from massively labour intensive industries to knowledge-based industries such as automobiles, electronics and telecommunications. Thus, developing country MNCs have veered away from searching to satisfy basic utilitarian needs: that is, needs for natural resources and markets. At their globalising stage, they have gone abroad, no longer looking for basic resources; instead they have focused their efforts on more ambitious endeavours such as the search for new (and even advanced 'western') markets, developed new strategic assets and obtained higher efficiencies and economies of scale. All these are to be found in the ever-expansive literature of the so-called 'second wave'.

The proponents of this second wave of developing country multinationals likewise sought to point a brighter and more optimistic picture of the characteristics of these firms. Through the learning-by-doing and learning-by-adapting technological accumulation processes, these firms were able to develop sustainable ownership advantages that allow them to compete in the global market (Cantwell and Tolentino, 1990, Tolentino, 1993, van Hoesel, 1999 and Dunning et al., 1997).

As we indicated at the start of the paper, however, the extant literature pertains to developed and developing multinationals and little of this relates to a discussion of Malaysian-based nascent or current MNC's. Thus, there is a clear call for cases to be developed from Malaysian-based companies. Thus, the next section discussed the research method and indicates the procedure adopted to explore the domestic and international expansion of a Malaysian-based telecommunications corporation – namely TM Berhad.

2. Methodology

Given the evident gap or paucity of studies on the area of an internationalisation process by Malaysian-based multinational corporations, this study employs a case study research method to examine a single firm's learning and internationalisation process. The research design requires an exploratory case study drawing upon multiple units of analysis (Yin, 1994). The main data collection method was a series of in-depth interviews with 10 key senior executives in TM International to develop the case study as relying on a single source of information would be inappropriate. The semi-structured open-ended interviews were conducted. All executives (including following titles: CEO, Senior Managers, Managers, Executives), interviewed has an in-depth knowledge of their firm's international

operation and investment. The 60-100 minute long interviews were digitally recorded, carefully listened to, and transcribed verbatim by using a word processor. A second listening was performed to ensure correspondence between the recorded and transcribed data. Complete case reports were sent back to interviewees to ensure validity and authenticity of the collected data. In addition, some telephone and email interviews were used to collect further information from the interviewees. In order to give a clearer description of a case study, multiple sources of evidence, including both primary and secondary data, including internal unpublished documentation, internal brochures, archival records, internet web sites, company annual reports, company newsletters, newspaper clippings, magazines and other sources (published and unpublished materials) (Punch, 1998; Yin, 1994) were also collected in order to construct the case and to increase validity.

3. Industry background

3.1 The Leading Domestic Telecommunication Networks Operators

In the Malaysian telecommunications industry, the strongest and most influential domestic telecommunication firms are fixed-line and mobile network operators. Equipment manufacturers play a relatively restricted role compared to service providers. Japanese and European multinationals have dominated the domestic telecommunications equipment industry (Alavi, 1999). The country's telecommunication sector has undergone consolidation with the original eight telco players subsequently being reduced to four companies, namely, Telekom Malaysia Berhad (TM), Maxis Communications Berhad, DiGi.Com Berhad, and Time dotcom Berhad. The consolidation was made due to the financial crisis that swept through Southeast Asia in 1996/97, when concerns over market saturation and infrastructure duplication with large-scale debt and negative equity hit the industry (Salazar, 2004). Consolidation was also made due to merger and acquisition of some firms to strengthen their position in the domestic market.

Among the four telcos, TM remains the most internationally active, with the furthest international reach. In the event of empirical research, TM International, a subsidiary of TM Berhad has operations and financial interests in 11 countries namely Sri Lanka, Bangladesh, South Africa, Malawi, Guinea, Cambodia, Ghana, Thailand, and more recently is India, Pakistan and Indonesia.

4. Domestic operations and international development of the tm group

4.1 Operations Review: Domestic Operations

In domestic market, the key operating revenue of the group is derived from fixed line businesses and cellular operations, followed by data services, Internet and multimedia. Contribution from the fixed-line segment was 45.6% or RM7, 482.5 million (Annual Report, 2006). TM Retail which began operations in July 2004 (formerly known as TM Telco) is a core business unit of TM. It has been given responsibility to manage and operate fixed line telephony and data based products and services in the country. Revenue from fixed line services comprises business telephony (Integrated Services Digital Networks (ISDN), payphone, interconnect, international inpayment) and residential telephony.

Apart from building up its domestic expansion and being less reliant on the competitive local market, TM has spread its wings and invested in several international projects. The group has taken further steps to raise overseas investment to contribute to group earnings. The next section looks at the group's international expansion in more detail.

4.2 Operations Review: International Operations - TM International Sdn Bhd.

In line with TM's vision of becoming a global communications player, TM International Sendirian Berhad (TMI) was established on 12 June 1992, with a paid up capital of RM 903 million. As an international investment branch for the group, the core business mission is to explore and manage the group's overseas investment activities. With the establishment of TMI, TM has some assurance of the effective management of its international investments, thus maintaining high standards of operation and management in the interest of value creation for the group. TMI aims to strategically expand the group's operations internationally and to capitalise on opportunities in selective investments within emerging markets, particularly in Asia and Africa. The company was considered as a national player carrying out important international activities; their board and management structure were mostly of national composition.

As pointed out by his key executive during the interview:

"TMI take a cautious approach. We only get into countries whose legal framework we are familiar with. We went to emerging markets looking for potential so that Telekom could grow with the host country".

Its expansion has been restricted to countries with which the Malaysian government has good or at least neutral relations (Padayachee and Valodia, 2002). TMI's strategy is to target emerging high growth markets with low penetration rates. Most of TM's international investments were made in the mid-1990s. They were initially

prudently restricted to markets nearer home. The relative proximity and in most cases a cultural affinity provides some comfort. To date, TMI has investments in South Africa, Guinea and Malawi in the African continent. Nearer in the region are Bangladesh, Sri Lanka, India, Cambodia, Indonesia and Thailand. When asked whether any new technology was proposed for any of these countries, one of the key executives pointed out that:

"Most of our international ventures are to the less-developed economic countries where our telecommunications technology is much better and advanced then theirs. Their people are not prepared to accept new technology yet".

This evidence shows that the technology of TM consists of assimilating and adapting foreign technologies rather pushing back the frontiers of knowledge. At the time of conducting the empirical research in the organisation, TM Berhad had investment in 11 countries (see Table 1). However, several international investments have been established in year 2005/06. Most of the projects initiated were in the region and in collaboration with the dominant local partners, thereby establishing a strong regional presence. TMI's presence in South Africa, Guinea, Malawi, Bangladesh, Sri Lanka, Cambodia, India and Indonesia is primarily in the fixed-line and cellular business.

Table 1. TM International Investment Ventures (Subsidiaries and Associate Companies)

Company	Country / Year Incorporated	Type of Investment / Business Networks	Partners / Alliances / Ownership (%)	Status
Societe Des Telecommunications De Guinee (Sotelgui s.a.).	Republic of Guinea (December 1995)	Joint Venture (with local Government)	Strategic partnership: 40% - Government of Guinea to form Sotelgui s.a(national telecommunication operator); 60% - TM	Under 10-year licence since 1995-2005 (with an option for a 10 year extension)
Ghana Telecommunications Company Limited (Ghana Telekom)	Ghana (Feb 1997)	Shareholder (with local Government and local partners)	Purchase of equity: 70% - Government of Ghana 30% - TM	Ceased operation after 2001
Telkom SA Limited (TSA)	South Africa (May 1997)	Joint Venture (with foreign partners and Government of South Africa)	Joint with US-based South Western Bell Corp (9%) via Thintana Communications LLC to acquired TSA (total 15%); 6% - TM	Awarded 5-year exclusive licence to provide domestic and international telecommunication service for the whole of South Africa which lapsed in 2002
Dialog Telekom Limited (formerly known as MTN Networks (Private) Limited (MTN)	Sri Lanka (February 1994)	Shareholder	Shareholding structure: 87.8% - TM 12.2% - public	Licence awarded for a period of 18 years until 2013; listed in year 2005
TM International	Bangladesh	Joint	30% - AK Khan & Co. Ltd	15 years

(Bangladesh) Limited (TMIB)	(October 1995)	Venture	(a leading Bangladesh business group) 70% - TM	nationwide GSM licence until 2011 renewable annually thereafter
Samart Corporation Public Company Limited (SAMART)	Thailand (June 1997)	Joint Venture	Stake (19.22% of TM) in Samart Corporation Public Company Ltd.	In February 2006, TMI repositioned its business partnership with Samart by acquiring a direct 24.42% stake in Samart I-Mobile Public Company
Telekom Malaysia International (Cambodia) Com. Ltd. (TMIC) [formerly known as Cambodia Samart Communications Co. Ltd. (CASACOM)]	Cambodia (May 1998)	Shareholder	Partnership with Samart Corp. Public Co. Ltd from Thailand (100% - TM)	Awarded a licence until year 2027

continued

Company	Country / Year Incorporated	Type of Investment / Business Networks	Partners / Alliances / Ownership (%)	Status
Telekom Networks Malawi Limited (TNM)	Malawi (January 1995)	Joint Venture	40% - Malawi Telecommunications Ltd 60% - TM	To operate GSM cellular services until 2014 (15 years license period)
PT Excelcomindo Pratama (Excelcomindo)	Indonesia (January 2005)	Shareholder	59.7% - TM, 16.8% - Khazanah, 7.4 (AIF Indonesia Ltd), 16.0% (PT Telekomindo Primabhakti), 0.1% (Employees & Public)	
MobileOne Limited	Singapore (August 2005)	Joint Venture	29.79% - SunShare. Sunshare Investments Ltd is a consortium in which TMI holds 80%; Khazanah 20%	

Mobile Telecommunications Company of Esfahan (MTCE)	Iran (December 2005)	Joint Venture	Agreement between TMI and Technology Resources Industries – to transfer MTCE equity from TRI to TMI (49%)	To operate a GSM 900MHz service for a 15 years period commencing 19 May 2001
Multinet Pakistan (Pvt) Limited (Multinet)	Pakistan (February 2005)	Joint Venture	78% - TMI, 22% - local investors	
Spice Communications Private Limited	India (March 2006)	Joint venture	49% - TMI; 51% - Mcorp Global	

Source: Telekom Malaysia, 2006

The first international investment of TMI began in 1995, when the group expanded its operations internationally in the Sri Lankan market. MTN Networks (Pvt) Limited (Note 1) (MTN), was set up to establish, operate and maintain the GSM cellular services utilising the 900 MHz frequency band. It operates Dialog GSM, the country's largest mobile phone network. Dialog GSM is also a key player in ISP, Internet, and mobile satellite service provision.

The Government of Sri Lanka awarded the licensing agreement to the TMI for a period of 18 years until 2013. MTN managed to emerge as the leading cellular company with a subscriber base reaching 1.539 million subscribers at the 31 March 2005 – accounting for approximately 60% share of the country's mobile sector and 40% of total telecommunications subscribers. TM listed MTN Networks on the Colombo Stock Exchange in the 28 July 2005 (Business Times, 7 July 2005).

The success of the early international venture motivated the group to pursue its international expansion activities vigorously during 1995-1997. In December 1995, the group formed a strategic partnership with the Government of Guinea (GOG) to form Societe Des Telecommunications De Guinee (Sotelgui S. A). Telekom Malaysia acquired 60% equity in Sotelgui S.A, amounting to a value of US$45 million, while GOG owns the remaining 40%. The investment is focused on Government-to-Government collaboration. Sotelgui S. A is the national telecommunications operator and is the market leader with a 60% share of the cellular market. It is also the sole provider of wireline and wireless services in Republic of Guinea, with a customer base in excess of 143,000. The year 2003 marked important infrastructural achievements, with GSM being deployed in 19 towns in the provinces. However, in December 2005, TM Berhad has announced to draw its investment in Guinea in relation to group strategy to more focus in ASEAN countries (Utusan Malaysia, 14 December 2005).

In the following year, TMI expanded its operation in Calcutta, India, holding a 37.7% share in Usha Marting Telekom Limited. Having begun its operation in September 1995, the group was given a licence to install and operate a GSM cellular network in the country under the brand name, COMMAND. The stake, however, was sold in October 2000 for US$130 million, to Hutchinson. The main reason for Telekom's withdrawal from India was the restricted coverage given to it, which, as a result, would have capped its growth (Malaysian Business, 1 August 2004).

Another investment of TMI in the African continent is in Malawi. The group formed a joint-venture company with the Government-owned Malawi Telecommunications Limited (MTL) in 1996 to form Telekom Networks Malawi Limited (TNM). Telekom Malaysia holds 60% equity while MTL holds the remaining 40%. When it commenced operations on 15 December 1995, the initial paid-up capital of the company was only MK65 million (RM3.9 million). At the end of the 2004 financial year it stood at MK350 million (RM23.5 million). The rationale for investment of the group is in line with the Malaysian Government's call to local companies to form strategic alliances with foreign parties (Padayachee and Valodia, 2002). In addition, Malawi Posts and Telecommunications Corporation (MPTC) were corporatised from the Telecommunications and Post Department of the Government of

Malawi, and this has made available to TM, an opportunity to be the first foreign participant to enter into a joint venture in the country.

In 1996, the group further expanded its ventures to Bangladesh. TMI and A.K Khan Group (a leading Bangladesh Business Group) entered into a joint venture to formed TM International (Bangladesh) Limited (TMIB). The former holds a 70% stake in this joint venture while the latter holds the remaining 30%.

The group's international ventures to Thailand began in 1997 when the company acquired a 24.99% stake in SAMART Corporation, a public listed company in Thailand. It also bought a 33.33% in Digital Phone Company (DPC), a Samart subsidiary for US$135 million (RM337.5 million) with the commitment to buy new DPC shares at US$45 million (RM112.5 million) to bring the total stake to 40%. TMI's principal partner in Samart is the Vilailuck family, one of the country's successful entrepreneurs, with a 48.73% shareholding in the company. The partnership is the first step in creating a regional telecommunications infrastructure to rival all others in the global market (The Edge, 16 June, 1997). In year 2000, there was a significant change in the shareholding structure in DPC as Samart Corp sold a large number of its shares to the Shin Corporation. The founder of Shin Corporation is Thailand's present Prime Minister, Thaksin Shinawatra. Similar to India, the group's investment in Thailand with DPC was disposed of in year 2001 for US$245 million, resulting in an exceptional gain of RM827.8 million for the group. This was due to the nature of the competitive markets and restricted coverage given, which limited opportunities to expand in that country.

The major and most profitable international project made by the group was in South Africa. The investment took place in 1997. TMI invested in Telkom South Africa (TSA) through its consortium with South Western Bell Corporation (Note 2) (SBC Communications Inc.) of the United States through Thintana Communication LLC. The purchase of a 30% stake in Telekom SA Ltd by TM is reported to be closely linked to the Malaysian utility's policy of investing in developing countries to overcome competitive pressures in its own domestic telecommunications industry. It is the largest investment in Africa by a Malaysian company (Business Report, 27 March 1997). The Vice President of Customer Network Operations TM, put succinctly:

"We believe that Telekom Malaysia can contribute in a substantial way to South Africa's economic development and upliftment of disadvantaged groups" (Quoted in Telekom Malaysia Press Release, 10 December 1996).

Similarly, the President of Johannesburg based Southwestern Bell International Development Africa (Pty) Ltd commented:

"SBC and Telekom Malaysia share not only a reputation for management and technical expertise, but a well-known commitment to employee training and high-quality technology for their local partners" (Quoted in Telekom Malaysia Press Release, 10 December 1996).

TM's investment in South Africa may be part of a strategy to further penetrate the African continent. Reports indicate that Telkom SA Ltd and TM are seeking to expand in Africa, where telecommunications privatisations are under way in Uganda, Senegal, Cote d'Ivoire, Ghana, and the Democratic Republic of Congo (Business Day, 17 September 1997). As strategic equity partners, the two companies jointly hold a 30% stake in TSA. TSA was given a licence granting the company an exclusive right to provide public switched telecommunication services (PSTS) for a period of 5 years commencing in May 1997, to the end of financial year on 31 March 2002. TSA also owns 50% of Vodacom Group Proprietary Ltd ('Vodacom'), the leading cellular operator in South Africa, with approximately 9.7 million wireless subscribers. In return for the period of exclusivity, TSA is required to meet stringent rollout and service obligations to improve teledensity and accessibility in South Africa. On 18 June 2004, the company reported an exceptional gain of RM 640 million from the partial sale of its stake in Telkom SA South Africa. Thintana disposed of a 14.9% stake in Telkom SA comprising 82.99 million shares for 6.06 billion rand (RM3.54 million). With the stake sale, Thintana's interest in Telkom SA has been reduced from 30% to 15.1% (The Star, 22 Jun 2004). Thintana is 60% owned by SBC and 40% by TM. Therefore, Telekom's effective stake in Telkom SA Ltd was reduced from 12% to 6%. Telekom's portion of the sale was 33.19 million shares, amounting to 2.42 billion rand (The Sun, 21 Jun 2004). On 15 November 2004, TMI sold its remaining 6% to South African Black Empowerment Consortium. The disposal resulted in an exceptional gain of RM1, 515.2 million for the financial end 2004 which contributed to the group profit. During the interview, one of the key executives claimed:

"The investment in South Africa gave us a great return and shows that our intention to move abroad and place the investment in those countries in the early days was the right decision".

When TM first announced its intention to reduce its stake in the South African company, it raised some doubts, as the latter was achieving excellent results. However, it is believed that the move signalled a strategy to move away from a market reaching saturation point and reallocate investments to areas that promise higher growth potential. The partial disposal is in line with Telekom's move to consolidate its strategic investment overseas and focus on

markets closer to Malaysia, especially in the Asia-Pacific region (The Sun, 21 Jun 2004). Moving to the Asia-Pacific region would be a positive step for TM considering the good growth potential in those countries (Malaysian Business, 1 August, 2004).

Apart from South Africa, Malaysian Telekom also bought a 30% stake in Ghana Telekom (GT) in 1997. TM was part of G-Com; a consortium led by the Telekom group and the Government of Ghana (70%). The group acquired 30% equity in GT for US$38 million in February 1997 governed by a Stock Purchase and Sale Agreement. GT had been a profitable telecommunications provider even before its privatisation. The company recorded a profit of US$14 million in 1997 and US$3 million before the privatisation (Malaysian Business, 1 August 2004). In August 2000, TM signed an agreement to acquire an additional 15% for US$100 million. The investments in Ghana, however, did not meet expectations, and in July 2001, only four and the half years after the start of operation, TM lost management control in GT after the Government of Ghana 'unilaterally terminated' the employment contract of the managing director and appointed an interim management committee to oversee day to day affairs. Telekom's management of GT became a contentious issue during the elections and the contract was not renewed when it expired in February 2002. The new government under the New Patriotic Party led by John Kufuor had chosen Norway's Telenor to replace Telekom as the strategic investor to improve GT's network. In late 2002, Telekom withdrew its investment in Ghana, 'as it can no longer protect its investment' (Malaysian Business, 1 August 2004). The disposal of the GT stake is Telekom's third exit from its strategic investments overseas after India and Thailand in 2001, due to the nature of the competitive markets in those countries.

As part of its plan to increase its revenue from overseas ventures and be less reliant on the domestic market, the group announced its entry into Indonesia and re-entry to the Indian market at the end of 2004, thereby establishing a strong regional presence. In 2004 TMI targeted new core investments in a bid to strengthen its presence closer to home. In Indonesia, TMI reached an agreement with the Rajawali Group, the principal shareholders of PT Excelcomindo Pratama (XL), to acquire Indonesia's third largest mobile operator, which was duly completed on 11 January 2005. The transaction is structured as an initial acquisition of a 27.3% interest amounted US$314 million in cash, together with transfer of majority management and board control to TM. The company intends to acquire additional shares to achieve a majority shareholding in 2005. The Chairman of Telekom stressed that:

"we are excited to acquire a substantial equity interest in XL and hope we can increase our stake further. This is clearly a major acquisition for us and is in line with our strategy to acquire mobile assets in low penetrated markets closer to home" (The Sun, 9 December 2004).

In India, the group revisited the country with renewed vigour when it formed a joint venture with Singapore Technologies Telemedia (STT) to buy shares equity in IDEA Cellular, the leading cellular operator in India to operate cellular services with a subscriber base of over 4.5 million (Utusan Malaysia, 27 November, 2004). Both parties have entered into a definitive agreement to acquire a 47.7% stake in IDEA Cellular for a total consideration of approximately US$390 million (US$1 = RM3.80). The joint venture with STT would further improve TMI's ability to compete in the increasingly competitive global mobile telecoms market (Malaysian Business, 1 August 2004). Under the terms of the agreement, the consortium will acquire the entire stake from Cingular Wireless, and simultaneously infuse additional capital into IDEA. The consortium is structured as 60% (ST Telemedia) and 40% (TM International), and its three largest shareholders are Cingular Wireless, the Tata Industries and the Aditya Birla Group. The proposed investment is consistent with the objectives of ST Telemedia and TM International: to become significant wireless players in the Asian markets; and to participate in the growth opportunities in the Indian cellular market. It was stressed in an interview that the venture is:

"a promising area of growth. As a wholly-owned subsidiary of Telekom Malaysia, we are optimistic about the role that TM International can play in IDEA and the Indian cellular market".

In moving forward, Telekom has also expanded its operation in Pakistan telco. TMI owns 78% stake in Multinet Pakistan (Private) Limited, whereas 22% by local investors. Pakistan is being selected for TMI investment, as it able to provide a window of opportunity into the Middle Eastern market.

From the interviews with key management of TM Berhad, seven primary factors have been identified motivates the firm in their internationalisation: globalisation of industry and commerce, reducing of trading barriers, privatisation, competition, regulation asymmetry, new telecom technologies and political needs. Potential new markets include those in Indonesia, Myanmar, Cambodia and Vietnam in South East Asia and India, Pakistan, Afghanistan, Iran, Bangladesh, Nepal and Sri Lanka in the South Asian region. The company's core focus in the international market will be on the provision of cellular and value-added services.

Having discussed the background of the group's growth and development, the paper now continues by explaining how Telekom's domestic growth and international growth were achieved.

5. Business strategies and ownership advantages

The following discusses the primary source of ownership advantages of the group. Although the growth of TM group was built on various aspects of its ownership advantages, it is not based on physical capital alone. Knowledge of the telecommunication industry and its status as a Government-linked Corporation (GLC) were also strategic assets for expansion process.

5.1Industry Knowledge and Experience Advantages as a Pioneer Telco

As a national pioneer telco, its long-term monopoly and dominant market position in the telecommunication industry has enabled the firm to continue expanding with no competition. TM's initial monopolistic position gave it plenty of time to accumulate industry knowledge and experience, and allow the control of the domestic market especially in the fixed line business. There is no doubt that the organisation's familiarity with the needs and behaviour of the local market is a major ownership advantage for TM. Teece (1998) proposed that knowledge-based ownership advantage is crucial to the firm. According to him, one of the ultimate sources of ownership advantage that are not tradable is knowledge assets in its employees. Knowledge assets are hard to imitate because of the complex and tacit nature of knowledge (Polanyi, 1966).

This human resource capability is one of the key advantages the group has compared to other telco operators in the country, thanks to its serious investment to acquire technical knowledge and expertise in developing highly educated workforce. Staff and skill development continues to be a priority in the firm's expansion. This forward thinking and ingenuity has helped the group expand its business operations both domestically and internationally. Although TMI places strong emphasis on its human resource skills and knowledge, the firm has yet to reach the stage of having strong and influential knowledge, especially knowledge concerning internationalisation. Relatively little attention has been given to this area, the reason for this being that the firm's international expansion is a new phenomenon and only started in the mid-1990s. The pool of expert staff with internationalisation knowledge is still insufficient.

Despite this limitation, the firm was still able to grow rapidly in some international markets. This implies that the group's ownership advantage lay not so much in its marketing and management skills, but more in its capability in cultivating and exploiting a broad range of contacts through government facilitation. Co-operation between developing countries through South-South Co-operation is one of the intermediaries used by TMI to expand internationally (Jomo, 2002). For instance, the TM presence in South Africa in 1997 is evidence of the use of government contacts. The group's investment in Telkom SA has dominated Malaysian involvement in the South African economy (Padayachee and Valodia, 2002).

5.2 Overall Superior Network Quality, Customer Service and Premium Branding

The second factor that accounted for the domestic and international growth of TM is overall superior network quality, customer service and premium branding. TM has sought to optimise its network capacity, quality and performance in those areas where its target customers are located and where there is heavy subscriber usage such as high population density areas and principal traffic routes. The company customer-focused culture is geared to performance-based, time-critical and responsive customer care and service. This focus has contributed to TM's recognition as an industry leader in Malaysia with respect to service quality, customer care and overall customer satisfaction. As evidence, in the annual survey by Superbrands Malaysia Magazine and Reader's Digest in 2004, TM received the Gold Award and was voted as one of the telecommunications industry Superbrands of the year (Annual Report, 2004).

The TM brand has been recognised as one of the leading brands in Malaysia. Although its name recognition had yet to reach a global level, it can claim that it has reached a certain quality standard in the region. In an effort to strengthen its presence domestically and internationally, a new brand identity was launched on 14 April 2005. The new brand is not a mere cosmetic change. It encompasses a real change in the way TM provides its services and mission. It was built through consistently managed advertising, promotions and other image programmes built around TM's commitment to providing high quality and innovative communications services and on anticipating and meeting customer needs. There were three main reasons behind the re-branding exercise (Annual Report, 2004). First, to renew its image and refresh TM's brand identity after 15 years of being a public listed company. Second, to reinforce the change efforts that are taking place, and third, in order to compete against key players in the telecommunication industry in the international arena, there is a need for a new brand identity that is international and universal.

5.3 Technological Competence

Technology is often designed for the place where it originated, and once transferred to another location, adaptation usually takes place to suit the local environment and maximise benefit from locally-sourced inputs (Dunning,1993). The extent of adaptation undertaken by firms depends on the nature of the affiliates' operations. In developing

countries, capital and technology have always been the underlying driving forces behind the evolution of the telecommunication sector (Hobday, 1990). According to Hobday, the telecommunication firms in developing countries accumulate their technology competence on a sequence basis, learning from their suppliers prior to operating the systems.

Telecommunications technology has always been the underlying driving force behind the growth of TM. The infusion of technology has enabled TM to grow from strength to strength to become one of the leading adopters of technology, especially in the industry of telecommunications. TM's involvement is not limited to acquiring technology for adoption but also developing technology through research and development, system integration as well as promoting technology through its service. However, the research and development of the latest telecommunications equipment is not a priority, and TM cannot yet be labelled as an innovator. This is because most of the technological advancement and skills were acquired from foreign experts through both equity partnership and contract-based ties. The technology capability of TM is on a par with that of other international telecommunication players and is driven by customers' needs and requirements. To maintain its competitive edge, TM continuously invests in new technologies and work closely with its technology suppliers to improve its services. The group's strong financial standing allows it to purchase and acquire its technology equipment from established foreign suppliers such as Ericsson, NEC, Philips and AT&T. TM engineers will work closely with the suppliers' technical teams to gain a working knowledge of the network.

In the international market, TMI used and applied the same technology as in the domestic market. Since most of the TMI ventures are in less developed countries, the technology used was similar to that used at home and some was at a lower technological level. This has assisted in the ease of the group's expansion. An executive gave an example of the level of technology in some countries. In Sri Lanka, TMI used a basic telecommunication technology, as the country was not ready for advanced equipment. This enabled TMI to adapt its technological skills to the local environment.

The ability of TM to bring this technology is one of the ownership advantages the group has over its local partners. However, it is obvious that the technology available to the group is more suited to the local environment of developing nations. Lecraw (1981) and Wells (1986), who pointed out that the technologies of developing country MNCs most often were the result of an adaptation of an existing innovation or consisted of a renovated technology that had been forgotten or discarded in developed economies, stressed a similar point.

5.4 Reputation of the firm as Government-linked Corporation

In the case of TM Berhad, the Government of Malaysia owned more than 60% share in the company (Lent, 1991). Having the government as its major shareholder made the firm a rather unique and influential organisation not just domestically but also internationally. The company has been seen to have an important strategic role in the economy in terms of the provision of rural telephony, the building of capital intensive projects, such as the RM 1 billion backbone for the Malaysia Super Coridor project, and its role as an investment arm of the government, 'carrying the flag' in Asian and African countries (Salazar, 2004). Its strategic planning was synchronised with governmental plans for economic growth and development. Although the government does not participate directly in the day-to-day operation and management of the group in which it holds equity, it still oversees the operation of TM through its representation on the board of directors. The board plays an active role in improving governance practices to ensure that best interest of shareholders and other stakeholders are served by transparent disclosure policies.

The reputation of the group as a GLC in the domestic business scene has attracted potential joint venture partners in the international arena. TMI has received an offer to become a joint partner in its international expansion. This reputation provided TMI with an opportunity to select its partners from a wide selection of the world's top telecom companies. Most of the joint ventures made by TMI are with other GLCs in other countries, and some with non-GLCs. The status of the firm as a GLC also gives TM an image of stability, both financially and in terms of management capability. As it possesses a strong stand-alone credit profile, it has rarely been necessary for the government to provide financial assistance (Business Times, 7 Jun 1999).

An argument often received by the group from the public and industry is that development and expansion of TM's was entirely based on its vast connection with the government and the state agencies, due to the status of the group as a GLC (Malaysian Business, 1 November 2001). Although this may be an exaggeration, it would be unrealistic to deny the claim completely, given the highly politicised nature of the industry. The entire ownership and the company's strategic role in the economies development has given it strong support from the government. In a study of the political economy of telecommunications in Malaysia and Singapore, Mesher and Zajac (1997) claimed that the creation of (National Economic Policy) NEP to increased Malay ownership in the business sector inspired the government to use its political power as a means to ensure that Malays dominated in the telecommunications sector.

Consequence, since the end of NEP in 1990, the entry barrier to non-Malay participation has been minimal (ibid).

Having explained TM approach towards internationalisation, the next section discusses how the group exploits these ownership advantages and expands its operations internationally.

6. Conclusion and implication of the case evidence

The purpose of this paper was to explore the emergence of a leading Malaysian telecommunication company and nascent MNC – namely – TM Berhad. The case study of TM Berhad has presented some interesting insights on the growth of this countries major telecommunications player, which has moved in a relatively short time from domestic telecommunications firm into an international player and nascent MNC. Undoubtedly, its status as government-linked corporation, had underpinned the group's growth in the domestic market which was partly based on business network connections with the Malaysian government; although the group via its interviewees wished to claim its technological expertise was a major contributor. However, TM's exploitation of these extensive relationships is understandable; given the status of the company prior to privatisation was a government department within the Ministry of Energy, Telecommunications and Posts.

The firm's international expansion process does not seen to be based just on government connections, but also upon its technological expertise, business networks with foreign partners, and knowledge and experience of developing-country markets. Undoubtedly, the groups' reputation as Malaysia national telecommunications firms increased its credibility in the eyes of its foreign partners. TMI's primary motives for overseas expansions were to gain market presence by searching for new opportunities and establish regional coverage of operations. Regional economies which typically have high populations but low phone penetration rates remain the main focus of its international investments. The group believes most of its ventures are located in important growth regions in the industry, which have the potential to become fast growing markets.

Some of the findings in this paper contradict prevailing misleading stereotypes in the developing-country MNCs literature that corporations from developing countries are inherently weak, their advantages derived from conventional cost savings and are labour intensive, often unable to compete internationally, and their internationalisation follows an incremental process. The evidence from the TM case shows that the group's international expansion was facilitated through various types of ownership advantages such as knowledge and experience in the telecommunication industry, technological competence, reputation of the firm as a government-linked corporation, and business networks with foreign parties. The firm's internationalisation process reflected opportunistic moves rather than being incremental in process and stages. The case study thus offers interesting insight into the birth, developmental process, and international expansion of a nascent multinational corporation from a previously unconsidered developing economy.

7. Limitations and future research

The study is limited by several factors that should be addressed in future research. First, the number of case company could have been larger. Second, the case selection could have been given extending to various other sectors of economic activity such as hotels, textiles, banking, insurance, manufacturing, and supermarkets. Finally, in order to provide a more general view of the international expansion of developing country MNCs, comparison with other developing countries should be conducted. In sum, all these limitations lead to opportunities for future research.

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Notes

Note 1. MTN Networks was incorporated in Sri Lanka pursuant to a joint venture agreement dated 27 August 1993, entered into between TMI and a Sri Lankan company, Sunpower. In 1996, MTN Networks became a wholly owned subsidiary of TMI.

Note 2. SBC is one of the leading diversified telecommunications companies and the second largest wireless communications company based in the United States. SB provides innovative telecommunications products and services under the Southwestern Bell and Cellular One brands. The company was rated by Fortune magazine as the most admired telecommunications company in the US.

Multiple Attribute Grey Target Decision Making Model Based on Linear Combination Weights Determining and Entropy

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Abstract

Gray target decision making is one method of gray systematic theory for solving multiple attribute decision making problem. The weight definite method of the index in the present researches on gray target decision making is monotonous, it does not accord with the actual conditions; From the point of view of mathematical statistics in addition, the true weight coefficient of every index is a random variable, the weight coefficient that different assignment method draws is only a sample value of the true weight coefficient, and it has some uncertainty. For this reason, a method of determining the linear combination weights based on entropy, using optimization theory and Jayne's maximum entropy principle, is presented to deal with the problem of determining the weights in multiple attribute decision making. The existing grey target decision making model has been got improved and the example demonstrates the validity of this model.

Keywords: Entropy, Grey target decision making, Linear combination assigning weights, Multiple attribute decision making

1. Forewords

There are a large number of MADM (Multiple Attribute Decision Making) problems in such activities as the society, economy and etc. A lot of domestic and international scholars have already carried on diversified researches and discussions to MADM and have made it develop rapidly. The grey target decision making is one of the methods to solve MADM problems using the grey systematic theory. An important factor influencing the rationality of MADM is the weight of evaluation index. The existing researches of grey target decision making (documents [1, 2]) all treat the importance of every index equally, or assign weight to every index with single subjective law. In reality, different indexes have different function in different decision, so it dose not accord with actual conditions to treat the importance of every index equally or assign weight with single subjective law and it is essential for improvement of the already existing grey target decision making model. From the point of view of mathematical statistics in addition, the true weighting coefficient of every index is a random variable, the weighting coefficient that different assignment method draws is only a sample value of the true weighting coefficient, and it has some uncertainty. For this reason, this text proposes one method giving consideration to the synthesis of subjective law and objective law, introduces Shannon entropy to describe the uncertainty brought by various kinds of assignment methods at the same time, and on this basis has set up the multiple attribute grey target decision making model. The instance analysis with this model has stated the rationality of it.

2. Set up of the grey target decision making model

Generally a MADM problem has a decision scheme set $S = \{s_1, s_2, L, s_n\}$, which is composed by assessed targets or drafted schemes; and an index set $A = \{a_1, a_2, L, a_m\}$, which is composed by evaluation indexes or attributes. The effect sample value of the scheme s_i to the index a_j is $x_{ij}(i = 1, 2, L, n; j = 1, 2, L, m)$ and the effect sample matrix of the scheme set S to the index set A is $X = [x_{ij}]_{n \times m}$.

2.1 Index standardization

Because the magnitude order and dimension of every evaluation index will exist differently in actual appraisal problem and the attribute is different, some indexes require that the smaller the better, some indexes require that the greater the better, while some indexes demand to fall into a certain interval. So it is necessary to carry on the standardized treatment to the appraise matrix before appraising.

At present the commonly used index types include benefit type, cost type and interval type, etc. It is the better that benefit type index value is the greater, the better that cost type index value is the smaller, and the better that interval

type index value falls into a certain interval. This text will use the principle of "reward the good and punish the bad" to standardize indexes according to reference document (Dai, Zou, Wang, Zhu & Zhou, 2000, pp. 32-36), the basic thought is that a positive number from 0 to 1 is assigned to the index when its value is superior to the average level, while a negative number from 0 to -1 is assigned to the index when its value is inferior to the average level.

It is supposed that O_1, O_2, O_3 respectively stands for the suffix sets of benefit type index, cost type index and interval type index, so there is the equation $O_1 \cup O_2 \cup O_3 = \{1, 2, L, m\}$, and $O_i \cap O_j = \varnothing (i \neq j, i, j = 1, 2, 3)$.

Order $z_j = \frac{1}{n} \sum_{i=1}^{n} x_{ij}, (j = 1, 2, L, m)$, if A_j is benefit type index, there is the formula (1):

$$r_{ij} = \frac{x_{ij} - z_j}{\max(\max_{1 \leq i \leq n}\{x_{ij}\} - z_j, z_j - \min_{1 \leq i \leq n}\{x_{ij}\})}, (j = 1, 2, L, m) \tag{1}$$

If A_j is cost type index, there is the formula (2):

$$r_{ij} = \frac{z_j - x_{ij}}{\max(\max_{1 \leq i \leq n}\{x_{ij}\} - z_j, z_j - \min_{1 \leq i \leq n}\{x_{ij}\})}, (j = 1, 2, L, m) \tag{2}$$

And if A_j is interval type index, for example, A_j belongs to the interval of $[C, D]$, there is the formula (3):

$$r_{ij} = \begin{cases} 1 - \dfrac{2(C - x_{ij})}{C - \min_{1 \leq i \leq n}\{x_{ij}\}}, & x_{ij} < C \\ 1 - \dfrac{2(x_{ij} - D)}{\min_{1 \leq i \leq n}\{x_{ij}\} - D}, & x_{ij} > C \\ 1, & C \leq x_{ij} \leq D \end{cases} \quad (j = 1, 2, L, m) \tag{3}$$

The above transform is called the "reward the good and punish the bad" transform operator, and it can transform the effect sample matrix $X(t) = (x_{ij})$ into the decision making matrix $R = [r_{ij}]_{n \times m}$. It can be concluded that all the elements of the matrix R have no dimension and they all accord with the "reward the good and punish the bad" criterion, and that the value of every element belongs to the interval of $[-1, 1]$, $(i = 1, 2, L, n; j = 1, 2, L, m)$. The vector $r_i = (r_{i1}, r_{i2}, L, r_{im})(i = 1, 2, L, n)$ is called the effect vector of the scheme S_i.

2.2 The multiple attribute grey target decision making model

(1) Definition 1: Supposed that

$$r_j^* = \max_{1 \leq i \leq n}\{r_{ij}\}, (j = 1, 2, L, m) \tag{4}$$

Call the follow vector as the optimum effect vector for the multiple attribute grey target decision making, which is also called the "bull's-eye".

$$r = (r_1^*, r_2^*, L, r_m^*) \tag{5}$$

(2) Supposed that the vector of weight drawn through the method of linear combination weights assigning which is adopted by this text is $W^* = (w_1^*, w_2^*, L, w_m^*)$.

Definition 2: Call the follow formula as the multidimensional ellipsoid grey target regarding r as the "bull's-eye".

$$R^{(m)} = \{(r_{i1}, r_{i2}, L, r_{im}) \mid w_1^*(r_{i1} - r_1^*)^2 + w_2^*(r_{i2} - r_2^*)^2 + L + w_m^*(r_{im} - r_m^*)^2 = R^2\}$$

(3) Definition 3: Supposed that $r_i = (r_{i1}, r_{i2}, L, r_{im}) \in R^{(m)}$, and call the variable d_i as the "bull's-eye distance" of the

effect vector r_i. The size of the "bull's-eye distance" has reflected the quality with the effect vector. The smaller the "bull's-eye distance" is, the more excellent the decision scheme is; On the contrary, the greater the "bull's-eye distance" is, the worse the decision scheme is.

$$d_i = |r - r_i| = \sqrt{w_1^*(r_{i1} - r_1^*)^2 + w_2^*(r_{i2} - r_2^*)^2 + \mathrm{L} \ w_m^*(r_{im} - r_m^*)^2} \tag{6}$$

2.3 The linear combination assigning weights based on entropy

(1) Supposed that the appraising person gets several kinds of weight vectors for the evaluation index, such as W^1, ... , W^l, using kinds of subjective and objective assigning weights methods. For example, one of the weight vector is $W^k = (w_1^k, w_2^k, \mathrm{L}, w_m^k)^T$, it meets the equation $\sum\limits_{j=1}^{m} w_j^k = 1$, $w_j^k \geq 0$, $(k = 1, 2, \mathrm{L}, l)$.

Make the vector $W^* = (w_1^*, w_2^*, \mathrm{L}, w_m^*)^T$ as the linear combination weight vector of the above several weight vectors such as $W^1, \ldots, W^k$. The formula (7) is about the linear combination weight vector.

$$W^* = \sum\limits_{k=1}^{l} x_k W^k \tag{7}$$

In the above formula, the variable x_k stands for the linear combination coefficient, and it accords with the equation

$$\sum\limits_{k=1}^{l} x_k = 1, \ x_k \geq 0 \tag{8}$$

Order the vector $x = (x_1, x_2, \mathrm{L}, x_l)^T$ stands for the linear combination coefficient vector, and it can be easily verified that the weight vector drawn from the formula (7) accords with the equation

$$\sum\limits_{j=1}^{m} w_j^* = \sum\limits_{j=1}^{m} \sum\limits_{k=1}^{l} x_k w_j^k = 1 \tag{9}$$

(2) From the point of view of mathematical statistics, in the realistic system, the true weight coefficient of every evaluation index is a random variable, and the true weight vector that they form is a random vector. The weight vector W^k can be viewed as a sample of the true weight vector, and the linear combination coefficient x_k can be viewed as the probability of the true weight vector taking the sample value. So the linear combination coefficient vector x has some uncertainty and this uncertainty can be shown by the Shannon entropy:

$$H = -\sum\limits_{k=1}^{l} x_k \ln x_k \tag{10}$$

(3) The purpose of solving for the linear combination vector is just to confirm the suitable combination coefficient vector x. So on one hand it should make the weighting "bull's-eye distances" between all schemes and the ideal scheme minimum, which means the two follow formulas should be tenable.

$$\text{Min} \ \sum\limits_{i=1}^{n} d_i^2 = \sum\limits_{i=1}^{n} \sum\limits_{j=1}^{m} \sum\limits_{k=1}^{l} x_k w_j^k (r_j^* - r_{ij})^2 \tag{11}$$

$$\text{s.t.} \ \sum\limits_{k=1}^{l} x_k = 1, \ x_k \geq 0 \tag{12}$$

And on the other hand, it should try its best to dispel the uncertainty with the combination coefficient vector x. According to Jayne's greatest entropy principle, the comprehensive weight coefficient for index should make the Shannon entropy unable to fetch great, it means that the two follow formulas should be tenable.

$$\text{Max} \quad H = -\sum_{k=1}^{l} x_k \ln x_k \tag{13}$$

$$\text{s.t.} \quad \sum_{k=1}^{l} x_k = 1，\ x_k \geq 0 \tag{14}$$

So solving for the linear combination weight vector is a problem of multiple attributes optimization. In order to solve this problem, this text constructs the follow single attribute optimization problem (SP):

$$\text{Min} \quad \mu \sum_{i=1}^{n} \sum_{j=1}^{m} \sum_{k=1}^{l} x_k w_j^{k} (r_j^{*} - r_{ij})^2 + (1-\mu) \sum_{k=1}^{l} x_k \ln x_k \tag{15}$$

$$\text{s.t.} \quad \sum_{k=1}^{l} x_k = 1，\ x_k \geq 0 \tag{16}$$

In the formula (15), the positive parameter $0 < \mu < 1$ expresses the balance coefficient between two attributes, and it can be provided in advance according to the practical problem. It can be proved that this single attribute optimization problem (SP) has the only result and the result is as follows:

$$x = \left[\frac{p_1}{p}, \frac{p_2}{p}, \text{L}, \frac{p_l}{p} \right] \tag{17}$$

In the formula (17), the results of vector p and vector p_k are as follows:

$$p = \sum_{k=1}^{l} p_k，\quad p_k = \exp\{-[1 + \mu \sum_{i=1}^{n} \sum_{j=1}^{m} w_j^{k} (r_j^{*} - r_{ij})^2 / (1-\mu)]\}，\quad (k=1,2,\text{L},l)$$

(4) Use the formula (7) to solve for the linear combination weight vector W^{*}.

2.4 The multiple attribute grey target decision making algorithm

In sum, it can get the multiple attribute grey target decision making algorithm as follows:

(1) Construct the effect sample matrix $X = [x_{ij}]_{n \times m}$ according to the multiple attribute decision making problem;

(2) Use formulas (1), (2), (3) to transform the effect sample matrix X into the decision making matrix $R = [r_{ij}]_{n \times m}$;

(3) Solve for the optimum effect vector r according to the formula (4) by the decision making matrix R ;

(4) Solve for the linear combination coefficient vector x according to the formula (17);

(5) Solve for the linear combination weight vector W^{*} according to the formula (7);

(6) Solve for the "bull's-eye distance" d_i of the effect vector r_i, and arrange d_i according to the order from small to large, then can get the optimum sequencing of every scheme.

3. Demonstrated application

3.1 Brief account of the application

In order to develop the new products, five kinds of capital schemes from s_1 to s_5 have been drafted. The effect sample value of every scheme is arranged in Table 1, and tries to arrange them in an order.

3.2 The model calculation

Among the indexes, the Expect NPV and Risk Profit are benefit type indexes while the Capital Cost and Risk Loss are cost type indexes. We utilize the method of this text to solve for the sequencing of the capital schemes, and the concrete steps are as follows:

(1) Set up the effect sample matrix according to data of table 1;

$$X = \begin{bmatrix} 5.20 & 5.20 & 4.73 & 0.473 \\ 10.08 & 6.70 & 5.71 & 1.599 \\ 5.25 & 4.20 & 3.82 & 0473 \\ 9.72 & 5.25 & 5.54 & 1.313 \\ 6.60 & 3.75 & 3.30 & 0.803 \end{bmatrix}$$

(2) Transform the effect sample matrix into the decision making matrix according to formula (1) and formula (2);

$$R = \begin{bmatrix} 0.8007 & 0.1071 & 0.0833 & 0.6886 \\ -1 & 1 & 0.8257 & -1 \\ 0.7823 & -0.4881 & -0.6060 & 0.6886 \\ -0.8671 & 0.1369 & 0.6969 & -0.5711 \\ 0.2841 & -0.7559 & -1 & 0.1937 \end{bmatrix}$$

(3) Get the optimum effect vector according to the formula (4);

$$r = (0.8007, 1, 0.8257, 0.6886)$$

(4) Supposed that the appraising person gets three kinds of weight vectors for the evaluation index using different kinds of subjective and objective assigning weights methods, they are as follows:

$$W^1 = (0.10, 0.30, 0.15, 0.45)$$

$$W^2 = (0.20, 0.30, 0.30, 0.40)$$

$$W^3 = (0.45, 0.15, 0.10, 0.30)$$

Make the balance coefficient $\mu = 0.8$ and calculate the combination coefficient vector according to formula (17);

$$x = (0.6665, 0.0039, 0.3296)$$

(5) Solve for the linear combination weight vector according to formula (7);

$$W^* = (0.216, 0.251, 0.134, 0.399)$$

(6) Solve for the "bull's-eye distance" d_i of every scheme;

$d_1 = 0.5234$, $d_2 = 1.3558$, $d_3 = 0.9114$, $d_4 = 1.1930$, $d_5 = 1.1730$

(7) Arrange d_i according to the order from small to large, then can get the optimum sequencing of every scheme.

$d_1 > d_3 > d_5 > d_4 > d_2$

3.3 The result analysis

Table 2 shows the comparison of assessment results of different assigning weights methods. Seeing from table 2, the different methods all get the result of $s_1 > s_3$, so it can be thought that scheme 1 is optimum and scheme 2 takes second place. The assessment results of the other three schemes are not the same, so it can't well offer reference for making policy though single one assigning weights method. The linear combination assigning weights method adopted by this text can synthesize characteristics of various kinds of methods so better as to offer basis for making policy.

4. Conclusion

The choice of the weight coefficient of the evaluation index is the critical event while appraising multiple attributes system. Using optimization theory and Jayne's maximum entropy principle a method of linear combination weights assigning based on entropy is presented to deal with the problem of assigning weights in multiple attributes decision making, it considers not only the synthesis of subjective assigning weights method and objective method but also the uncertainty of different methods, and the existing grey target decision making model has been got improved. At last the demonstrated application shows the rationality and significance of this method.

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Table 1. Effect sample value of every sample Unit: ten thousands of RMB

Target \ Scheme	Capital Cost	Expect NPV	Risk Profit	Risk Loss
s_1	5.2	5.2	4.73	0.473
s_2	10.08	6.7	5.71	1.599
s_3	5.25	4.2	3.82	0.473
s_4	9.72	5.25	5.54	1.313
s_5	6.6	3.75	3.3	0.803

Table 2. Assessment results of different assigning weights methods

Weight Vector \ Scheme	W^1	W^2	W^3	W^*
s_1	0.56732	0.63603	0.41798	0.283289
s_2	1.26782	1.33755	1.52136	1.151147
s_3	0.98581	1.13107	0.73300	0.501505
s_4	1.10372	1.191431	1.35689	1.156536
s_5	1.24973	1.44092	0.99467	0.936148
Result of Optimum Sequence	$s_1 > s_3 > s_4 > s_5 > s_2$	$s_1 > s_3 > s_4 > s_2 > s_5$	$s_1 > s_3 > s_5 > s_4 > s_2$	$s_1 > s_3 > s_5 > s_2 > s_4$

Financial Integration and Real Exchange Rate

Volatility: Evidence from South and South East Asia

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Abstract

Real exchange rate fluctuations take a central place in the discussions over the choices of economic policies in developing economies. It is essentially the dependence with respect to imports and the specialization in exports that account for real exchange rate fluctuations on the economic performances of developing countries. The accessibility to the world financial market also plays an important role in helping to smooth out consumption in financing trade balance disequilibrium.

Identifying the sources of real exchange rate fluctuations enables one to measure, on the one hand, the consequences of economic policies implemented by the government on the real exchange rates, and on the other, the room policy makers have at their disposal to deal with possible real exchange rate movements harmful to economic activity. In this perspective, we address in the paper the main question: does financial liberalization contribute to real exchange rate fluctuations in South and South East Asia?

Our study suggests that openness helps to reduce real exchange rate fluctuations but financial integration increases real exchange rate volatility. We encourage the countries of South and South East Asia to improve the flexibility of their exchange system and to pursue the sequential liberalization policy.

Keywords: Real Exchange Rate, Volatility, International Financial Integration, GMM, South and South East Asia

1. Introduction

Understanding the impact of financial integration on macroeconomic volatility in general and the exchange rate in particular, remains a major challenge for the theoretical and empirical studies. In theory, financial integration could help to lower macroeconomic volatility in developing countries as it provides access to foreign capital which can help to diversify production capacity that is affected by a stability of the exchange rate.

The impact of the increase in financial flows on the volatility of the exchange rate depends on several factors, including the composition of these flows, and the quality of the economic structures, particularly the financial system. For example, the financial liberalization in a less developed financial system can lead to an increase in volatility.

International financial integration must, in theory, help the developing countries to reduce macroeconomic volatility. But the empirical studies suggest that the developing countries did not reach the potential advantages of a financial liberalization. The process of liberalization of capital account was often accompanied by an increased vulnerability with crisis. Globalization raised the risks since the interconnection between financial markets, may amplify the real and financial shock effects.

Independent of the effects on volatility of production, theory suggests that financial integration should reduce

exchange rate volatility. Reduction of exchange rate fluctuations is considered as a determinant of economic welfare. Access to the international markets provides better opportunities for countries to share macroeconomic risks and, in this way, to reduce uncertainty.

The empirical studies on the effects of globalization on exchange rate volatility remain vague. In particular, evidence on the effects of financial integration on volatility is limited and non-conclusive. Moreover, the existing literature is devoted, to a great part, to analyzing the effects of financial integration on consumption volatility with little interest to exchange rate volatility. This work now provides some new evidences on the subject. We investigate the link between capital controls (international payments restrictions) and currency stability for a sample of countries of South and South East Asia.

The analysis of the factors affecting exchange rate volatility is based on a panel of 10 economies (Note 1) for the period 1979 - 2004. Volatility is related to macroeconomic fundamentals—most notably, real GDP growth, government consumption (in percent of GDP), domestic investment, money and trade openness (measured by the sum of exports and imports relative to GDP). Controlling for the effect of these macroeconomic variables, we examine the effect of financial liberalization on the real exchange rate volatility. Volatility is computed as the standard deviation of the logarithm of the quarterly real exchange rate. We use the GMM system estimator in panel dynamic (Blundell, M. and Bond, S., 1998), as estimation technique.

The goal of the present paper is twofold: First, posit a structural relationship between real exchange rate (RER) volatility and the volatility of RER fundamentals. Second, test the following hypotheses: (i) RER fluctuations are less volatile in more integrated economies, and (ii) financial liberalization helps attenuate RER fluctuations in South and Southeast Asia.

2. Financial Liberalization and Real Exchange Rate Volatility

A large literature on the appropriate sequencing of financial liberalization suggests that early lifting of controls on the capital account may destabilize the economy. McKinnon (1973, 1993), for example, maintains that decontrol of the capital account should come at the end of the reform sequence, following domestic financial liberalization, bank reform, and trade liberalization. In particular, McKinnon argues that a rapid inflow of (official or private) capital will cause real appreciation of the exchange rate, making it difficult for domestic tradable producers "to adjust to the removal of protection" (1993, p. 117). Thus, " a big injection of capital at the time the liberalization increases imports while it decreases exports and throws out the wrong long-run price signals in private markets" (*ibid.*).

Capital controls may also have a destabilizing effect. Restrictions on the international capital account may in fact lead to a net capital outflow and precipitate increased financial instability. Dooley and Isard (1980) point out that controls preventing investors from withdrawing capital from a country act like a form of investment irreversibility: by making it more difficult to get capital out in the future. Controls may make investors less willing to invest in a country. Following this reasoning, Bartolini and Drazen (1997a, b) show that imposing capital controls can send a signal of inconsistent and poorly designed future government policies.

Capital controls may also be ineffective and result in distortions. Edwards et al.(1999), for an example, argue that legal capital restrictions frequently prove ineffective, and are easily sidestepped by domestic and foreign residents and firms. They document how capital controls may lead to economic distortions and government corruption that in turn contribute to economic instability.

The theoretical impact of the increase in financial flows on the volatility of the rate of exchange depends on several factors, including the composition of these flows, specialization, and the quality of the economic structures, particularly the financial system. For example, if the financial opening is associated with a little developed financial system, this could lead to an increase in volatility.

In the literature, we notice a convergence of the research results on the effect of capital liberalization on the growth (Eichengreen 2001). Studies that concentrate on the liberalization of the stock and shares market find positive effect of liberalization (Bekaert, Harvey and Lundblad (2001, 2004), Romer (1993)). In addition, they discover that the international liberalization is often associated to less inflation that in turn can reduce exchange rate volatility.

International financial integration must, in theory, help the developing countries to reduce macroeconomic volatility. The empirical studies suggest that developing countries, in particular, did not reach the potential advantages of a financial liberalization. The process of liberalization of the capital account was often accompanied by an increased vulnerability to crisis.

The International Monetary Fund in its 2002 report provides evidences indicating that in developing countries, the financial openness is associated with a less macroeconomic volatility. However, Bekaert, Harvey, and Lundblad (2002) confirm in particular that capital account liberalization increases the volatility of production and the volatility

of consumption in the emerging countries.

A more conclusive econometric study is presented by Kose, Prasad, and Terrones (2003a) that used measurements of restrictions of the capital account rather than rough financial flows in order to show the different aspects of financial integration. This analysis confirms the increase of the relative volatility of consumption for the countries having more significant financial flows. However, the authors also identify that more financial integration considerably reduces volatility. O' Donnell (2001) examines the effect of financial integration on the volatility of output growth over the period 1971-94 for 93 countries. He finds that a high financial level of integration is associated with lower volatility. These results also suggest that a higher level of financial development favor a fall in output volatilities through financial integration. In particular, Bekaert, Harvey, and Lundblad (2002) find that the capital account liberalization reduces production and consumption volatility.

Certain older empirical work finds mitigated and non-conclusive results concerning the effect of the financial openness on macroeconomic volatility. Easterly, Islam and Stiglitz (2000) working on a sample of 74 countries over the period 1960-97, conclude that neither the financial opening nor the volatility of flows of capital has a significant impact on macroeconomic volatility. However, they show that a higher level of development of the financial sector reduced the volatility of the growth. On the other hand, an increase in the degree of commercial opening generates an increase in the volatility of production, especially in the developing countries. Their results indicate that neither the financial opening nor the volatility of capital flows have any considerable impact on the volatility of production. On the other hand, Buch, Dopke, and Pierdzioch (2002) do not find a logical empirical relationship between financial openness and real exchange rate fluctuation. Gavin and Hausmann (1996) studied the sources of output volatility in developing countries over the period 1970-92 and they do not find any significant positive correlation between capital flows and output volatility.

Independent of the effects on output volatility, the theory suggests that financial integration should reduce the volatility of the exchange rate. The capacity to reduce the fluctuations in the exchange rate is regarded as a determining factor of the economic welfare. In addition, access to the international money markets provides better opportunities for the countries to share the macroeconomic risks and by way, to reduce uncertainty.

In a sufficiently general model, Obstfeld (1984) tried to cover the two extreme cases of closed capital account and free mobility of private capital. It stipulates that the liberalization of the capital account is generally accompanied by an initial period of real appreciation. Indeed, in the short run, an increase in the stock of net foreign assets increases demand for non-tradable and thus to an appreciation of the real exchange rates. Otherwise, he suggests that the suppression of constraints on the capital account can contribute to a real appreciation and an external deficit.

Dornbusch, Goldfajn and Valdés (1995) suggest that independent of exchange regimes; financial integration can make countries vulnerable to the external shocks. But according to Calvo et al. (2000), the effect of financial liberalization on economic fragility can be reduced by a more flexible exchange system. Indeed, the rise in the exchange rate volatility can be compensated in the financial markets by a strong capital mobility that helps to absorb external shocks. However, it cannot be a guarantee against the prolonged misalignments in exchange rates resulting from bad resource allocation and macro-economic instability.

Frankel (1996) studied the effect of tax on the exchange transactions. He showed how capital controls can reduce the effect of speculators' behaviour on exchange rates. Frequent monetary crisis in the emergent markets, caused by an increased volatile flow of capital, highlights the imperfections of the international financial liberalization. Multiplication of crisis in the emergent countries confirms risks of an immediate and unconditional financial liberalization. In this context, restrictions on capital movements may be necessary to reduce the real exchange rate volatility.

De Gregorio,, Eichengreen, Ito and Wyplosz (2000) support that the control of capital account in the short-term is the best way for the harmful effects of capital movements. Indeed, long run capital flows, in particular the FDI, are generally advantageous. Whereas short run flows involve instability and more vulnerability to financial crisis. Ferrari (2000) notes that an important increase in capital movement combined with floating exchange rate is generally accompanied by a strong short-term volatility.

Corden (2002) underlines: «...Inevitably, when there is a boom, there will be real appreciation irrespective of whether the exchange rate is fixed or flexible… There is little reason why a boom that is based on, or at least ends, in euphoria should not go on its merry way under a currency board or a floating regime as much as under a fixed-but-adjustable-regime. For avoiding the adverse effect of a boom, exchange controls or taxes that discourage excessive short-term borrowing matter».

Krugman and Obstfeld (2003) showed that globalization and liberalized capital lead to exchange rate fluctuations. Hau (2002) finds an optimistic result according to which real exchange rate is less volatile for the most open

countries (financial and commercial openness). The study was carried out on the 23 OECD countries for the period 1980 - 1998. Calderon (2003) evaluated the determinants of real exchange rate volatility for 21 industrialized countries. He showed that trade openness is likely to affect the RER volatility. Calderon (2004 b) studied the effect of the financial and commercial opening on the RER volatility for a panel of industrialized and emergent countries over the period 1974-2003. Using the recent dynamic GMM technique, the author found a positive effect of liberalization on the reduction of the RER volatility. However, Edwards and Rigobon (2005) studied the case of Chile for 1990s and showed that the capital controls decrease exchange rate vulnerability to external shocks.

From the above discussion, it appears that the findings of empirical studies on the effects of globalization including financial integrations on exchange rate volatility are rather vague and non-conclusive for the developing countries. Moreover, the existing literature is devoted in a great part to analyzing the effects of financial integration on consumption volatility, with little interest in exchange rate volatility.

3. Data and Methodology

In the present section, we describe the data used for our empirical evaluation of real exchange rate volatility and we present the econometric technique used.

3.1The Data

We have gathered annual data on real exchange rates and fundamentals such as real output, money, terms of trade, government spending, domestic investment, openness and International Financial Integration for a sample of 10 countries of South and South East Asia such as Bangladesh, China, India, Indonesia, Korea Rep, Malaysia, Pakistan, Philippines, Sri Lanka and Thailand. We use annual observations over the 1975-2004 period.

The variables are defined as follows (Note 2):

Dependent Variable:

Real exchange rate volatility is calculated as standard deviation of the effective real exchange rate over a five-year period.

We define at the beginning, the RER as: $\dfrac{P}{EP^*}$, where

P= Domestic price index, expressed by the consumer price index (as it has an important weight of non-exchangeable goods)

P^* = Foreign price index, expressed by the consumer price index of the U.S. (as it has an important weight of exchangeable goods).

E= Nominal exchange rate, defined a proxy as the average price of dollar in local currency. An increase (decrease) of the RER means a real appreciation (depreciation) of the relevant currency.

We use annual data to construct the real effective exchange rate index for country i at period t, *TCREF$_{it}$*, as the nominal exchange rate index multiplied by the relative price of the rest of the world (in U.S. dollars) to the domestic price index,

$$TCREF_{it} = \frac{\dfrac{P_{it}}{P_{i0}}}{\left(\dfrac{E_{it}}{E_{i0}}\right)\prod_{k=1}^{n}\left[\dfrac{P_{kt}^*}{P_{k0}^*}\dfrac{E_{k0}}{E_{kt}}\right]^{w_k}} \ , \text{ where,}$$

(1) E_{it} and P_{it} are nominal exchange rate and consumer price index respectively of the country i, in period t,

(2) E_{kt} and P_{kt} are nominal exchange rate and consumer price index respectively of k-commercial partners, in period t. Price level at time 0 represents the base period of our index numbers, and

(3) W_k, the weights, are computed as the ratio of the bilateral trade flows of country i to the trade-flows of its main commercial partners.

Explanatory Variables:

(1) The volatility of growth rate as the standard deviation of the GDP growth rate.

(2) The volatility of government consumption as the standard deviation of the change of the government expenditures. The data are from WDI CDROM (2006).

(3) The volatility of domestic investment (ID), as the standard deviation of the change of the ID. The data are from WDI (2006).

(4) The volatility of money is the standard deviation of the growth rate of the monetary base.   The data are from the base of the IMF CDROM (2006).

(5) The volatility of the terms of trade (TT) as the standard deviation of the TT changes. The data are from WDI (2006).

(6) The trade openness as the ratio of total imports and exports on the total domestic expenditure.

(7) International Financial Integration (IFI), (from Lane and Milesi-Ferretti (2006) database). We consider three indicators to measure IFI. The ratio of   total engagements and asset on GDP (IFI), the net foreign credit position is considered as an alternate indicator of the IFI (measured by the difference between the total of the assets and engagement (in absolute value)) and finally a political measurement (measured by capital account liberalization (CC) using the Aguirre and Caldéron (2005) data source).

(8) Exchange rate regimes are from Levi-Yeyati and Sturzenegger (2005).

We regress the RER volatility on the primary determinants (output growth, inflation, deficit) and openness (trade and financial).

3.2 The Model

Our baseline regression equation is:

$$Y_{it}=\mu_{it}+X_{it}\beta+F_{it}\gamma+Z_{it}\delta+\varepsilon_{it} \tag{1}$$

where, Yit represents the RER volatility, *Xit* is the vector of fundamental volatility —which comprises the standard deviation of shocks to real output, domestic investment, government consumption, money, and terms of trade—*Fit* is the measures of financial integration, while *Zit* represents the matrix of control variables such as trade openness and dummies for the fixed and intermediate exchange rate regimes.

3.3 Estimation Technique (Note 3)

The proposed panel data regression poses some challenges for estimation. The first is the presence of unobserved period and country specific effects. While the inclusion of period specific dummy variables can account for the time effects, the common methods to deal with country- specific effects ("within" or "difference" estimators) are inappropriate given the dynamic nature of the regression. The second challenge is that most explanatory variables are likely to be jointly endogenous with economic growth, and, thus, we need to control for the biases resulting from simultaneous or reverse causation. In the following paragraphs, we outline the econometric methodology that we use to control for country specific effects and joint endogeneity in a dynamic model of panel data.

We use the Generalized Method of Moments (GMM) Estimator developed for dynamic models of panel data that were introduced by Holtz- Eakin, Newey and Rosen (1988), Arellano and Bond (1991), and Arellano and Bover (1995). Taking advantage of the data's panel nature, these estimators are based on, first, differencing regressions and/ or instruments to control unobserved effects, and, second, using previous observations of explanatory and lagged dependent variables as instruments, called "internal" instruments.

After accounting for time specific effects and including the output gap in the set of explanatory variables *X*, We rewrite the equation (1) as follows,

$$Y_{it}=\alpha Y_{i,t-1}+\beta'X_{it}+\eta_i+\varepsilon_{it} \tag{2}$$

In order to eliminate the country- specific effect, we take first- differences of equation (2),

$$(Y_{it}-Y_{i,t-1})=\alpha(Y_{i,t-1}-Y_{i,t-2})+\beta(X_{it}-X_{i,t-1})+(\varepsilon_{it}-\varepsilon_{i,t-1}) \tag{3}$$

The use of instruments is required to deal with the likely endogeneity of the explanatory variables and the problem that, by construction, the new error term, *(e_{it} - e_{it-1})*, is correlated with the lagged dependent variable,

$(y_{i,t-1} - y_{i,t-2})$.

Taking advantage of the panel nature of the data set, the instruments consist of previous observations of the explanatory and lagged dependent variables. As it relies on past values as instruments, this method only allows current and future values of the explanatory variables to be affected by the error term. Therefore, while relaxing the common assumption of strict exogeneity, our instrumental- variable method does not allow the *X variables* to be fully endogenous.

Under the assumptions that (a) the error term, ε, is not serially correlated, and (b) the explanatory variables, *X*, are

weakly exogenous (i. e., the explanatory variables are assumed to be uncorrelated with future realizations of the error term), the GMM Dynamic panel estimator uses the following moment conditions.

$$E\left[Y_{i,t-s} \quad . \quad (\varepsilon_{i,t} - \varepsilon_{i,t-1})\right] = 0 \qquad \text{for } s \geq 2 \; ; t = s......t \qquad (4)$$

$$E\left[X_{i,t-s} \quad . \quad (\varepsilon_{i,t} - \varepsilon_{i,t-1})\right] = 0 \qquad \text{for } s \geq 2 \; ; t = s......t \qquad (5)$$

The GMM estimator based on these conditions is known as the *difference* estimator. Notwithstanding its advantages with respect to simpler panel data estimators, there are important statistical shortcomings with the difference estimator. Alonso- Borrego and Arellano (1999) and Blundell and Bond (1998) show that when the explanatory variables are persistent over time, lagged levels of these variables are weak instruments for the regression equation in differences. Instrument weakness influences the asymptotic and small sample performance of the difference estimator. Asymptotically, the variance of the coefficients rises in small samples. In addition, the Monte Carlo experiments show that the weakness of the instruments can produce biased coefficients.

To reduce the potential biases and imprecision associated with the usual difference estimator, we use a new estimator that combines in a system the regression in differences with the regression in levels (developed in Arellano and Bover (1995) and Blundell and Bond (1998). The instruments for the regression in differences are the same as above. The instruments for the regression in levels are the lagged differences of the corresponding variables. These are appropriate instruments under the following additional assumptions: although there may be correlation between the levels of the right- hand side variables and the country- specific effect in equation (3), there is no correlation between the differences of these variables and the country specific effects. This assumption results from the following stationarity property,

$$E\left[Y_{i,t+p} \quad . \quad \eta_i\right] = E\left[Y_{i,t+q} \quad . \quad \eta_i\right] \qquad (6)$$

$$E\left[X_{i,t+p} \quad . \quad \eta_i\right] = E\left[X_{i,t+q} \quad . \quad \eta_i\right]$$

The additional moment conditions for the second part of the system (the regression in levels) are (Note 4):

$$E\left[(Y_{i,t-1} - Y_{i,t-2}).(\eta_i + \varepsilon_{i,t})\right] = 0 \qquad (7)$$

$$E\left[(X_{i,t-1} - X_{i,t-2}).(\eta_i + \varepsilon_{i,t})\right] = 0 \qquad (8)$$

Thus, we use the moment conditions presented in equations (4), (5), (7), and (8) and employ a GMM procedure to generate consistent and efficient parameter estimates.

We employ a Generalized Method of Moments (GMM) procedure to generate consistent estimates of the parameters of interest and their asymptotic variance- covariance (Arellano and Bond, 1991; Arellano and Bover, 1995). These are given by the following formulas:

$$\hat{\theta} = (\bar{X}'Z\hat{\Omega}^{-1}Z'\bar{X})^{-1} \bar{X}'Z\hat{\Omega}^{-1}Z'\bar{Y} \qquad (9)$$

$$AVAR(\hat{\theta}) = (\bar{X}'Z\hat{\Omega}^{-1}Z'\bar{X})^{-1} \qquad (10)$$

where, θ is the vector of parameters of interest (α, β), *y* is the dependent variable stacked first in differences and then in levels, *X i*s the explanatory variable matrix including the lagged dependent variable (yt- *1, X*) stacked first in differences and then in levels, *Z i*s the matrix of instruments derived from the moment conditions, and Ωˆ is a consistent estimate of the variance covariance matrix of the moment conditions.

The consistency of the GMM Estimator depends on whether lagged values of the explanatory variables are valid instruments in the growth regression. We address this issue by considering two specification tests suggested by Arellano and Bond (1991) and Arellano and Bover (1995). The first is a Sargan Test of over-identifying restrictions. It tests the overall validity of the instruments by analyzing the sample analogue of the moment conditions used in the estimation process. Failure to reject the null hypothesis gives support to the model.

The second test examines the null hypothesis that the error term ε*i, t* is not serially correlated. As in the case of the Sargan test, the model specification is supported when the null hypothesis is not rejected. In the system specification, we test whether the differenced error term (that is, the residual of the regression in differences) is second order serially correlated. First order serial correlation of the differenced error term is expected even if the original error term (in levels) is uncorrelated, unless the latter follows a random walk. Second-order serial correlation of the differenced residual indicates that the original error term is serially correlated and follows a moving average process at least of order one. This would reject the appropriateness of the proposed instruments (and would call for higher-

order lags to be used as instruments).

4. Empirical Result

We provide the results of our panel data regression analysis on the determinants of real exchange rate volatility and the effect of financial integration. We begin by analyzing the stylized fact and correlation analysis. Then, we present our econometric result and its interpretation.

4.1 Descriptive and Correlation Analysis

In figure 1, we observe the importance of exchange rate volatility in the majority of the region. This volatility seems to be smaller in some cases, like in Bangladesh, China, and India. But the volatility trend over time indicates a small decline for most countries, like Korea, Malaysia, Pakistan, Philippine, Sri Lanka and Thailand.

Our figure 2 shows the importance of financial integration evolution in the entire region, notably during the last decade. The trend over time seems to be positive for all countries. At this level the question which arises: which correlation exists between the real exchange rate (RER) volatility and IFI?

In table 2, we report the results of a panel correlation analysis including probability values for RER volatility and fundamental determinants.

First, we find that RER volatility is positively correlated with the financial integration. This correlation is higher among countries with intermediate and flexible exchange rate regimes. In contrast, with fixed regime, RER volatility is negatively correlated with financial integration (Bangladesh, China, Indonesia, Malaysia and Thailand). Indeed, fixed exchange rate regime can stabilize the RER and reduce its volatility. This implies that the impact of financial openness on exchange rate volatility depends on the exchange rate system in this region.

Second, the correlation between RER volatility and trade openness is negative and stronger among countries with fixed regimes than among countries with flexible regimes. Indeed, the correlation coefficient between the two variables is -0.265, and it is significant at 5%.

Third, the GDP growth volatility is positively and significantly associated with RER volatility for the full sample and in most cases. The result is the same for correlation between RER and domestic investment (ID).

Finally, the correlation between RER volatility and government spending, terms of trade, and money does not seem to be significant. This implies that, volatility of these variables cannot represent the source of RER volatility in the region. However, countries with fixed exchange rate system, we consider that government spending and terms of trade as sources of RER volatility.

4.2 Financial integration and fundamental volatility (outcome and policy measures): Panel Regression Analysis

We present evidence on the determinants of real exchange rate volatility for our sample of 10 selected countries over 1975-2004. As stated in the previous sections, our dependent variable is the volatility of exchange rate measured by the standard deviation of changes in the real effective exchange rate.

In table 3, we present the estimation results of the baseline regression model using the GMM system estimator. Here we regress the ERER (Equilibrium Real Exchange Rate) volatility on the primary determinants (output growth, Investment, Government spending, Money and Term of trade) and openness (trade and financial). Here, we expose two regressions accordingly to the measures of Financial Integration, if there is an outcome measure (IFI) or policy one (CC) (Note 5).

First, we find that the higher the volatilities of the output growth and investment the higher the volatility of real exchange rate. The estimated coefficients are positive and statistically significant. The coefficient of government spending is also positive and is relatively significant. However, the monetary and terms of trade coefficient enter with the wrong sign and are not statistically significant. This implies that exchange rate volatility in the region is explained by volatility of real factors and not monetary and external shocks.

Second, trade openness has a negative relationship with the volatility of real exchange rates. According to our estimates in Table 3, an increase in the volume of exports and imports as a percentage of real GDP induces a decrease in the RER volatility. On the other hand, if trade openness increases by 1%, RER volatility may decline by almost 0.08% and 0.11%, in each equation.

Third, the coefficient of financial openness is positive and significant regardless of the measure of financial integration used. The coefficient is significant at the 5% level for each outcome and policy measure. This means that, if the country is more integrated to the international financial market, the RER will be more volatile. According to our estimates, if financial integration increases by 1%, RER fluctuations would increase by 0.08% and 0.09% respectively, in output (here, we use the IFI measure) and policy measure.

Finally, we also find that fixed and intermediate exchange regimes can decrease real exchange rate volatility in the region. Some countries like Bangladesh, Indonesia, Malaysia, Sri Lanka and Thailand adopt fixed exchange rate system.

Conclusion

What is the importance of financial liberalization in real exchange rate fluctuations in South and South East Asian countries? It is this question that we have tackled in this paper in order to underline the relative importance of the different sources of impulsion. Our results suggest that openness help to reduce real exchange rate fluctuations but financial integration increases RER volatility. However, this later finding is less prominent in countries with a fixed exchange rate regime. This finding is supported by the new financial architecture accompanied by more flexible exchange rates (Leiderman and Bufman (1996), Bayoumi and Eichengreen (1998), Eichengreen (2000 b), and recently Obstfeld, Shambaugh and Taylor (2004)) that can lead to an increase in real exchange rate volatility.

We conclude that real exchange rate (RER) is well in the centre of economic dynamics and its fluctuation depends on economic specificities of every region in particular its degree of insertion in the international markets. In particular, financial integration context plays against the stability of the RER in South and South East Asian countries.

These countries need to revise their efforts of financial integration by adopting sequential and gradual reform in their liberalization policy. This way they can realize more stability of their RER. Consequently, they have to revise their exchange rate policies to raise the challenge of the new financial architecture. Although the exchange rate policy is one of the several considerations in the area of international financial integration the RER flexibility is a valuable factor. We encourage the countries of South and South East Asia to improve the flexibility of their exchange rate system for their desired economic growth.

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Statistics: CDROM of Chelem (2005), IFS (2006) and WDI (2006)

Notes

Note 1. Ten countries are Bangladesh, China, India, Indonesia, Korea Rep, Malaysia, Pakistan, Philippines, Sri Lanka and Thailand.

Note 2. For more information, see table 1

Note 3. Cesar Calderon (2004)

Note 4. Given that lagged levels are used as instruments in the differences specification, only the most recent difference is used as instrument in the levels specification. Using other lagged differences would result in redundant moment conditions (see Arellano and Bover, 1995).

Note 5. See table 3.

Table 1. Definitions of Variables and Sources of Data

Variables	Definitions	Sources
RER volatility	Standard Deviation (SD) of ERER	CDROM of WDI, 2006 & Chelem base, 2005 (LibraryUniversity of Tunis El Manar)
Growth rate volatility or Output volatility(Voutp)	SD of the GDP growth	WDI, 2006
Government spending volatility(Vgs)	SD of change of GC	WDI, 2006
Domestic investment volatility (Vdi).	SD of change of DI	WDI, 2006
Money volatility (Vmon)	SD of the growth rate of monetary base	IMF, 2006
Terms trade volatility (Vtt)	SD of TT changes	WDI, 2006
Trade openness (Open)	(M +X) /dom. expenditure	WDI, 2006
Financial integration (IFI, NFA and CC)	Net foreign asset, difference between total assets and engagement , capital liberalization	Lane and Milesi-Feretti (2006)
Exchange rate regimes	Fixed, intermediate, flexible	Levy-Yeyati and Sturzenegger (2005)

Table 2. Real Exchange Rate Volatility and Financial Integration: Panel Correlation Analysis Correlation between Real Exchange Rate Volatility and its Determinants
(Five-year period observation for a sample of 10 countries for 1975-2004)

| | Full Panel | | Sample of countries according to Exchange Rate Regimes | | | | | |
| | | | Fixed | | Intermediate | | Flexible | |
	P. Corr	P-value	P. Corr	P-value	P. Corr	P-value	P. Corr	P-value
Voutp	0.616	(0.00)	0.645	(0.00)	0.704	(0.00)	0.491	(0.05)
Vdi	0.459	(0.00)	0.476	(0.07)	0.524	(0.02)	0.332	(0.16)
Vgc	0.000	(0.99)	0.416	(0.12)	0.243	(0.33)	0.360	(0.15)
Vmon	-0.010	(0.94)	0.031	(0.89)	0.146	(0.56)	0.097	(0.71)
Vtt	0.010	(0.94)	0.493	(0.06)	0.212	(0.39)	0.106	(0.68)
Open	**-0.265**	**(0.06)**	-0.344	(0.17)	-0.293	(0.19)	-0.271	(0.24)
IFI	**0.193**	**(0.15)**	**-0.455**	**(0.08)**	**0.369**	**(0.13)**	**0.364**	**(0.15)**
NFA	**0.231**	**(0.10)**	**-0.425**	**(0.10)**	**0.580**	**(0.01)**	0.322	(0.16)
CC	**0.341**	**(0.01)**	0.108	(0.70)	**0.375**	**(0.12)**	**0.503**	**(0.03)**

Table 3. Real Exchange Rate Volatility and Financial Integration: Basic Regression Model Sample of 10 countries, 1975-2004 (Five-year period observation)
Estimation Method: GMM system Estimator (Arellano and Bover, 1995)

	Outcome Measures [a]	Policy Measures [b]
Constant	1.968***	0.091
	(0.00)	(0.08)
RER volatility (t-1)	2.739**	2.413**
	(0.00)	(0.00)
Output volatility	2.546***	2.118***
	(0.00)	(0.00)
Investment volatility	0.206*	0.151
	(0.14)	(0.16)
Government Spending Volatility	0.273	0.153
	(0.17)	(0.17)
Money volatility	-0.174	- 0.814
	(0.83)	(0.44)
Terms of trade Volatility	-0.221	- 0.655
	(0.51)	(0.31)
Trade Openness	-0.089**	-0.113*
	(0.03)	(0.12)
Financial Integration	0.081**	0.096**
	(0.03)	(0.05)
Fixed exchange rates	-0.094*	-0.112*
	(0.06)	(0.11)
Intermediate Exchange rates	-0.127*	-0.138*
	(0.11)	(0.14)
Number of groups	10	10
Number of obs.	50	50
R^2	0.35	0.31
Specification Tests (p-values)		
- Sargan Test	0.33	0.25
- 2nd.Order Correlation	0.35	0.29

*, **, and *** imply respectively statistical significance at the 10%, 5% and 1% levels.

a, b: Two equations are classified according to the measure of the financial integration. We take IFI and CC respectively for outcome and policy measures.

Figure 1: Evolution of RER Volatility in South and South East Asia (1979-2006)
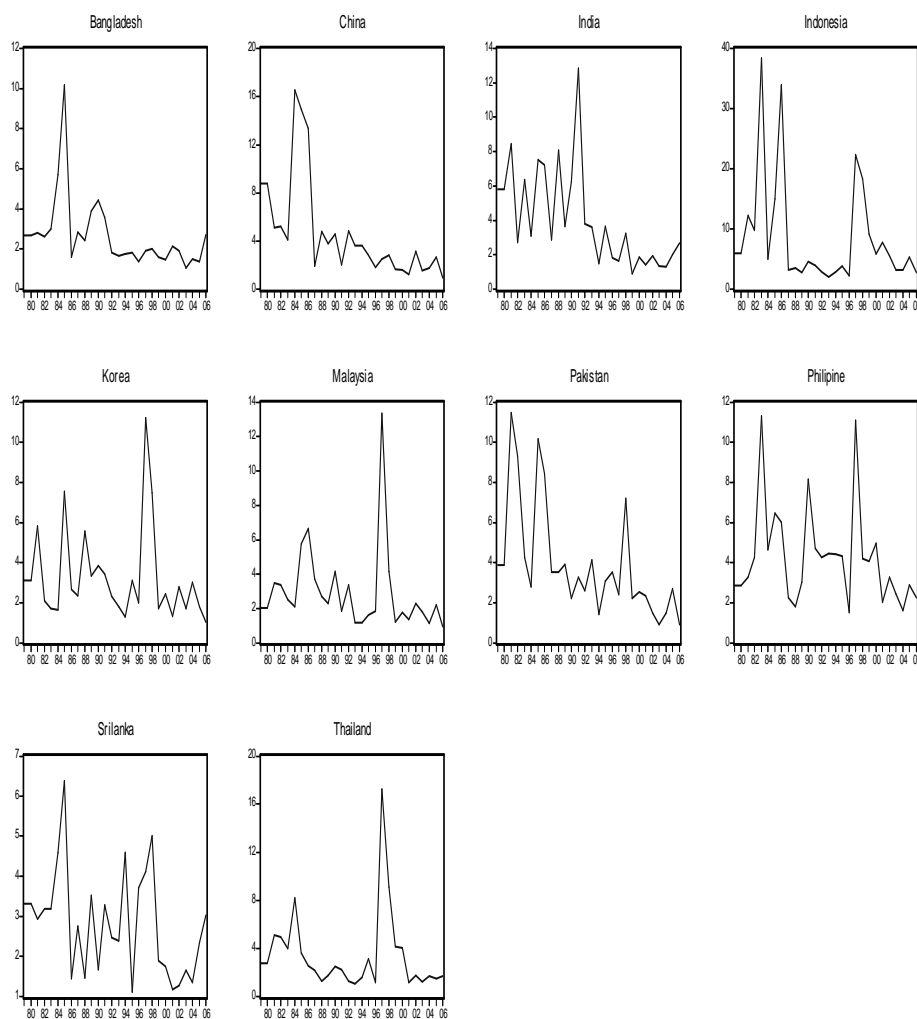
Sources: WDI 2006 and calculation of authors

Figure 2: Evolution of International Finanacial Integration in South and South East Asia (1979-2004)
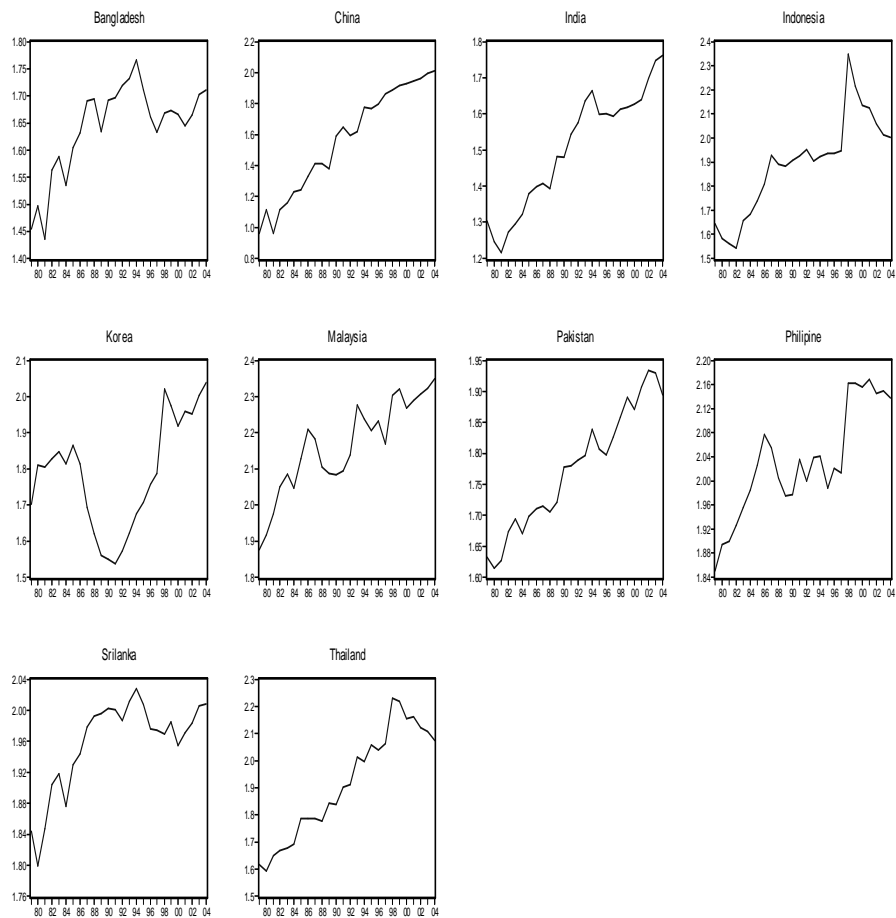
Sources: Calculation of authors and CDROM Chelem (2005), IFS (2006), WDI (2006) & Lane & Milesi-Feretti (2006).

A Study on the Transaction Method of Information Commodity

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Abstract

Information commodity is kind of information product which can satisfy certain need of the society and can be used to exchange with something. Information commodity owns unique characteristics deferred from physical goods. The transaction methods of information commodity are special. Starting with presenting the two transaction modes "sale" and "rent", this paper chiefly discusses three kinds of transaction methods of information commodity, that is, one-time transaction, multi-time transaction, and band transaction, based on the analysis of the specialties of information commodity.

Keywords: Information commodity, Transaction method

1. The components and types of information commodity

Information commodity is kind of information products that can be exchanged in market and are formed by information that has been developed, processed, organized, and transformed to meet certain social need. In contrast with material commodity, information commodity stresses more on its property of information instead of materials. Information commodity usually has two parts, namely the entity and the carrier. The entity refers to the actual content of information commodity. It is the integration of human intelligent labor. The carrier refers to the material form of information commodity.

Information commodity can be simply classified as traditional information commodity, such as books, patents, newspapers, micro-tapes, etc. and new information commodity, such as commercial databases, computer software, and electric books. The former firstly appears in libraries. It can provide with information services for people, meeting their information needs. The later has high-tech carrier and even discards the carrier completely. Besides, some people still classify the information facilities into the scope of information commodity. Because their transaction mode is completely same with that of material commodity, here we do not study the transaction mode of information facilities.

2. The uniqueness of information commodity

Differing from material commodity, information commodity is unique in these aspects as follow.

Firstly, the production of information commodity is non-repetitive. In general, material commodity can realize repetitive production, achieving the mass production at lower costs. But the production of information commodity is kind of creative producing activity. The creativity in the production process determines the non-repetitiveness of information commodity's production. Therefore, its value can not be evaluated by traditional indexes, such as social necessary labor time and the labor consumption. Besides, the value of information commodity is guaranteed by its exclusiveness. Without the exclusiveness, the information commodity becomes valueless. Therefore, the repetitive production of information commodity will debase its value.

Secondly, the utility value of information commodity can not be reduced in use. Information commodity can be shared. And the shared part of information commodity is the entity, namely the information but not the carrier. Under certain special condition, trading information commodity does not mean the bargainer lose the ownership of information commodity completely. With special technologies and certain insurance of contracted supervision, the purchaser can obtain the access right of information commodity. But it does not mean the purchaser has the ownership of the information commodity. Therefore, the owner can sale his or her information commodity many times, which makes the transaction of information commodity more complex.

Thirdly, the value of information commodity is dynamic and unstable. Most material commodity can be finished after a series of production procedures. But information commodity has two-step production. The first step is to produce information content, namely the intelligent labor fruit. The second step is to make copies. Its nature is material production. The utility value of material commodity does not change in its successive circulation. But the value of information commodity is uncertain and dynamic in its market circulation. For example, its value in production is intense. Its value in circulation is increasing. Its value in storage is declining. Its price in exchange is uncertain. And its value in information consumption may be re-generated.

Fourthly, the price of information commodity is changeable and complex. Many factors affect the price of

information commodity, such as the information commodity itself, including its costs, efficiency, and quality, and market factors, including production and management risks, times of exchanges, relations with other commodities, and social economic factors, including productivity, economic strength, economic system, economic policy, economic order, politics, and laws.

3. The transaction modes of information commodity

Transaction is the process in which a consumer gets certain use right of one commodity. Information commodity shows its uniqueness in consumption. For example, both the timeliness of information commodity and the quality of consumer can affect the transaction. Therefore, the final effect of information commodity is uncertain, and the value of effect is uncertain either. The uncertainty of expected profits and the relevant risks of values make the purchasers hope to share economic risks with the bargainers, which causes the appearance of many transaction modes, such as one-time transaction, multi-transaction, and binding transaction. The one-time transaction is to transfer the utility value and risks completely in one transaction, including purchase, auction, bidding, and price negotiation. In the one-time transaction, there is may be one purchaser or many purchasers. The multi-transaction is a successive process in which the purchaser and bargainer share the risks and profits of information commodity together. The bargainer shares purchaser's expected profits by certain way (such as deducting a percentage from the total profits) and takes on relevant risks and responsibilities. Renting, price separation, subscription, and sharing risks all belong to the multi-transaction. In contrast with the multi-transaction, the binding transaction is to sale different information commodities with different functions at one time. For example, the office suit of Microsoft has adopted this transaction mode in promotion.

As far as specific transaction modes are concerned, although there are many different ways, such as auction, authorization, sale, and rent, there are only two transaction modes in nature. One is that the purchaser uses the commodity exclusively. The other is that the purchasers use the commodity together. In one word, one is to sale the commodity (using exclusively) and the other is to rent the commodity (using together). Either "to sale" or "to rent" is from the angle of bargainer of information commodity. Next, we will analyze the two transaction modes from the viewpoint of bargainer.

3.1 Sale ------ using exclusively

If the bargainer chooses to sale the information commodity, the purchaser can use it exclusively. In other words, the purchaser does not necessarily depend on the bargainer in using the information commodity. However, the use of information commodity is not absolute exclusive. The purchaser does not possess the only use right of information commodity. This issue is determined by the transaction mode adopted by the bargainer and the purchaser and the transaction contract.

The sale of information commodity may be achieved by any transaction modes mentioned above. Next, we'll discuss the sale of information commodity based on the types of information commodity and specific transaction modes.

In the one-time transaction, the bargainer sale the use right of information commodity completely. There are also two kinds of conditions. In the first condition, the purchaser completely owns the use right of information commodity and the bargainer should not sale the use right to any third party. In other words, the bargainer loses the ownership of information commodity. For example, the trade of most traditional information commodities, such as patent, may adopt this kind of transaction mode,. In the second condition, the purchaser merely obtains the use right of information commodity and the bargainer can sale the use right to any other people. In other words, the bargainer still obtains the ownership of information commodity. For example, the trade of some new-type information commodities, such as computer software, and electric books, may choose this kind of transaction mode.

In the multi-transaction, the use right of information commodity is separated into several parts that will be delivered to the purchaser for several times. Some new-type information commodities, such as computer software, and databases, usually choose this kind of transaction mode. There are also two kinds of conditions. One is the complete purchase and the other is the non-complete transaction. In fact, the later is few. Only the entrusted software development may adopt this transaction mode. Because the computer software and database need to be updated and perfected continuously, most purchasers choose the multi-transaction mode in order to share the costs and risks of information commodity with bargainers. The multi-transaction is a special transaction way of information commodity, which is determined by the uniqueness of information commodity and differs from the divided payments of traditional material commodity. The multi-transaction of information commodity means not only multiple payments but also multiple deliver of commodity.

In the binding transaction, as the bargainer sales certain information commodity, he or she will provide with other information commodity for purchaser to use at the same time. A typical case is that the Microsoft binds its Office

unit and Media Player with Windows and sales them together. Only if the purchaser buys and installs Microsoft's Windows platform, the system will automatically adopt the Office unit and the Media Player. Professedly, this kind of transaction mode can provide with free software for purchaser. But as a matter of fact, it can achieve a lock-in effect on the purchaser. In a sense, it is kind of unfair competition, which may lead to the appearance of monopoly. The Real One Player has ever sued Microsoft for this cause.

3.2 Rent ------ sharing use

In this kind of transaction mode, the purchaser can obtain the use right of information commodity for certain period. Therefore, it is economical for the purchaser. But from the angle of bargainer, he or she prefers the one-time transaction mode and the multi-transaction mode.

In fact, the traditional information commodity emerged in library is shared by renting. Because of the commonness of library, it is not necessary to charge users for their using information commodity. After the commercialization of information product, library may choose to collect certain rents from users in order to obtain more capitals and provide with more advanced services for users.

In the information market, the most typical one-time transaction is to rent videos. For the purchaser, the videos have the highest values in their first use. But later their values decrease sharply, and even becomes zero. Therefore, the purchaser prefers to rent videos. And the renter can own the videos' information entity and their carriers for ever. In most cases, the renter merely obtains the use right of information entity and the ownership of the carriers. And it is the developer who possesses the ownership of the videos' information entity. For example, the CD companies have the ownership of CDs. And the software developers possess the ownership of software.

The binding transaction is not common in the renting of information commodity. But in the one-time renting transaction, it may happen. For example, as the purchaser obtains the temporary use right of video, he or she has to use certain player to realize the value of video. Under this condition, certain player can be integrated into the video. By this way, the video will be played by the binding media player. Therefore, the binding transaction merely helps to realize the use value of information commodity. Although it is not inevitable, it is necessary in certain condition.

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The Study of Cooperation among Circum-Bohai-Sea Region

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Abstract

The Circum-Bohai-Sea region is the third strategic economical circle after "the Pearl River delta region" and "the Yangtze River delta region". This paper analyzes competitive abilities of this region from many aspects. And then it points out the structure development pattern: 3C pattern ("core","circle","crowd"), the paper provides theoretical and actual operation basis for conforming competitive abilities and speeding up development in Circum-Bohai-Sea region.

Keywords: Circum- Bohai- Sea Region, Competitive Ability, "3C" pattern

During the 21st century, the fundamental unit of international economy competition is neither an enterprise nor a country, but it is the economical circle, or the city group, also is the region development which is proposed in the theory of economical development. Speaking exactly, division of labor, the cooperation and the competition among the regions will decide economics and political pattern of future world. The situation of region development in our country can be described in the following way: During more than 20 years when China implemented the reform and opening policy, the coastal city group of eastern part has already obtained huge success, while at present the economy superiority is gathering to the Pearl River delta region, the Yangtze River delta region and the Circum-Bohai-Sea region. And the Circum-Bohai-Sea region has become the third growth extreme to promote Chinese economy to soar relying on its advantageous position, resources, transportation, superiority of industry and scientific research and so on. Certainly, this region has also exposed some pending issues in the initial period of development, and these problems may be made up or solved only when the region acts appropriately to the current situation, adopts the reasonable policy and takes effective measures. Without doubt, the Circum-Bohai-Sea region has the profound practical significance regarding the economic region development of China and even the economic competition strength of entire nation.

1. Region development theory summary and the synopsis of circum-bohai-sea region

1.1 Background of region development theory and present situation

Looking from the economic concept, the region refers to the certain spatial scope which is advantageous for organizing, planning, coordinating, and controlling economic activity and performs to consider the entirety in the foundation of the administrative area. While, the so-called region development mainly refers to the overall plan which is carried to obtain fast development of local economy in the condition of facing changing external environment.

The region economy development is a major tendency of economical globalization. Now in the world, the most major characteristic of economy development is that economy globalization accelerates region economic integration; conversely region economic integration promotes economy globalization. Moreover, the economy globalization may cause resource in each nation to carry on the effective disposition in the global scope, and the economical relation is closer, the cooperation scope is more and more widespread. Meanwhile, in the process of realizing economy globalization, region economy has the foundation and condition of broad cooperation because of closed district, connected economy relation and interlinked culture. What's more, it is advantageous for disposing resources reasonably, reducing the cost, expanding scale, and strengthening the superiorities and the competitive abilities of the region development. Speaking overall, the phenomenon mentioned above is one kind of performances which sign the progress of the society. The economy globalization does not repel the region economical development, while the economical region may promote the economy globalization well; these two mutually promote, and mutually fuse (Liu Yi, 1998).

Along with the tendency of region economic integration experienced in the world economy, our country has also raised a tide: the Pearl River delta region, the Yangtze River delta region and the Circum-Bohai-Sea region. As the next round of region economical hot spot, the Circum-Bohai-Sea city group radiates and leads China's northeast, North China and China's northwest. Because of the very important status, Circum-Bohai-Sea region is supposed to base on the reality, make up defect and realize health and stable development, to contribute labors and materials for the Chinese economy region development under the impetus of superior policy support and the economy macroscopic law of development.

1.2 The synopsis of Circum-Bohai-Sea region and the strategic sense outline

Circum-Bohai-Sea region includes five provincial capital regions: Beijing, Tianjin, Shandong, Liaoning, and Hebei, with abroad hinterland covering North China, northeast, northwest and Shandong, Henan. It accounts for approximately 520,000 square kilometers of the land area with more than 60 harbors distributing in the region and the population occupies 17.5% of the nation. Looking from the geography structure, it surrounds Bohai Sea to assume the shape "Q". Besides, the region contains huge development potential because of its diverse resources, developed technology, advanced education, characteristic culture, and abundant industry foundation.

The development of Circum-Bohai-Sea region is not only related to region development, but it is connected with strategic plan of nation. We can understand that Circum-Bohai-Sea region is pivotal in economy development of our country from two aspects. Firstly, from the angle of development regulation, "the harbor impetus industry, the coast radiates the inland, the city leads the countryside, and the metropolis circle radiates the region", this experience is drawn from the process of realizing industrialization and modernization in developed countries. As a general rule used for reference, the Circum-Bohai-Sea region is a good example. It will undoubtedly become the third biggest engine to draw   Chinese economy to grow, then lead Chinese economy to realize soaring for the third time if it can fully display superiorities such as local position, multitude harbors, crowded cities, and promote the whole competitive abilities through union and cooperation; Secondly, from the angle of development pattern, our country urgently needs to have a economy center in the north part in order to realize coordinated development of the region in the big economical pattern. In the condition of the Pearl River delta region in the south and the Yangtze River delta region in the middle, the Circum-Bohai-Sea region certainly undertakes the responsibility to strengthen the impetus function of economy in north part of China and advance reasonable layout and coordinated development of region economy.

2. Development strategy research about circum-bohai-sea region

Faced with the good development opportunity and the positive policy support, Circum-Bohai-Sea region still needs a perfect strategic plan, and a reasonable region development pattern, to guarantee the stable and fast development. Based on region development theory and superiorities and inferiorities of the region, the paper proposes "3C ('core','circle','crowd')" structure development pattern, namely displaying "the function of core cities--Beijing and Tianjin ", promoting "Beijing ,Tianjin and Hebei economical circle" to soar, and simultaneously coordinating and driving "the Liaodong Peninsula city group with the Shandong Peninsula city group" to develop, then conforming competitive abilities of the secondary regions, and speeding up development of the Circum-Bohai-Sea region, in the end, make it play the role of "the third level" in economy development of our country. Followings are development plan and strategy:

2.1Formatting "3C ('core','circle',' crowd')" structure development pattern

Development of a region must have a reasonable development pattern with high quality to make the safeguard against nonessential winding. In view of the geographical position and resources superiority of the Circum-Bohai -Sea region, the paper especially proposes "3C" structure pattern which conforms to its development. Following is the quintessence of this pattern: Beijing continues to display the function of politics and cultural center, simultaneously completes into the financial center, and positively develops the high tech industry. Tianjin should develop to a modernized port city, and important economic center of north part of our country. Once Beijing and Tianjin economical conformity mechanism straightens out ,they may become the main item of the Circum-Bohai-Sea region, named "core" in 3C; In the foundation of coordinating Beijing and Tianjin ,we should promote the Beijing ,Tianjin and Hebei economical circle to develop, named "circle" in 3C; As the Circum-Bohai-Sea region's two wings ,Liaodong Peninsula and the Shandong Peninsula ,should fully display the service function of port city, strengthen the competitive advantage of the city group. Moreover, when we develop the characteristic industry, we should strengthen the rational division of labor of harbors and the reasonable disposition of logistics. to provide green channel for Beijing ,Tianjin and Hebei economical circle, even the entire region in the respect of economy development ,this is named "crowd "in 3C.

We may directly understand "3C" pattern from the under chart which signs the development structure pattern:

2.2 Beijing and Tianjin coordinately developing, promoting the competitive ability, and fully displaying the function of core city

Development of a region frequently must depend on the impetus of one or two cities. For example, "the Pearl River delta region" depends on Guangzhou, Shenzhen; and "the Yangtze River delta region" depends on Shanghai, Suzhou, Nanjing, Hangzhou. As is the some condition, economic development of the Circum-Bohai-Sea region is close with promotion of city competitive abilities of Beijing and Tianjin. The economical conformity mechanism of Beijing and Tianjin once straightens out, the Circum-Bohai -Sea region will have the core or the main item, and have the

condition of advancing the economical strategy. This conclusion is on the basis of so-called polarization theory, which refers to that, economy firstly develops quickly in the certain region scope, then attracts the peripheral element of production to gather, and speeds up further development. This is the economical polarization effect which is general in each nation with regard to region development. Therefore, there must have a temporary economy growing point in the Circum-Bohai-Sea region (such as the core cities "Beijing and Tianjin") to lead the development of the peripheral inferior region.

2.3 Breaking administration limit and realizing rational division of labor of secondary region city

If Circum-Bohai-Sea economic zone wants to comprehensively unfold its economical development strength, it must break the administrative division limit, and should carry on rational division of labor in Beijing, Tianjin, Hebei, the Liaodong Peninsula and the Shandong Peninsula, and also form an integrated, competitive industrial system and public facility system. Meanwhile, it should not only have the relation with the world economics and the national market, but also have the suitable regional characteristic. All mentioned above are important mentalities of realizing fast development of economy in the Circum-Bohai-Sea region.

Regarding breaking the administration limit, it firstly must oppose to the local blockade, then comprehensively eliminate the system barrier to the mobile element of production, and enable each kind of enterprise to become the main body of the region economic activity, in the end, make element of production such as capital and labor force flow freely; Next, the core area and each big city must complete the rational division of labor, for instance, the core city circle should pay great attention to the function of national politics, science, technology, education, cultural and developing foreign relations; The Shandong Peninsula and the Liaodong Peninsula should adjust reorganization of enterprises, and improve the conformity of industry to develop to the main body of heavy industrial base in north part, even in the whole country.

2.4 Realizing optimization of each secondary region industry chain, positively connecting rails with the global economy, and enhancing the competitive abilities

Under the foundation of industry development in each subsidiary region of the Circum- Bohai-Sea region, the region should positively carry on the industrial conformity, develop and use resources together, in order to achieve the maximization of the resources effectiveness, and realize the sustainable development. In addition, at present it not only must develop the existing traditional industry, but also must develop into one of world important manufacture bases; Meanwhile, it must depend upon the technical innovation to seize the commanding point of the industrial technology, establish the mechanism through the system innovation to adapt the marketing economy enterprise system as soon as possible, and realize industrial conformity of the Circum-Bohai-Sea region, and then form the whole competitive advantage of region.

Moreover, in condition of the whole world economic integration, only when we put region as a whole entity in the international environment to participate in competition and cooperation, can a region gradually enhance its competitive abilities. Under this background, we need to strengthen international competition strength of region economy, and make the region economy development melt into the globalization system to participate in division of labor in the scale of global economy.

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The Status Quo and Prospects of Regional

Economic Cooperation between China's

Xinjiang and Neighboring Countries under the

Framework of the Shanghai Cooperation Organization

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Abstract

Because of unique geopolitical advantages of China's Xinjiang, it gradually becomes forward positions among China and member states and observer countries of Shanghai Cooperation Organization for developing regional economic cooperation. The article begins with the status quo of regional economic cooperation between China's Xinjiang and neighboring countries under framework of the Shanghai Cooperation Organization, and analyses prospects of regional economic cooperation, at last points out priority fields in regional economic cooperation.

Keywords: China's Xinjiang and neighboring countries, Regional Economic Cooperation, Prospects

Xinjiang locates in the northwest border of China, its land border is more than 5,600 km, which is bordering with Russia, Kazakhstan, Kirghiziatan, Tajikistan, Pakistan, Mongolia, India, and Afghanistan eight countries, Uzbekistan and Turkmenistan are Xinjiang's another two neighboring countries, xinjiang is the important bridge and channels connecting China with the Central Asia, West Asia, South Asia and East and West Europe. Since ancient times, Xinjiang has economic trade relations with the neighboring countries, especially in recent years, along with the increasingly expanded and developed of Shanghai Cooperation Organization (SCO), Xinjiang's unique geographical advantages and resources advantages are even appeared, which propel the process of the regional economic cooperation between Xinjiang and neighboring countries.

1. The Status Quo of Regional Economic Cooperation between China's Xinjiang and Neighboring Countries under the framework of SCO

Faced with the trend of economic globalization and regional economic cooperation, Xinjiang developed actively regional economic cooperation with 10 neighboring countries by using its own geopolitical, and port advantages, cultural advantages and historical advantages, and has achieved some success. Especially in recent years, the levels of the regional economic cooperation was continuously enhanced, the fields were continuously expanded, the models were also innovated, the principal part were continuously enriched, the scale was expanded, the pattern of regional economic cooperation of multi-levels and multi-directional, multi-forms and multi-channels is gradually forming.

1.1 The levels of regional economic cooperation was continuously boosted

After 10 years of development, the levels of regional economic cooperation between Xinjiang and neighboring countries have been boosted. The regional economic cooperation is no longer a small-scale regional cooperation, which becomes an abroad one that Asian and world pay close attention to, its radiation regions of regional economic cooperation was continuously expanded, from a small regional cooperation that only contains Xinjiang and Central Asian countries to the abroad region that now includes some Asian economical body, such as China, Russia, India and Kazakhstan, etc.. Especially since the establishment of SCO, the regional economic cooperation is aroused more extensive attention, which is from the initial low level that is the border areas of trade, to the multi-levels cooperation that relates to the current international organization and coordination, the central government to promote the autonomous regional government-led implementation of the government's border area.

The level of regional economic cooperation has developed into a high-level which includes the level of border area (border trade), the regional level (Urumqi Frontier Economic & Trading Fair) and the international organizations or national level (in the Kazakhstan border free trade center) etc. In addition, the level of regional economic cooperation also manifests in trade forms, which has developed the flexible and diverse methods of trading that include the cash trade, border trade, small border trade, compensation trade, tourism and shopping trade, etc.

1.2 The fields of regional economic cooperation was continuously expanded

China's Xinjiang and neighboring countries belong to rich resources regions, their natural resources are very abundant, such as oil, gas, minerals etc., and they have strong advantages in resources.

With the development of the regional economic cooperation process among Xinjiang and neighboring countries, their advantages of economic cooperation have been apparent, the fields of economic cooperation have been expanded constantly. From the relations of the establishment of economic cooperation, the fields have expanded to most areas of the national economy from the initial areas, that is to say, from energy, agriculture, animal husbandry, health care, and several other traditional areas to minerals industry, electric industry, the supplies industry, the food industry, tourism, transport, bio-technology, light industry, environmental protection, education, and other areas. Moreover, with the impulse of every national government and related organization, the scopes of regional economic cooperation are developing in depth.

1.3 The models of regional economic cooperation were constantly innovated

With the trends of economic globalization and regional economic cooperation, China's Xinjiang draws lessons from the successful experiences in aspects of models of regional economic cooperation, combining with Xinjiang's actual situation (such as economic development, geographic conditions, ports advantages) and the choice of China's economic security strategy, it innovates and creates new models of regional economic cooperation that are suitable for Xinjiang's actual conditions.

Now, there are many models of regional economic cooperation which include forum-driven or meeting-driven model, the border trade zone model, the cross-border cooperation zone model, border economic cooperation zone model etc. Although these models have just begun to implement, their practicality is comparatively strong. If we consider others successful models in the world and the prospects of regional economic cooperation between Xinjiang and neighboring countries, Xinjiang also can choose the triangle model, the model of relying on border ports, the border trade zone model, and golden foursquare mode as well as SCO mode.

1.4 The principal part of regional economic cooperation was continuously enriched

With the appearance of Xinjiang's geographical location advantages, there are great changes in the principal part of regional economic cooperation. Xinjiang's all grades governments have taken part in the process of regional economic cooperation between Xinjiang and neighboring countries, from autonomous regional government to the state, counties and cities town government. Especially, Xinjiang's border states participate actively in regional economic cooperation with the neighboring countries, such as Lli Kazak Autonomous Prefecture with Kazakhstan, Kashgar Administrative Offices and kirghizia as well as Pakistan, Altay Administrative Offices with Russia, and Mongolia.

In recent years, the principal part of foreign trade of Xinjiang and its neighboring countries changed a lot. In 1978, Xinjiang had few enterprises in Xinjiang that have foreign trade rights, and these enterprises were basically state-owned. With the decentralization of China's foreign trade independence, China broadened restrictions to the business enterprises that engaged foreign trade gradually, so a growing number of collective, private and foreign funded enterprises participated in the process of Xinjiang's foreign trade, the patterns of the principal part is diversified, multi-levels, multi-channels, all-round which includes various economic sectors, such as the state-owned, collective, private and foreign funded enterprises. At the end of 2006, Xinjiang has 3500 enterprises that has the

right of operating foreign trade, of which including 62 enterprises that their amount of imports and exports is 10-50 million dollars, 17 enterprises is 50-100 million dollars, 24 enterprises is 100-400 million dollars, two enterprises is 400 million dollars. Although Xinjiang's 105 foreign trade enterprises account for 3 perent of the total number of enterprises of Xinjiang, the amount of imports and exports of these enterprises account for 86% of the import and export volume of Xinjiang.

We can also look the changes from the companies' registration types, in 2006, Xinjiang's Customs House completed the total amount of import and export 9.10327 billion dollars, of which includes, the state-owned economy 3.37642 billion dollars, accounting for 37.09% of the total amount of imports and exports; The collective economy is 763.59 million dollars, accounting for 8.39%; The private economy is 4.77959 billion dollars, accounting for 52.51%; Three-capital enterprises to 182.42 million dollars, accounting for 2.00% ; The rest is 1.25 million dollars, accounting for 0.01%.It fully shows that non-state-owned enterprises which contain the mixed-ownership enterprises, private enterprises, foreign-funded enterprises etc., are becoming the main force in the import and export of Xinjiang.

1.5 The scale of regional economic cooperation was continuously expanded

In recent years, the social order of neighboring countries has gradually become stable; their economy has also begun to the right path, which provides a good environmental conditions for developing the inter-regional economic cooperation. Xinjiang develops actively regional economic cooperation with the neighboring countries by using its unique advantages and China's economic advantages. The scale of regional economic cooperation is expanding, which mainly embodies two aspects, one is the increasing in trade amount, another is optimizing of trade structure of commodities.

1.5.1 The value of imports and exports

With the accelerate of process of regional economic cooperation between Xinjiang and neighboring countries , the value of trade has increased year by year, from 855.58 million dollars in 1998 to 7.95228 billion dollars in 2006, the annual increase rate is 35.8 percent points. In 2006, Xinjiang's total value of imports and exports is 9.10327 billion dollars, and total value of imports and exports with the neighboring is 7.95228 billion dollars, accounting for 87.36 percentage of Xinjiang's total amount of import and export, which shows that the vast majority of Xinjiang's trade was concentrated in these neighboring countries such as Kazakhstan, Kyrgyzstan, Tajikistan and Pakistan, and others. In 2006, Kazakhstan, Kyrgyzstan, Pakistan, Uzbekistan and Tajikistan are located the first, second, third, fourth and fifth place in the Xinjiang's foreign trade, the value between Xinjiang and these countries is respectively 5014.72, 1857.29, 343.30, 266.31 and 218.1 million dollars, accounting for 55.09%, 20.4%, 3.77%, 2.93% and 2.40% respectively. (Table 2)

1.5.2 The optimization of trade structure of commodities

After 10 years development, the structure of import and export commodities between Xinjiang and neighboring countries has changed a lot. Xinjiang's structure of import and export commodities has constantly improved, the proportion of exports of industrial products has gradually increased, and the proportion of exports of high value-added products has also increased. The proportion exports of industrial products account for the total value of exports of Xinjiang from 27.2% in 1985 to 90.2% in 2005, increased 63%, while the proportion of primary products from 72.8% in 1985 to 9.8% in 2005.

The export commodities of foreign trade between Xinjiang and neighboring countries were gradually changed, from the low-end materials to the high-end finished products, the structure of trade has been further optimized. The commodities of import and export changed a lot, from several initial primary materials to products in various fields such as the chemical industry, textile, agricultural machinery, construction machinery and equipment, fabricated metal products, agricultural products, home appliances, food, daily necessities, electronics and machinery etc., even including high-tech products such as biological preparation etc. For example, in 1992, the commodities Xinjiang exported to the neighboring countries were sugar, rice, live goats, stallion and frozen meat, caustic soda, flour, alcohol, etc; The major commodities Xinjiang's imports from neighboring countries were steel, fertilizers, timber, electrolytic copper, automobiles and their components, non-ferrous metals, bulldozers, excavators, etc.. But during the 5 years (from 2000 to 2005), The commodities Xinjiang exported to the neighboring countries were mainly food, daily commodities, alcoholic products, refined oil, machinery and electronic products, cereals, oil and soil mechanical products, petrochemical products, pharmaceuticals, farm machinery and equipment, clothing and textiles, paint, leather, etc.; The major commodities Xinjiang's imports from neighboring countries were crude oil, cotton, copper, timber, paper, aluminum ingots, chromium ore, iron ore, ferrous metal mining, fur, cotton picking machines, chemicals and other raw materials etc.

2. The prospects of regional economic cooperation between China's Xinjiang and neighboring countries under the framework of SCO

China's Xinjiang should take full advantage of their geographical location advantages and China's economic and technical advantages, develop the regional economic cooperation actively, develop preferential cooperation fields such as transportation, energy minerals, light industry, tourism etc under the framework of SCO.

2.1 The traffic fields

Traffic field can offer the prerequisite conditions that exploiting economy and trade cooperation potential between Xinjiang and neighboring countries, that promoting the development of regional economic cooperation .Xinjiang is an important transport hinge and channel that linking China with the South Asia, Europe. Because Xinjiang and neighboring countries in South Asia are located in the Asia-Europe inland, they completed their economy and trade cooperation depending mainly on highways and railways, so the traffic fields plays a very important role in the regional economic cooperation between Xinjiang and neighboring countries, especially road transport, rail transport etc. Xinjiang should develop the cooperation of highway construction with Russia, Mongolia, Kazakhstan, and Kyrgyzstan etc actively, expand actively the railway cooperation with Kazakhstan, Tajikistan, and Kyrgyzstan etc under the framework of SCO.

2.2 The energy and mineral fields

As China's demand for energy resources is increasing, particularly oil, energy fields has become preferential and key field in the regional economic cooperation between Xinjiang and neighboring countries. Xinjiang's neighboring countries, such as Russia, Kazakhstan, Turkmenistan and Uzbekistan, have abundant oil and natural gas resources, which accounting for a large proportion in the world. Take Russia and Kazakhstan for example, Russia is the world's largest country in oil and gas resources, its oil proved reserves amount to 6.5 billion tons, which accounting for 12-13% of the world's proved reserves, and natural gas reserves amount to 48 trillion cubic meters, which accounting for 1 / 3 of the world's proved reserves.

In addition, according to the data provided by *the Journal of Oil and Gas*, Russia's remaining recoverable reserves of oil reach 8.22 billion tons, which accounting for 4.6% of the world's remaining recoverable reserves of oil; The natural gas reserves reach 47.6 trillion cubic meters, which accounting for 27.2% of the world. Moreover, according to the data from United States USGS52000, Russia's undiscovered oil resources reach 10.6 billion tons, undiscovered natural gas resources reach 33.1 trillion cubic meters; Kazakhstan has overland exploitable oil reserves 40 billion tons, and natural gas 3 trillion cubic meters. Kazakhstan's Caspian region has oil recoverable reserves 8 billion tons, of which only the largest exploitable oil reserves of Kashagan oilfield amount to 1.6 billion tons, natural gas recoverable reserves more than 1 trillion cubic meters.

Xinjiang is not only an important energy base of China, but also a replacement district in China's future energy import strategy. It establishes natural prerequisite conditions for participating in cooperation in oil and gas field between Xinjiang and neighboring countries under framework of SCO. In addition, the proposition of energy club under framework of SCO has entered the substantive phase, advocated by Russia, and the majority of member countries and observer countries show positive attitudes towards the establishment of energy club universally, they hope to benefit from the relationship between energy supply and demand by participating in energy club. It establishes the material foundation and environmental conditions for developing cooperation in the oil and gas fields between Xinjiang and neighboring countries, especially with Russia, Kazakhstan and other countries under the framework of SCO.

Apart from cooperation in oil and gas fields, Xinjiang also develops others fields cooperation such as power, coal, mineral, with neighboring countries. The most possible fields is power. The power field is the most promising one between Xinjiang and Kazakhstan, Tajikistan, Kyrgyzstan in the future, and it is most effective and of opportunity.

In addition, Xinjiang can develop cooperation in the field of metal mineral with Kazakhstan, Kyrgyzstan, Uzbekistan, Mongolia etc, carry actively out cooperation in aspects of mineral exploration, development, process, etc.

2.3 The light industry fields

According to the economic complementarities between Xinjiang and neighboring countries, we can arrive at the conclusion that China and Xinjiang have strong comparative advantages in textile industries, industrial supplies and the food industry, and that the industrial system of neighboring countries is not perfect, the light industry products are short of, such as supplies, food etc. Xinjiang can develop cooperation in light industry fields in order to seize the market actively in Central and South Asia by relying on China's technological advantages and price advantages in these fields. This fields include light industrial and textile industry (cotton, wool spinning, spinning, weaving share,

cotton knit, wool knitting, printing and dyeing, chemical fiber, etc.), the supplies industry (household appliances, cosmetic supplies, hardware, small articles of daily use, telecommunications and office supplies, etc.), the plastic and paper industry, the food industry (casing industry, the dairy industry, the sugar industry, tobacco, fisheries, the tobacco industry, etc.).

2.4 The tourism fields

Xinjiang and neighboring countries have abundant tourism resources, The unique natural sight and scenic sight, unique folk customs make the level of cooperation complementary is higher in this field.

Currently, the neighboring countries have some problems such as exploitation of tourism resources is not enough, basic establishments are weak, and tourism facilities are outdated in the development of tourism, which results in the development of tourism industry of neighboring countries is slow. They have abundant exploitation potential in aspects of tourism, its prospects is relatively broad. Xinjiang can develop cooperation in these fields with Russia, Mongolia, Kyrgyzstan, Kazakhstan etc.

3. The Conclusion

Via analyzing of the status quo of regional economic cooperation between China's Xinjiang and neighboring countries, we can see that the regional economic cooperation located in the initial stage, which origins from the economic development , economic complementarily and some non-economic factors etc.However, we not only see these disadvantages, but also some irreplaceable advantages, such as Xinjiang's geographical advantages, port advantages, China's economic and technological advantages and resources advantages of neighboring countries etc. Especially, in recent years, with the impulse of SCO and other international organizations, this regional economic cooperation shows strong vitality and developmental potential; its prospects are relatively broad. We can foresee, with the rapid economy development of China and neighboring countries, their economy complementary is bound to deepen further in aspects of regional economic cooperation, cooperation fields will be further expanded, after several years, this region will become the most influential region in the world.

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Table 1. Total Imports and Exports by Registration (Customs Statistics)   (USD10 000)

Item	1998			2006		
	Total Imports and Exports	Total Exports	Total Imports	Total Imports and Exports	Total Exports	Total Imports
State-owned Units	129809	59898	69911	337642	209667	127975
Collective-owned Units	11138	6341	4797	76359	58485	17874
Private-owned Units				477959	431508	46451
Three Kinds of Ventures	11558	8499	3059	18242	14260	3982
Other Types of Ownership	41	37	4	125	3	122
Total	152546	74775	77771	910327	713923	196404

Table 2. Total Value of Xinjiang's Imports and Exports with neighboring Countries (USD10 000)

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006
Russia	11958	8939	6765	12253	21540	27453	22325	23400	16926
Kazakhstan	48820	92624	117932	90356	136552	254613	328607	501563	501472
Tajikistan	1083	487	1028	706	475	873	3088	9931	21810
Uzbekistan	2469	369	952	555	1913	3773	8576	13832	26631
Turkmenistan	24	57	243	96	993	2472	359	1355	4328
Kirgizistan	19344	13186	17137	9900	15386	23094	46206	74686	185729
Afghanistan	11	37	2	24	11	127	286	594	107
India	238	409	1750	194	1097	2260	1087	1536	2557
Pakistan	1043	3064	2128	873	6937	25539	16315	34275	34330
Mongolia	568	518	711	860	420	878	1644	2833	1338
Total	85558	119690	148648	115817	185324	341082	428493	664005	795228

Table 3. Xinjiang's Imports and Exports by Category of Commodities   (USD10 000)

Years	Exports			Imports		
	Total	Primary Goods	Manufactured Goods	Total	Primary Goods	Manufactured Goods
1985	18020	13117	4903	11177	158	11019
1995	76880	38678	38202	65918	27515	38403
2000	120408	36002	84406	105991	46502	59489
2005	504024	49432	454592	290165	117075	173090

A Study on Subcontractor Management in Indian Project

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Abstract

How to improve the efficiency of local subcontractor management in the Indian projects of China Petroleum Pipeline Bureau (CPP) is the center of this thesis. Based on the introduction of background and the analysis of reasons, this thesis puts forward a new management mode that combines "tame elephant", "huge stick", and "candies & sweet epithets" based on the "elephant-training artifice", and advances several suggestions on the project management.

Keywords: CPP, Subcontractor management, Risk management, Elephant-training artifice, Information database

1. The introduction of background

Since the foundation of China Petroleum Pipeline's (CPP) India project division, it has experienced several delays, concerning employees' visas and equipments customs clearance, which postponed the project for five and half months. Even after the project begun in late Feb. 2007, it came across many jamming and natural disasters, such as the lagged transfer of right of use (ROU), the counteraction of local residents, the difficult local subcontractor management, and the coming of rain season. All these factors make CPP face great challenges to complete the main part of the project in late 2007 according to the former contract. Moreover, the difficulty of managing India subcontractors is the commonness of the six spreads of CPP in India. At the very beginning, many experienced spread managers complained: "As far as spreads are concerned, India is far different from China. In China, sub-contractors are crazy for the bid. But in India, even if we provide with people and equipments, they still refuse to work well for us." The great differences bring about certain initial maladjustment for managers of different levels in CPP. But after several months' coordination, these managers adjust themselves and their tactics, and adopt many effective management measures. This thesis tempts to discuss the issue of how to manage subcontractors in form of researching project, with the hope of attracting jade by laying bricks.

2. The main problems and reasons

2.1 The different humanism, customs, and habits

Similar to China, India has multiple nationalities and religions. It is also a mystery and colorful country with thousands of years' history and culture. Therefore, it is not surprising for us to find that there are not only holy saints but also villains.

Different customs and habits are important factors that cause conflicts in CPP's subcontractor management. For example, India has the most festivals and holidays in the world. The legal holidays are 120 days. Plus different religious, regional, custom, and special memory days, Indian is almost living in festivals. These diversified and separate holidays make it more difficult to arrange the work schedules of tasks completely based on contracts.

At the same time, the different work-and-rest time also serves as a difficulty in the subcontractor management. In most Indian companies, the work time is from 10:00 morning to 5:30 afternoon. Most workers prefer to have a cup of morning tea before going to work and the lunch time is from 1:00 to 3:00. The effective work is less than six hours. The lower work efficiency is out of the expectation and tolerance of CPP managers completely. The Indian subcontractors can not catch up with the work arrangement of CPP. As a result, the cooperation is full of conflicts at the very beginning.

Besides, most Indian subcontractors can not keep to time. In their words, "One minute" means "hours". And "tomorrow" means lower possibility.

2.2 The insufficient communication and understanding

Language is the most direct and fundamental reason. Because this is the largest international project after the foundation of CPP, CPP sent nearly 2000 workers and more than 2000 large- and small-scale heavy equipments for India (pipeline across four states of India, namely states of Andhra Pradesh, Karnataka, Maharashatra, and Gujarat). Although CPP prepared for this project carefully, the interpreters for each spread could not meet the practical needs in quality and quantity. What's more, as a multiple nation, India has more than 400 languages that belong to four language families, namely Indo-European family, Dravidian family, Sino-Tibetan family, and Austro-Asiatic family (Ou Zhang, 2005). The languages in different families are completely different. But English and Indian are most

popular. During the negotiation between CPP and local subcontractors, there were usually an interpreter for English, an interpreter Indian, and an interpreter for other language. Imagining the terrible final words in a "words-passing game", it is not hard to understand the effect and quality of communication among many languages is far from satisfaction.

2.3 The lower productivity and poor social environment

Although as one of golden countries (Brazil, Russia, India, and China) India's gross domestic production (GDP) realizes an increase between 6% and 9%, merely inferior to China (Xiaowen Liu, 2006), its production and processing level and construction of fundamental facilities are still poor. However, the pipeline construction is a specialized industry that demands for high technologies, high costs, and amounts of investment on equipments, and technological and service support. Some bid- sections of CPP have to work in wild fields. It is much hard for them to obtain foods, not mention the qualified subcontractors. These facts lead to the shortage of subcontractors and higher costs of transportation. Therefore, the construction can not be guaranteed in a sense.

2.4 The interference from owners

As CPP manages the subcontractors, owners may interfere with the project irrationally or excessively. That is one of the main factors causing the difficulty in the subcontractor management. Because many subcontractors are introduced by owners, they preferred to listen to the owners. Sometimes, owners ordered subcontractors to change construction designs in order to pursue better results, what directly caused the increase of costs and wastes. Subcontractors usually follow the two different directions from CPP and owners or just listen to owners. That makes the CPP's subcontractors management more difficult.

3. The countermeasures

*3.1 The elephant-training artifice (*Alexander & Qishen He, 1997)

For Indian, elephant is not only a powerful production tool, exerting practical effect on production, but also a spiritual dependence. In India, people usually adopt three artifices to train an elephant, changing it from a wild animal into a helpful worker. The first artifice is to force wild elephant to do things as what people want it to do by using sticks and whips. The advantage is its short training time. But the elephant may be out of control and hurt its owners cruelly. The second artifice is to encourage wild elephant with candies& sweet epithets to do things as what people want it to do. In contrast with the first one, this artifice has a long training period. But it can help to turn wild elephant into a gentle helper. The third artifice is to put wild elephant into old domestic elephants. If the wild elephant follows the words of people as what the tame elephants do, it will get candies or sweet epithets. Otherwise, it will be punished. The third artifice is the most popular and effective method used in elephant-training in India.

Apparently, a successful elephant trainer needs three magic weapons, namely tame elephants, sticks, and candies & sweet epithets.

3.1.1 Tame elephants

Obviously, choosing a successful "tame elephant" is the key for successful subcontractor management.

There is severe disparity between the poor and the rich in India. And India has strict social orders. For example, the special caste strictly determines people's social position and social influence. Therefore, in daily works, CPP managers can pay more attention on the most influential "tame elephant" instead of coping with each member of the subcontractor. By this way, the "tame elephant" can help to supervise and guide other subcontractors. The effect of this method is very evident in practical management.

Here, we have to admit that the owner is qualified "tame elephant". There is old saying that "It is the man who ties the bell can release it." Because of the owner, CPP wined the project. Therefore, CPP has to gain the help of the owner in subcontractor management. It is undeniable that the owner is a bilateral tool anytime. Except for the negative effect mentioned above, the owner can exert great positive effects at the same time. If properly used, the positive effect of owner is larger than its negative effect. In this Indian project, the owner is the Reliance Group that has already developed into the largest and influential "giant" in India in fifty years. Therefore, it must have unordinary social background. It is well known that the resources mastered by the owner and its influences on local subcontractors are most valuable resources for CPP's success in India. In practical work, CPP should construct nice cooperative partnership with the owner by timely and efficient communication, which will help to solve problems in projects. More instances can illustrate this point. For example, the fourth spread had to construct a concrete pipe traversing a reservoir. But its long construction period makes it impossible to complete this task before the rain season. After times of communication, the owner advanced a new "silent water pipeline" traversing program, which greatly shorten the work time and guarantee its accomplishment in time. As far as the negative effects of the owner are concerned, such as the irrational and excessive interference of subcontractors, however, CPP must decline their

unreasonable requirement strictly and ask for compensations for relevant results and influences. More cases showed that only if CPP proves the right of decision with its capabilities and final facts can it win the respect and recognition of the owner and subcontractors.

Besides, some subcontractors can also serve as "tame elephants" due to their long-term cooperation with CPP. For instance, the financial division of CPP chose an Indian accounting office to co-operate. This accounting office had provided with great helps in CPP's account application and company register by its influences in Indian government. To develop and use the cooperative resources can not only benefit CPP's present project in India, but also will serve as a base for exploring new market in South-East Asia in future.

3.1.2 Sticks

In project, the most effective "stick" is to sign a detailed and perfect contract, and lay stresses on later execution and management.

Therefore, as negotiating with any subcontractor, CPP must ensure that the subcontractor fully understands all the articles in contract, concerning why hire him, what he should do, and what is the punishment result if fail to fulfill the contract. However, in practice, the most perfect and detailed contract can not guarantee that the subcontractor can achieve the proper fulfillment of contract. Therefore, it is necessary to use other "sticks" to restrict subcontractors, such as the strict financial system, the system of signing for finished tasks in time, the bank-guaranteed system, and the system of risks deposits. What's more, CPP can introduce a competitive system by choosing several back subcontractors

3.1.3 Candies & sweet epithets

In any effective project, clear reward-and-punishment is the insurance for battle effectiveness and the essential requirement for strict disciplines. In the elephant-training artifice, the trainer has to inspire and deepen the positive effect by candies and sweet epithets. As far as the project is concerned, the spreads of CPP can constitute flexible reward system and empower their operational employees to reward subcontractors according to their workloads and behaviors. By this way, it may generate unexpected effects. For example, as CPP managed the material transportation subcontractors in the fourth spread, the two subcontractors transported pipes two times a day and the largest transportation capacity is 30 pipes, which greatly restricted the project requirement for 70 pipes one day. In order to solve this bottle-neck problem, CPP determined to give the driver a reward of 200 rupee for three times of transportation one day, and more 300 rupee for four times. By this way, the "candies" reward directly active the motivation of drivers, in addition reducing the transportation process, the fourth spread even created a highest pipe-transportation record, transporting 201 pipes one day, and then the pipe crisis was solved perfectly.

4. The development and suggestions

In the subcontractor management, managers in CPP's spreads gradually possess many effective management measures based on constant exploration and rich management experiences. For example, the third spread of CPP had chosen seven subcontractors for a blowing pipe task. Based on fair competition, managers encouraged subcontractors to complete their tasks in time and rewarded them respectively according to each one's workloads. In order to achieve more effective subcontractor management, it is necessary that CPP could take actions in the following aspects in future.

4.1 Construct a risk management consciousness

Before choosing qualified subcontracts, CPP should make careful risk evaluation on the possibility of success and the potential effects of each subcontract on the whole project. Considering different features of tasks and evaluation results, CPP should choose different subcontractors for the sake of reducing the risks as much as possible. Based on the STWO principle, CPP must analyze subcontractors' strengths, weaknesses, threats, and opportunities. For example, CPP can take best use of subcontractors' advantages to solve the difficulties in project, such as the irrational interference of local people. After analyzing the subcontractors carefully, CPP should adjust their ideas and motivate their own advantages to complement subcontractors' shortages, such as improving the necessary technological direction and facilities. In a word, CPP should serve as a cooperative partner to coordinate with subcontractors to complete their tasks as soon as possible.

4.2 Employ more local labors and empower subcontractors completely

Because of differences in languages, environments, and customs, CPP has to employ more excellent local talents to realize localization of management in order to communicate with subcontractors timely and rightly. To employ more local labors is the most effective way to improve management efficiency and save costs. At the same time, although there are many difficulties in subcontractor management, CPP can not reduce the power of subcontractors. On the contrary, CPP should empower their subcontractors to such a degree that they can control their costs to increase the

margin profits, which will motivate the subcontractors effectively.

4.3 Collect useful information and construct a subcontractor database

"Know the enemy and know yourself, and you can fight a hundred battles with no danger of defeat." In today's changeable information times, information is vital. Collecting the latest local information about politics, economy, humanism, religion, owners, and subcontractors, can benefit the timely decision- making and tactic-adjustment for CPP. For example, soon after the start of the project, CPP had changed the focus from spread 6,7and 8 to spread 3,4 and 5 , and collects the optimal strengths to work for these sections based on many influencing factors. This decision was proved to be right and timely. At the same time, based on present information database, CPP can construct a subcontractor database, which can not only strengthen the subcontractor management in resources programming and adjustment, but also serve as a resources base for the exploration of new market in future.

In a sense, the difficulties that CPP faced in India are common for Chinese enterprises entering the international market. How to strengthen the local subcontractor management and improve efficiency is the key of the project. Just as CPP's logo "fight for transmitting the eastern petroleum to the western, and gain success in Indian project", only if all CPP workers combine together, can they overcome all difficulties and gain the winning with a fighting spirit.

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Is the Common Good Improved by Economic

Globalisation and the Activities of Multinational Corporations?

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Abstract

After embracing globalization, some countries have achieved fast growing. Meanwhile, many multinational corporations (MNCs) have made significant profits and also contributed a lot to economic growth. However, opponents believe that the benefits haven't been equally shared and view it "as a threat to prosperity, cultural integrity, and the environment" For developed countries that compete successfully in the globalisation process, globalisation causes great economic growth and prosperity .On the contrary, developing countries that are excluded in the globalisation process become more marginalized and more vulnerable. Although globalisation has many benefits, the common good hasn't been improved by economic globalisation and the activities of MNCs.

Keywords: Globalisation, Developing countries, Developed countries, Positives, Negatives

1. Introduction

Globalisation is the "buzzword" of the modern world. Basically, economic globalisation refers to "the removal of barriers to free trade and the closer integration of national economies" (Stiglitz, 2002,p.ix). It describes the global increasing integration of economies through trade and financial flows as well as movement of people and knowledge across international borders (Harris & Seid, 2004)."The globalisation of markets" written by professor Theodore Levitt in 1983 was a landmark article concerning globalisation. Levitt asserted that "the future belonged to companies that make and sell 'the same thing, the same way, everywhere'"(Levitt, 1933 cited in O'Higgins 2003,p.53). After embracing globalisation, some countries have achieved fast growing. Meanwhile, many multinational corporations (MNCs) have made significant profits and also contributed a lot to economic growth. A MNC refers to "a company that is headquartered in one country but has operations in other countries"(Eweje, 2005,p.5,lecture 3). However, globalisation has given rise to growing forceful worldwide anti-globalisation movements, and has attracted the hot debates from researchers, corporations, policy makers and social activists since 1980s. Proponents regard it as a force for economic growth; however, opponents believe that the benefits haven't been equally shared and view it "as a threat to prosperity, cultural integrity, and the environment"(Eweje, 2005, p.6, lecture 2). The purpose of this paper is to discuss the common good is not improved by economic globalisation and the activities of MNCs.

2. Context-History of globalisation

Economic globalisation has a long history. "Globalisation is the forward march of civilization through history, placing humanity's mark on earth" (Yong, 2004,p1). Globalisation rooted in the 15th century when western explorers voyaged for new trade routes. The Dutch Republic dominated European ocean trade in the late 16 century. In 18th century, industrialisation enhanced Britain's position as a global empire builder. In 19th century, only Europe and North America took part in the international economy activities. Now Asia, Latin America and Africa are all involved in the globalisation (Young, 2004). Besides the broader geographic areas, commerce and financial services today are more advanced and deeply integrated than ever before (IMF, 2000).

3. Present state

Generally speaking, economic globalisation can lead to both positive and negative effects to the common good. As the driver and actor of economic globalisation, MNCs play a critical role in causing the effects of globalisation.

3.1 Positives of globalisation

First of all, Globalisation led to economic growth and higher incomes of both rich and poor people. International trade is very helpful for economic development. Globalisation offers liberated market and creates more opportunities for trade. Because of increased export, many countries in Asia are growing fast, and millions of people there are reducing poverty .Due to the liberalisation of trade, consumers have better access to more goods at low price. Then people's living standard has been improved and people now live longer than before (Stiglitz, 2002).

Globalisation has huge potential for global integration, and it helps developing countries to improve their isolated

situation. Globalisation is driven by high technologies, such as internet, digitalisation, satellite communications … ant etc. The advanced communication technologies connect people everywhere. It helps people in the developing countries to know what's going on in the world, and facilitate them access to knowledge. And MNCs play an important role in transferring managerial and marketing skills, advanced technologies and new products from developed countries to developing countries (Stiglitz, 2002).

Globalisation is also helpful to improve the health conditions in the world, especially in the developing countries. International corporations, such as the international Red Cross, facilitates the movement of knowledge and medicines from the developed countries to developing countries (Stiglitz, 2002).

Besides these unquestionable good influences of economic globalisation, there are some arguments in favour of globalisation.

The proponents view that Globalisation is poor countries' main road out of poverty. "Economic 'globalisation' is a historical process, the result of human innovation and technological process"(IMF,2000, p.2). The poor countries should accept the progressive globalisation in order to fight against poverty. And without globalisation, there would be more poor people today (Gaunt,2002 cited in Eweje, 2005). The number of people living on less than $1 a day has decreased greatly from 55 percent to 24 percent of world population (O'Higgins, 2003).

Advocates make the point that Globalisation provides lots of employment opportunities for developing countries. Due to the low labour cost in developing countries, many MNCs relocate their operation to these countries. Compared to local enterprises, MNCs always offer higher wages. Local people, especially woman who are not able to make much money, prefer to work in MNCs(O'Higgins,2003).In addition, local people benefit from upgrading skills and advanced technologies.

The advocates also believe that the international financial and trade institutions (IFTIs), which are the main institutions that govern globalisation, plays an important role in transferring loan and aid from developed countries to developing countries. The WTO is a democratic institution with one-member, one-vote rule, and most member countries have democratically elected governments.

3.2 Negatives of globalisation

Besides the benefits mentioned above, many people do believe that globalisation has lost of negatives.

First of all, the benefits of globalisation haven't been shared by millions of world's poor. The income gap between the richest and the poorest countries is enlarged. In the period 1960-1962, average income accounted for $212 per capita in poor countries and $11,417 in the rich countries; by 2000-2002, average income increased by only $55 to $267 in poor countries, but average income increased by $20,922 to $32,339 in rich countries (Versi, 2004). Moreover, the actual number of poor people has gone up by almost 100 million meanwhile the total world income improved by 2.5% averagely each year (Stiglitz, 2002). And 22 industrialized countries, which stand for 14 percent of the world's population, master about half of the world's trade and over half of its FDI (Versi, 2004).

An anti-globalisation economist Mark Weisbrot (2002) noted that the growth rate per capita GDP in all low and middle-income countries in the last 20 years decreased a lot compared to the previous rate. For example, per capita income in Latin America increased by 75 percent from 1960 to 1980, but it grew only 7 percent from 1980-2000.

Globalisation didn't ensure the world's stability. The loose capital market in Latin America and Asia is beneficial for Western bank, but Latin America and Asia suffered crises when huge amount of 'hot money' that had flooded into suddenly poured out. Price inflation occurred and even the currencies were collapsed. Such kind of crises result in high investment insecurity, massive unemployment and problems of social dissolution. The stability of all developing countries is under threat (Stiglitz, 2002).

Although MNCs provide many jobs in the poor countries, "they are exporting jobs to low-wage countries"(Eweje, 2005,p.19, lecture 3). MNCs have the opprobrium to exploit workers in their sweatshops. Opponents protest that MNCs, such as Wal-Mart, Gap and Nike, ask workers work in prison-like environment and pay them subsistence wages. Workers haven't got workers' rights and are treated inhumanly. For example, Nike paid only US$0.45 per day for their sweat-shop workers in Indonesia in 1991, not enough to maintain the basic living (Roddick, 2001). Some MNCs don't run their own factories and subcontract the work to local enterprises, which are usually more oppressive than MNCs. In this way, MNCs don't oppress workers in poor countries directly, but they do it indirectly. They are held liable for human rights falling (O'Higgins, 2003).

In addition, the nature of the work is low-level. MNCs usually keep knowledge-based, high value activities at home or advanced countries. In another words, MNCs keep the technology and skill distance between the poor and rich countries (O'Higgins, 2003).

IFTIs behaves in favour of the rich countries. Although the IFTIs, like IMF, WTO and World Bank have done something good to the developing countries, they don't act democratically. These institutions pay much attention to protect the rich countries' interest, and developing countries' interests are ignored. For example, seven western countries, called G 7, control about half of the voting power in the World Bank and IMF. These countries are USA, Japan, France, UK, German, Italy, and Canada. USA and Europe share the top jobs in the World Bank and IMF habitually. There is no wonder that the IFTIs work for the rich countries (O'Higgins, 2003). Moreover, Seattle anti-globalisation demonstration protested that WTO didn't treat the North and the South equally, and not enough nongovernmental organizations could take part in its decision making (Institutional Investor,2000).

"The west has driven the globalisation agenda, ensuring that it garners a disproportionate share of the benefits, at the expense of the developing world"(Stiglitz, 2002, p.7). The Western countries insist poor countries to reduce trade barriers, but they maintain their own barriers by imposing tariffs, quotas or subsidizing their own industries. This is particular in the fields of agricultural goods, which is the critical source of export income for developing countries (Stiglitz, 2002). With entering the WTO, developed countries increased their agricultural subsidies. For instance, between 1995-1998, the rich countries of the Organization for Economic Cooperation and Development (OECD) doubled their agricultural subsidies from US$182 billion to US$362 billion totally; in 2001, the US House of Representatives decided that US$170 billion would be spend in supporting agriculture, and 64 percent of them would be used to increase subsidies (Kelsey,2002). Have removed the domestic supports and tariffs, developing countries can't compete with them.

Moreover, the prices of products on the "terms of trade" benefit only the developed countries, and the poor countries get the lower prices than what they paid for their imports. So some poor countries become poorer (Stiglitz, 2002). In the case of rural farmers in Uganda (Mubiru, 2003), the farmer's work harder, but the price of their coffee reduced a lot because of oversupply, and their earnings have been decreased 6.25 times.

In addition, antidumping laws often trouble developing countries unfairly. And they have to bear restrictive quotas on agricultural goods, clothing and textiles (Institutional Investor, 2000).

"Conditionality" undermined the cumulative trade benefits. Lenders imposed adverse conditions on poor countries for their assistance, such as high interest rate, undermined national sovereignty and short-term debt. Because the loan is borrowed in short-term form, the borrowers tend to default. And the IMF takes some measures to force these countries to pay the original loan back. Normally the poor countries have to bear further debt (O'Higgins, 2003).

The open markets of developing countries are vulnerable when lots of harmful goods pour into the markets easily. Tobacco companies of developed countries market their products to the poor people in the developing countries, who are too weak to resist the sales promotion. And governments are involved in it due to corruption. This causes the spread of smoking-related diseases (O'Higgins, 2003). Besides tobacco, globalisation accelerates the expansion of drugs trade in these countries.

Another disadvantage to developing countries is that traditional cultures are threatened by western cultural domination and loose their legitimacy. Western brands and logos pour into emerging markets when MNCs do businesses in developing countries. MNCs do lots of advertisements and promotions to impose their brands and cultures on the people in their home countries. Then western cultural norms occupy people's mind gradually. For example, Chinese didn't like western fast food in the past. But now McDonald and KFC are popular in China, particularly welcomed by children. And production standardization and uniform marketing facilitate western cultures to take place of the local culture by market brands (O'Higgins, 2003).

Globalisation leads to environmental resource and infrastructure degradation. Decreased forests and mineral resources change the earth's surface, growing factories pollute the air, water and land, crowded residential spaces destroy rural landscapes… and etc (EBF issue 19,2004). According to the finding of a study, in the Niger Delta, oils MNCs such as Shell, Mobil, Agip and Elf have generated environment pollution in oil production process, which hurt the local farming and fishing, and even the drinking water supply in the neighbouring communities was affected. Moreover, the potential harmful effects contain loss of property and diseases (Essential Action, 2000).

The flexibility of globalisation has bad effects as well as good effects on developing countries. Globalisation offers MNCs the flexibility to find the lowest cost but best value operations. MNCs consider about the lowest cost in terms of labour and factor costs, tax and exchange rate savings. The country, which has been chosen to be a site for their activities, can gain vast benefits if the operation involves many local enterprises. Local suppliers seek to establish the supply chain partnerships with MNCs. Then the host country can benefit from more jobs and general learning. "It is a win-win situation for everyone"(O'Higgins, 2003,p62). However, MNCs can evacuate suddenly if they find a cheaper place for their operation. This leads to huge jobs lost both at the MNCs site and in a series of suppliers' factories. And local economy is hit as a whole. Furthermore, MNCs locate or relocate their subsidiaries due to taxi

rate, which are involved in tax avoidance issues (O'Higgins, 2003).

4. Future directions of globalisation

"A better globalisation is the key to a better and secure life for people everywhere in the 21st century"(Versi,2004, p.2). But economic globalisation has marginalized the benefits of the poor people, and has led to a growing gap between rich and poor. How to make globalisation work for all the people in the world?

Firstly, globalisation should focuses on people rather than markets. "Markets may generate wealth, but they are amoral. What is missing is values, underpinned by politics"(George Soros, 2002 cited in O'Higgins, 2003,p.63). Even if MNCs don't cause the world's ills directly, they involve it. If MNCs take responsible globalisation strategies, some adverse effects of globalisation can be reduced (O'Higgins, 2003); meanwhile, responsible globalisation strategy is also a good long-term strategy for MNCs.

A good example is a diamond certification scheme to end the civil wars. Some countries finance civil war by the income from "blood diamonds". The traders and jewellers joined the scheme to buy only legally mined and certified diamonds because they realized the importance of customer perception (O'Higgins, 2003).

Another example is Global Compact, led by Kofi Annan, which is a powerful organisation between MNCs and UN. The Compact push corporations to sign up and act on nine principals, including human rights, labour and environment (O'Higgins, 2003). Now there are more and more corporations, labour groups and civil society organizations joining in the Compact because it can improve the companies' reputation and brand images.

Secondly, the rules of the global economy should be rewritten. Anti-globalisation protesters claim that the rules of globalisation are unfair. Democratic reforms should be held in the IFTIs, such as World Bank, the IMF and the WTO. The present G7 countries (USA, UK, Germany, France, Italy, Japan and Canada) should be expanded to G16, including countries from the developing world. And the international financial system should be regulated.

Lastly, the international community ought to forgive the debts of the world's poorest countries, and democratic government's old debts inherited from the previous corrupt, undemocratic governments.

5. Analysis and critique-Winners & losers

Globalisation is not a win-win strategy for both the rich and poor countries. Obviously, the rich countries are winners of globalisation, and the poor countries are losers. The developed countries are winners, and most developing countries are losers.

Poor countries have no chances to embrace globalisation. According to O'Higgins(2003), open market and free trade play a critical role for major market participation ,but generally major markets are not located in the poorest countries. And countries can benefit from trade when they can sell more and buy more, such as in the case of China and India. However, trade can't help the poorest countries that have no economic or social organization. The poorest countries in sub-Saharan Africa are not able to attract FDI even if the labour cost is very low there (O'Higgins, 2003). Furthermore, most capital is not invested in poor countries. For instance, during the early 1980s to 2000, about 90 percent of foreign direct investment (FDI) went to developed countries, and only 10 percent of FDI went to developing countries (Versi,2004).

Poor countries are unable to embrace globalisation. MNCs act as "powerful engines" to grow the world's economy, dominating the worldwide flows of capital, goods and services (Eweje, 2005). MNCs gain competitive advantages through globalisation practices. But majority of the MNCs belong to the developed countries, and no MNC among the top ten MNCs is belonged to developing countries. How can the poor and middle-income countries gain the same benefits as the developed countries from the globalisation practices?

Poor countries can't share the benefits of globalisation equally with the rich countries. Globalisation has driven the economic expansion successfully. Now the accumulated capitalist liquid wealth has reached about $79 trillion, which is enough to help every person in the world to get rid of poverty through work (Yong, 2004). However, parent company in developed country collect back profits gained in other developing countries by its subsidiary (Eweje,2005). Then the rich becomes richer, and the poor becomes poorer.

6. Conclusion

Generally speaking, economic globalisation and the activities of MNCs can result in benefits and harms to the common good. For developed countries that compete successfully in the globalisation process, globalisation causes great economic growth and prosperity .On the contrary, developing countries that are excluded in the globalisation process become more marginalized and more vulnerable. As the driver of the globalisation, MNCs contribute to the economic growth, but they are involved in exploiting workers and natural resources (Eweje,2005).The IFTIs works in favour of the rich countries. So there is no doubt that the benefits of globalisation haven't reached the poor people

in the world, and globalisation has widened the gap between the rich and poor. Moreover, globalisation has caused environment degradation, and has facilitated the corruption and the human rights fallings (Eweje,2005).   To sum up, although globalisation has many benefits, the negatives of globalisation overweigh its positives. And the common good hasn't been improved by economic globalisation and the activities of MNCs.

If amoral globalisation combines with corporate social responsibility and the unfair rules of globalisation are rewritten, globalisation will work better for all the people in the world.

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