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Geographical Factors in Determining IFDI Policy

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Abstract. With the initiative of the West China Development policy, the flow of Inward Foreign Direct Investment (IFDI) gradually increased in western China. This paper investigates and tests the determinants of IFDI for western China's11 provincesduring2002 – 2008. By compiling a pool data set and employing General Least Squares (GLS) with fixed effects model in natural logarithmic form, we explorethe IFDI in western China thoroughly. The proposed model illustrates reliable estimates of determinants of IFDI for the region. The market size, laborcosts, education level, imports and highway length are found to have a significant relationship with IFDI in western China, hence, they may be considered as determinants. On the other hand, research and development (R&D), length of railways, and postal and telecommunication services have a statistically insignificant effect on IFDI.
Keywords. Inward FDI determinants, Western China, Pool data..
JEL. F20, K20, L20, L20, M20.

1. Introduction

In recent years there has been a rapid increase of Foreign Direct Investment (FDI) into West China by foreign Multinational Corporations (MNCs). Previously, West China was not necessarily an attractive place to invest for MNCs as opposed to other regions of China. The rapid increase is apparent in the Inward Foreign Direct Investment (IFDI) into this region during the last 10 years. From a negative 15% in 1999, IFDI increased to positive 10% in 2002 and reached to 28% in 2008 (New China Sixty Years of Statistics Compilation, China Compendium of Statistics 1949 – 2008, 2009). These figures suggest that these investments have been advantageous for MNCs to invest in West China. These figures also suggest that the advantages that West China offers to foreign MNCs are linked to important policy changes on IFDI. Indeed, this was the case as beginning in 2000 *China Western Development program* was launched after a long procedural debate on clarifications of guidelines of the program that started in 1999. Up until that time western region did not witness reformation process of this scale.

Since the late 1970s China began implementing economic reforms and attractive new policies to increase trade openness, which, in fact, signaled the beginning of the transformation of the existing command economy to a market economy. Mostly, the coastal regions of Eastern China benefited from these reforms, and thus their economies advanced rapidly. However, the inner western regions of China did not benefit from the economic reforms as much and lagged

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behind significantly. The economic growth rate of China's eastern regions continued to exceed that of the western region until the early 2000s (Gu, Shenand Yu, 2004). The western share of gross domestic product (GDP) decreased from 20.88% in 1990 to 17.13% in 2000, and the relative levels of GDP per capitadecreased from 73.30% in 1990 to 60.87% in 2000 (Gu, et.al, 2004). In 1990, Shanghai's GDP per capita was 7.3 times that of Guizhou, the poorest province in China and by 2000, the gap had widened as Shanghai's GDP per capita reached a level 12.9 times that of Guizhou (Yeung & Shen, 2004). Furthermore, economic gap between China's West and East grew steadily, indicating an increase in east-to-west GDP ratio from 2.98 in 1980 to 4.33 in 2000 (China Statistical Year Book for Regional Economy, 2010).

The inclusion of Western China into reformation and restructuring process, namely *China Western Development program* did not begin until 2000. When the process, created by the State Council, began to aid in the development of the Western region of China, it began with a leadership group specifically focusing on the development of Western China. The leadership group emphasized its policieson six provinces, explicitly Shaanxi, Sichuan, Yunnan, Qinghai, Guizhou, and Gansu, five autonomous regions, namely Inner Mongolia, Guangxi, Tibet, Ningxia, and Xinjiang, and one municipality - Chongqing. These provinces and autonomous regions represented 71.5 % of mainland China's area, but only 27.9 % of its population in 2009, and 19.9% of China's total economic output as of 2009.

Since the initiation of reforms and restructuring, there has been a number of new policies the Chinese government has implemented to encourage FDI as well as to coordinate economic development in the region (State Council, 2009). One of these important policies, more specifically the *favorable tax policy* reduced the enterprise income tax rate from 33% to 15% in the western regions whereas in Central and Eastern China the rate remained unchanged at 33 %. These new policies in this area not only encouraged FDI by foreign multinationals, but also encouraged investments by domestic companies, as theyreduced or exempted the enterprise income tax and concessions for both domestic and foreign.

In addition to the *favorable tax policy*, the new policies established on mineral resources promoted a beneficial environment for foreign investment, and favorable land policies which encouraged *ownership rights* for those who reverted cultivated land to forest and grasslands and allowed economic entities and individuals to legally utilize certain land as long as it was used maintaining the principles of environmental protection. Alternatively, rights for the use of land were directly given by the state, in which case the land utilization fee was either exempted or reduced.

Furthermore, new policies and new configurations in the areas of infrastructure (related water, electricity, and gas pipeline), telecommunication, transportation, and postal services heightened the improvements in this region making it favorable for investment. With all of these improvements, over the years, macroeconomic indicators have suggested that the policies targeting economic development of the western region of China have been positive. The economic development is further illustrated by the east-to-west GDP ratio, whichin the past has indicated an economic gap between China's West and East regions. This gap, steadily, decreased from 4.33 % in 2000 to 2.94 % in 2009 (China Statistical Year Book for Regional Economy, 2010).

Although a number of researchers have studied the determinants of foreign direct investment (FDI) in China (Ali & Guo, 2005; Dees, 1998; Sun, Tong, & Yu, 2002), little attention has been paid to Western China.For example, Sun, Tong, and Yu (2002) examined FDI activities in China's 30 provinces by concentrating on

changes in FDI determinants over the period of 1986 to 1998. Their research suggested that coastal provinces received more IFDI than the Central and Western provinces. Similarly, Ali, and Guo (2005) suggested that China is the second largest recipient of IFDI and that the determinants of IFDI depend on the type of the firm investing. They further stated that market size is a determinant for US firms and low labor cost is a determinant for local export oriented Asian firms.

On the other hand, Boermans and Zhang (2011) examined the uneven regional distribution of IFDI from 1995 – 2006. They utilized a survey with determinants, such as institutional quality, labor costs, market size and geography and their findings suggest that IFDI is more prevalent in provinces with good institutions, low cost labor, and large market size. However, low labor cost and institutional improvements are the most important determinants overall.

Similarly, Zhang (2011) posited that on the regional level IFDI can be actualized due to determinants, such as tax rates, geography, and labor cost and market size. Market size, employment, wage rate, exchange rate and degree of government ownership are determinants of IFDI at the sectoral level. In addition, Zhang suggested that IFDI has "crowding out effects" at the national level in eastern region and a "crowding in effect" in the central region.

Correspondingly, in their study, Liu, Daly, and Varua (2012) suggested that market size, labor cost, labor quality, physical infrastructure development are important IFDI determinants in coastal regions. In addition, telecommunication, degree of economic openness and government incentives that attract FDI are determinants of IFDI in central and northeast regions.

As suggested by the previous studies, there are various determinants that range from industry to government incentives for firms to actualize IFDI; however these studies also indicate that there is a large gap in the specification of the determinants. This study intends to fill this gap by investigating the key determinants of IFDI in this particular area of China. Based on the empirical results, several recommendations are proposed for Chinese governmental decision makers to help them make appropriate policies and practices to attract FDI inflows to promote the economic development in Western China.

The paper is organized as follows: a literature review is presented in the second section. In the third section, the FDI determinants and hypotheses are investigated. In the fourth section, the data, model, and methodology are described. In the fifth section, the empirical results are discussed. Finally, theconclusion and recommendations are provided.

2. Literature review

Foreign direct investment theories attempt to explain the reasons FDI takes place and the factors that determine the type of FDI. Hymer (1960) and Kindleberger (1969) emphasized that market imperfection is the main reason that forces foreign companies to make foreign direct investments. The market imperfectiontheorysuggeststhat a company may hold certain advantages, which could not be utilized by its competitors such as technology or management in a specific field, raw materials or other inputs it could exclusively or preferentially access (Hymer, 1960). Kindleberger (1969) confirmed that the domestic market has to be imperfect in order to amplifythe firm's specific advantages. His statement supported Hymer's findings and thus he concluded that the reason FDI occurs is explained by the market imperfection theory. Therefore, the market imperfection theory fits very well with the determinants (imports – need for products to manufacture). On the other hand, Caves (1971) stated that the ownership of intangible assets held by companies created firm ownership advantages or specific

advantages, such as management skills, organizational capabilities, and technologies explained FDI.

The eclectic paradigm theory of FDI considers the intermediate product movements with factor endowments movements across nations and the theory of market imperfections (Dunning, 1988). According to the eclectic paradigm theory configuration, three advantages determine the pattern of international production. Those three advantages are ownership advantage, location advantage, and internationalization advantage also known as the OLI paradigm. Whena firm has ownership advantage (O), it intends to invest overseas to compete with foreign and domestic firms. Due to internalization factors (I), the firm prefers to exploit the ownership advantages within the firm, instead of licensing theproduction. Furthermore, because of the location advantage (L), it is preferable for the firm to produce overseas. Dunning (1998) classified the investment motivations into four categories: market-seeking (horizontal strategy to access the host-country domestic market), resource-seeking (to access raw materials, labor force, and physical infrastructure resources), efficiency-seeking (vertical strategy to take advantage of lower labor costs, especially in developing countries), and strategic assets-seeking (to access research and development R&D, innovation, and advanced technology).

Multinational corporations (MNCs) expand their operations abroad by approaches based on domestic market imperfections, firm specific advantages, and location specific advantages. Those three main categories of FDI theory explain appropriately why MNC sinvestoverseas instead of expanding their business in the home country or region. The market size, labor cost and incentive policies are considered to be location specific advantages. A lot of research has been done in this are ato explain the reasons FDI takes place in China. According to Zhang and Yuk (1998), location specific advantages are the main determinants of FDI in China.

3. Location Determinants of FDI within Western China

Several determinants for the location of FDI have been identified in previous studies. In their research on location of FDI in the United States, Coughlin, Terza and Arromdee (1991) found that the state land area, per capitain come, agglomeration, labor market conditions, transportation network, taxes, and the state spending are determinants of FDI across the states within the US. Bagchi-Sen and Wheeler (1989) identified that population size, populationgrowth, and per capita retail sales are important factors affecting the distributionof FDI among metropolitan areas in the US.

Friedman, Gerlowski and Silberman (1992) as summed that market potential, wage, skilled labor measured by per capita number of scientists and engineers, construction cost, and the number of major sea ports have animpact on the location of FDI in the US. Braunerhjelm and Svensson (1996) indicated that R&D agglomeration and exports have a significant impact on Swedish MNCs' location.

Based on the factors mentioned above, the differences in FDI inflows are caused by the differences in location factors of each province in China. In this study, we consider the market size, the labor costs, R&D expenditures, the education level, imports and exports, and the infrastructure ashteky location factors in determining the magnitude of FDI inflows into each province in Western China. The factors are described below:

In building our hypotheses, we consider the above mentioned firm motivations for investing overseas.

3.1. Market Seeking (Market Size)

In order to make sense of this section, we need to ask the following question: How did the policy impacted the market size in China for it to be attractive to the MNC to invest? Market size is considered the most important determinant of FDI location for horizontal market-seeking FDI, which motivates firms to look for new markets since it directly affects investment return and profits. Blomström and Lipsey (1991) and Head and Mayer (2004) foundasignificant and positive relationship between IFDI and market size. A larger market size provides a better opportunity for IFDI to reduce entry costs than a smaller one. In order for firms to exploit their ownership advantages, the probability of FDI inflows to a larger size market is higher than the inflows to a smaller market size (Culem, 1988). Hence, in this study we use the retail sales value in USD inthe host provinces to capture the market size effect. Consequently our first hypothesis is the following:

H_1: The higher the value of retail sales, the greater the flow of IFDI from foreign companies to the host province.

3.2. Asset Seeking

Agarwal (1980) found strong evidence that in developing countries cheap labor is a major factor that attracts FDI. Moreover, the role of cheap labor is even stronger in FDI involved in labor intensive production. In the FDI literature, labor cost is usually measured by the average wage. Therefore, in this study we consider the average wage as the measurement to reflect the labor cost that MNC sconsider to make their investment decision. In particular, we expect that lower labor costs will lead to higher levels of FDI inflows.Thus, the following hypothesis is proposed:

H_2: The lower the level of labor cost measured by the average wage, the greater the flow of IFDI from foreign companies to the host province.

3.3. Technology Seeking

MNCs usuallyestablishR&D centers in their home countries. Usually, the R&D in the host country serves the purpose of adapting technologies used in home countries to local needs (Borensztein, DeGregorio and Lee, 1998). Although, according to previous studies, establishing R&D centers in foreign affiliates is an important motive for FDI as well (Pearce and Singh, 1992). The local availability of R&D is a significant factor to attract FDI. Therefore, the following hypothesis is proposed:

H_3: The higher the R&D expenditure, the greater the flow of IFDI from foreign companies to the host province.

3.4. Education Level

The educational level is measured by the number of undergraduate students as a percentage of the total population of a province. Due to fast economic development, cheap labor is not the only attracting factor of FDI in China. Branstetter and Feenstra (1999) found that wage premiums are usually given to MNCs' employees, which indicate sthat quality workers are preferred by MNCs. The level of education of the labor force is a good predictor of the quality of the labor force. Based on that, the following hypothesis is proposed:

H_4: The higher the education level, the greater the flow of IFDI from foreign companies to the host province.

3.5. Import and Export

Trade (imports and exports) are considered to be complements rather than substitutes for FDI as it is noted in a number of empirical studies. MNCs intend to invest infamiliar markets where they have trade partners. High volumes of trade are a good indicator of high integration in the countries' economy. Grosse and Trevino (1996) suggest that exports to the host country take place to provide supplies to the affiliates; however, imports from the subsidiaries occur to supply the headquarters

in the home country. As a result, greater bilateral trade promotes more FDI flows to the host country. Based on this, the following hypotheses are proposed:

H_5: More exports from the host province to overseas will attract more IFDI from the foreign company to the host province.

H_6: More imports from overseas to the host province will attract more IFDI from the foreign company to the host province.

3.6. Infrastructure

Following Shapiro, Tang and Ma (2007), three different variables are used as a measurement of the infrastructure in host provinces: highways, railways; and post and telecommunication (P&T). We calculated the total kilometers of highways and railways of the host province to account for the highway and railways measure. For post and telecommunication, we calculated the expenditures on business post and telecommunication services in the host province to account for the activity of post and telecommunication. Since the infrastructure of a location determines the existing transportation network a higher highway and railway mileage per square kilometer is expected to relate positively with FDI. Based on these measures, the following hypotheses are proposed:

H_7: The longer the railways measured in kilometers, the greater the flow of IFDI from foreign companies to the host province.

H_8: The longer the highways measured in kilometers, the greater the flow of IFDI from foreign companies to the host province.

H_9: The higher the expenditure on business P&T, the greater the flow of IFDI from foreign companies to the host province.

Table 1. *List of variables*

Variable	Description	Expected Sign
Foreign Direct Investment(dependent variable)	FDI: Foreign direct investment in host provinces	
Market Size (H_1)	RS: Total retail sales of consumer goods in host provinces	+
Labor cost(H_2)	WR: Average Annual Wages in host provinces	_
R&D(H_3)	RD: Total expenditure on R&D in host provinces	+
Education level(H_4)	EL: Number of undergraduate students per 10000 population in each of host provinces	+
Export(H_5)	EX: Total export in each of host provinces	+
Import(H_6)	IM: Total export in each of host provinces	+
Railways(H_7)	RW: Total kilometers of railways in each of host provinces	+
Highways (H_8)	HW: Total kilometers of highways in each of host provinces	+

Post and Telecommunication (H_9)	P&T: Total expenditures on business post and telecommunication in each of host provinces	+

Data Source: China 60 Annual Compendiums of Statistics Yearbook and World Bank.

4. Data, Model, and Methodology

Based on the hypotheses stated above, the estimated model can be written as following:

$$LN(\ FDI_{it}\ ) = \alpha_i + \beta_1 LN(RS_{it}) + \beta_2 LN(WR_{it}) + \beta_3 LN(RD_{it}) + \beta_4 LN(EL_{it}) + \beta_5 LN(EX_{it}) + \beta_6 LN(IM_{it}) + \beta_7 RW_{it} + \beta_8 LN(HW_{it}) + \beta_9 LN(PT_{it}) + \epsilon_{it}$$

This paper uses a panel data set, which includes11 western provinces of China from the year 2002 to 2008 with a total of 77 observations. Based on theory and previous research, the natural logarithmic form of the model was used because the independent variables are not expected to have linear relationships. The exception is the railways variable (RW) for which the natural logarithms is not applied since Tibet had no rail ways prior to 2006. In this paper, we applied the methodology of Pooled EGLS with fixed effect to test 11 host provinces. In order to avoid bias caused by omitted variables the fixed effect model is used to minimize the influences of these omitted variables. Moreover, the Pooled EGLS model assesses a feasible GLS specification, which assumed that heteroskedasticity exists in the cross-section data set.

5. Results and Findings

Table 2. *Results of Pool Data Estimations, 2002-2008*

Log(RS)	1.71**(0.95)
Log(WR)	-1.31* (0.87)
Log(RD)	0.27(0.22)
Log(EL)	-0.51* (0.35)
Log(EX)	0.1(0.17)
Log(IM)	0.21* (0.16)
RW	0.00(0.00)
Log(HW)	0.28* (0.19)
Log(PT)	0.17(0.34)
R^2	0.97
Adjusted R^2	0.96
F-statistic	90.40
Durbin-Watson stat	1.48
Sample size (N)	77

Notes: Standard error in parenthesis.*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

According to the empirical results presented in the table above, most of the independent variables showed the signs we expected and hypothesized, except the education level variable (EL). The estimated coefficient of the market size variable (RS) is significant at the5% level and the estimated coefficients of the labor cost (WR), imports (IM), the education level (EL), and the length of highways (HW) are significant at a 10% level. However, the research and development (RD), exports (EX), the length of railways (RW), and the post and telecommunications

(PT) are not significant, which indicates that these variables do not impact IFDI in western China.

The significance of the estimated coefficient for the market size suggests that foreign direct investment was attracted by the rapid increase of western China's market size. When other variablesremainconstant, a 1% increase in retail sales would raise the FDI inflow by 1.71%. This phenomenon has beenobserved in previous studies (Blomström & Lipsey, 1991; Mayer, 2004). Therefore, we can infer that the large market size of China is one of the key determinants of FDI inflows into China.

The result also indicated that the estimated coefficient ofthe labor cost has a negative significant relationship with FDI inflows into western China at the 10% level. The significance of the estimated coefficient for labor costs indicates that when other variables are held constant,a1% increase of the average wage would decrease the FDI inflow by 1.31%. The average wage in China in USD increased from $12,500in 2002 to $29,200 in 2008. The income level of western areas which are less developed is lower than the developed coastal provinces. Even though the average wage in China increased, the growth in the western areas lagged behind coastal areas. Therefore, compared with China's national average wage level, the western provinces average wage level is still low. Agarwal (1980) stated that cheap labor is the most attracting factor of FDI in developing countries. Our results strongly suggest that the type of foreign direct investment activities in these provinces is predominantly for the production of labor intensive products or components and therefore cheap labor is another key factor attracting FDI in the western provinces.

Surprisingly, our results indicate that the coefficient of the level of education EL hasa negative significant relationship with FDI inflows in western China at the 10% level. When other variables are held constant, a1% increase in the education level would decrease the inward FDI inflow by 0.51%. Although the sign is not what we expected and hypothesized, the result indicates that foreign investors are only looking for cheap labor and not highly skilled labor or higher education human capital. This result also confirms that the production of labor intensive products is the prevalent type of industry in western China. Counter-intuitively, according to our results R&D does not have a significant relationship with inward FDI in western China. However, this result can be explained if one considers that the major motivation of foreign investment in western China is cheap labor, which is a type of asset seeking motivation.

The significance of the estimated coefficient of imports indicated that when other variablesremainconstant, a1% increase in imports would raise the FDI inflow by 0.21%.This result confirms the need of parent foreign companies to transport their key product components to support the subsidiary operations overseas by exporting to them. Zheng (2009) suggested that foreign direct investment was attracted by China's cheap labor market and that foreign companies import their product parts and assemble them to a final product ready for the market. For instance, foreign firms in electronics and automotive industries manufacture their products by importing high-end parts and key components such as processors and engines. On the other hand, the estimated coefficient of exports was not significant, which means that exports haven o significant relationship with inward FDI in western China. However, the result reinforced the previous results in substantiating that the major motivation of foreign investment in Western China is market seeking. In addition, regarding the infrastructure proxy, only the estimated coefficient for highways was significant at the 10% level, which indicates that when other variables remain constant, a 1% increase of highways would raise the FDI inflowsby0.28%.

6. Conclusions

This paper contributes to the literature by investigating the determinants of IFDI in western China in order to provide investors a better way to discern the advantages and benefits of investing in this region. The strong evidence from this study suggests that the market size measured by retail sales value, labor cost measured by average wage; theeducation level measured by the percentage of undergraduate students in each province, the volume of imports, and length in kilometers of highways and railways have a significant relationship with inward capital of foreign direct investment in western China. Retail sales, import, and length highways have a positive impact to attract FDI. On the other hand, the average wage and the education level act as deterrents of inward FDI in western China. This result validates our hypothesis that the motivation of MNCs' investment in Western China is market seeking and asset seeking. Similarly, previous studies found that the large market size provided more opportunities for MNCs to reduce entry costs than for smaller companies (Blomström and Lipsey, 1991) and that cheap labor is the most attracting factor of FDI in developing countries (Agarwal, 1980). In addition, the result of this paper showed that R&D has no significant relationship with inward FDI in western China.

The results have important policy implications for economic development of western China. It can be suggested that to attract more FDI inflows, local governments in the western provinces should improve the infrastructure, particularly the highways. Also, policies should encourage consumption to stimulate the economy as the central government proposed in order to exploit their advantage of relatively low labor costs. The government of each province should take advantage of their location characteristics to attract those MNCs who are motivated by such factors.

Because of the limited access to data, it was not possible at this time to compare the FDI patterns among industries in each province. If we specify the R&D expenditures of different industries, the result might be different. Also, even though the macroeconomic data mentioned in the literature review suggest that from the year 2000 the regions GDP increased and the economic gap between East and West China decreased, if data for 1990s were available, we could do an empirical analysis to compare the data before 2001and after 2001 to investigate whether the western China Development policy made any impact on inward FDI in western areas. Since the level economic development of each province is not the same, particularly, in the Shaanxi Province and the Sichuan Province, bias can be contained in the analysis. In a future study, cluster analysis can be done to control the bias caused by the unbalanced economic development.

Appendix

List of provinces under Western China Development policy:

Six provinces (Shaanxi, Sichuan, Yunnan,Qinghai,Guizhou, andGansu)
Five autonomous regions (Inner Mongolia, Guangxi, Tibet, Ningxia, and Xinjiang)

Conduct, Interpret and Test the Regression

Dependent Variable: LN(FDI?)
Method: Pooled EGLS (Cross-section weights)
Date: 03/16/11 Time: 16:36
Sample: 2002 2008
Included observations: 7
Cross-sections included: 11
Total pool (balanced) observations: 77
Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.473969	3.563337	0.694284	0.4903
LN(RS?)	1.714284	0.949807	1.804876	0.0764
LN(WR?)	-1.308844	0.873833	-1.497819	0.1397
LN(RD?)	0.272863	0.221506	1.231853	0.2231
LN(EL?)	-0.505905	0.350925	-1.441632	0.1549
LN(EX?)	0.098567	0.170571	0.577868	0.5656
LN(IM?)	0.208946	0.156949	1.331303	0.1884
RW?	1.83E-06	0.000107	0.017077	0.9864
LN(HW?)	0.276485	0.186351	1.483677	0.1434
LN(PT?)	0.165389	0.339718	0.486841	0.6282
Fixed Effects (Cross)				
_XJ--C	-1.391515			
_GX--C	-1.199099			
_SC--C	-2.508506			
_GZ--C	-0.589012			
_YN--C	-1.725417			
_TB--C	3.219066			
_SX--C	-0.698152			
_GS--C	-1.659747			
_QH--C	3.753807			
_NX--C	2.786978			
_NM--C	0.011596			
	Effects Specification			
Cross-section fixed (dummy variables)				
	Weighted Statistics			
R-squared	0.967880	Mean dependent var		16.88151
Adjusted R-squared	0.957173	S.D. dependent var		10.17649
S.E. of regression	0.341344	Sum squared resid		6.641390
F-statistic	90.39849	Durbin-Watson stat		1.482692
Prob(F-statistic)	0.000000			
	Unweighted Statistics			
R-squared	0.950065	Mean dependent var		11.95000
Sum squared resid	8.000885	Durbin-Watson stat		1.458453

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