Journal of Economic Development
Economic Research on Developing Countries
Page: 223 – 233

Determinants of Local Investment: Case Study in Provinces in Indonesia

Jamzani Sodik and Didi Nuryadin

Faculty of Economy UPN "Veteran" Yogyakarta

E-mail: jamzanis_edu@yahoo.com

Abstract

The main purpose of this research is to test the determinants of local investment in 26 provinces in Indonesia since 1993-2003 using dynamic panel method. Factors affecting local investment in Indonesia are market size indicator which is growth rate PDRB (X1), infrastructure indicator i.e. number of electricity capacity (X2), indicator spatial which is deensity (X3), indicator manpower that is labour force (X4) and wages/UMP (X5), and last of economic indicators that is export/level of chartered investment counsel openness (X6). The result concludes that all variables applied in stationary research has at data level (I0), equally all variables have owned degree of the same integration. Result of panel test cointegration using parametric approach indicates that Group rho-Statistic coefficient is 8432 while Group PP-Statistic coefficient co integration is 9193. The coefficient co integration by using Group ADF-Statistic is 2540. Probability of each testing method indicates that variable applied by cointegrating at level of significance at 5%. From total 7 testing panel, got result that all research variable of co integrating or on a long term research variable has direction of the same movement

Keywords*: investments, panel dynamic, unit root panel, and cointegration panel*

Introduction

Investment is a crucial issue in the discussion of economic recovery in Indonesia. One of the most important causes of the decline in Indonesian economic growth as the result of financial crisis is government inability to restore the level of investment, such as before the crisis.

Indonesia Investment Coordinating Board (Badan Koordinasi Penanaman Modal in Indonesia abbreviated to BKMP) data shows that "investment year" decretion respectively in 2003 and 2004 did not attract enough investors infuse capital in Indonesia. In 1997, the value of domestic investment (penanaman modal dalam negeri in Indonesia abbreviated to

PMDN) reached its peak at Rp. 119 trillion with 723 units of projects. However PMDN value declined continuosly after the peak position. In 2003, there is only Rp. 50 trillion of PMDN remaining with 196 projects. In November 2004 the value had fallen to only Rp. 33.4 trillion with 158 projects.

The same pattern appears on the foreign investment (penanaman modal asing in Indonesia abbreviated to PMA). In 1997, PMA value was US$ 33.7 billion with 778 projects. In 2003, the value fell to US$ 14 billion with the 1170 project. Ironically to November 2004, the new PMA recorded 9.6 billion U.S. dollars with the 1066 project (Kompas, 2005).

Table 1: Growth of PMA Agreement 1997-2003

Year	PMDN		PMA	
	Project	Value (IDR Billion)	Project	Value (US $ Million)
1997	723	119.877,2	781	33.788,8
1998	327	57.973,6	1.034	13.649,8
1999	237	53.540,7	1.177	10.884,5
2000	392	93.897,1	1.541	16.075,9
2001	264	58.816	1.334	15.056,3
2002	188	25.230,5	1.151	9.795,4
2003	181	48.484,8	1.024	13.207,2

Source: Department Industry and Trade, 2003, www.dprin.go.id

Table 1 shows the decreasing flow of investment since 1997 (the beginning of crisis) and continues until local autonomy implementation in 2001. It's undeniable fact that a condusive business atmospehere is a necessary to attract investment. A survey by Local Autonomy Implementation Committee (Komite Pelaksanaan Otonomi Daerah abbreviated to KPOD, 2004) suggested that institution is the main factor determining attractiveness of investment, followed by political and social factors, physical infrastructure, local economic conditions, labor productivity (Warta Ekonomi, 2005).

Another study by JETRO (Japan External Trade Organization) also showed that the investment climate in Indonesia is worse than in China, Thailand, Vietnam, and other ASEAN countries. The most influencing fator is problem in labor (the rise of labor cost and protests), customs

clearance problems, the absence of fiscal incentives, and various contra-business policies (Kuncoro, 2004).

Other associated problems with the investment climate in Indonesia suggested by a survey by the United Nations Conference on Trade and Development in the World Investment Report 2004 which ranked Indonesia in the second worst of 140 countries viewed from the investment performance index.

The pattern of investment performance shows that the investors interested to infuse capital in this country are often viewed as not more than just objects not subjects. Whereas 800 companies around the world own resources as worthy as the amount of 140 poor countries gross domestic product of (Kompas, 2005).

However, it should be noted that the economic crisis in Indonesia has different effects across the country. At the time of the national economy experienced contraction of economic growth at level -13.1% in 1998, Irian Jaya economy grew at 12.7%, as well as of the Batam grew at 3.5% (Kuncoro, 2003). It's clear that country risk is not identical with the regional risk, the risk to do business in the region.

If we see a list of the foreign investment that has been approved by the Indonesian government from the 1990-2000 based on the island, we can see that Java on average in the period of time is a major goal of foreign capital, as reflected from its average value of investment reached 63%, as for other areas in Indonesia purposed of foreign investment are Sumatra with 22%, Bali and Nusa Tenggara 7% and the remaining less than 3%. In general, Java attract foreign investors more than other regions because its attractive resources, such as the availability of facilities and adequate infrastructure, abundant labor, transportation, and the information which are relatively better than another region (Kurniawan, 2002).

Table 2: Approved PMA in Indonesia based on Region 1990-2000

Year	**Investment** Value **(US $ Million)**											
	Java	**%**	**Sumatra**	**%**	**Kalimantan**	**%**	**Sulawesi**	**%**	**Bali Nusa Tenggara**	**%**	**Maluku Irian**	**%**
1990	6533	66	1842	19	867.7	9	133.9	1	486	5	1.4	0
1991	7186.7	82	994	11	24	0	13	0	556	6	2.6	0
1992	6001.9	58	2452	24	441.2	4	91.4	1	52	5	815.3	8
1993	5729	70	2205	27	12.8	0	40.2	0	51	1	105.4	1
1994	21247.3	84	301	12	678	3	65	0	36	0	309.9	1
1995	27492	69	549	14	1649..3	4	2384.4	6	326	1	2596.4	6
1996	17908.4	60	4297	14	2873.6	10	2552.6	9	176	6	531.2	2
1997	20535	61	11163	33	1056.1	3	426.1	1	129	0	522.3	2

1998	10840.4	80	1415	10	722.7	5	192.7	1	365	3	25.9	0
1999	2635.9	24	7652	70	226.7	2	141.8	1	208	2	24.9	0
2000	10612.6	42	2998	12	136.8	1	69.2	0	11543	45	52.6	0
Average		63		22		4		2		7		2

Source: Indonesia Statistics 1990-2000, rearranged.

Table 3: PMA Projects in Java Approved by Government based on Lokation

Year	**Investment** Value **(US $ Million)**									
	Jakarta	%	**West Java**	%	**Central Java**	%	**Yogyakarta**	%	**East Java**	%
1990	1631.4	25	3857.4	59	97	1	6.8	0	949.9	15
1991	4216.6	59	2376.2	33	130	2	37	1	426.4	6
1992	1131.4	19	4497.8	75	42	1	48.4	1	281.8	5
1993	1669.1	25	2508	38	50	1	56.3	1	2282.6	35
1994	1858	12	5207.2	34	183	12	0.2	0	6275.8	41
1996	4403.9	25	7760.1	43	3273	18	69	0	2401.7	13
1997	6136.1	30	7973.3	39	2195	11	14.3	0	4215.6	21
1998	1700.1	16	5504.1	51	3066	28	6	0	563.5	5
1999	783.8	30	1498.2	57	69	3	10.5	0	273.7	10
2000	3273.1	31	3137.5	30	3082	29	3.9	0	1115.7	11
Average		27		46		11				16

Source: Indonesia Statistics 1990-2000, rearranged.

Focusing on Java alone, foreign investment is concentrated in only Jabotabek, West Java and East Java. Spatial pattern of foreign investment appears to be concentrated in many areas on the main island of Java, namely Java and Jabotabek West, with foreign investment value reached 71%. This data indicates the geographic concentration in foreign investment in Java.

The concentration of foreign investment in the two regions makes sense when the regional autonomy policy in Indonesia is being applied. As local governments are expected to be more economically independent in the region, the fact shows that only less than ¼ of the areas are economically independent and capable because the presence of natural resources in these areas. The rest are still experiencing difficulties in meeting the needs of capital and investment in order to carry out economic development (Kurniawan, 2002).

As foreign direct investment geographically concentrated only in the Jabotabek and Surabaya, an interesting question appears that is how could happen. Why did an area attract direct foreign investment more than other areas? What factors cause foreign investors to place funds and efforts in an area? Such questions are the adresess of this research.

This study will cover data of all provinces in Indonesia (26 provinces), which will be used to describe the phenomena of investment location selection since in the autonomy, regions or provinces competited to attract investors to the area.

Review of Previous Research

Theoritical Framework

According to the Hecksher Ohlin, traditional theory of FDI treats FDI as a form of international capital movements. The presence of relative differences of international labor and capital causes differences in rate return of capital as stated in the interest rate. This consequently causes a movement of capital from rich countries to poor countries.

Modern theory of FDI starts discussion by introducing two questions: firstly, why the same goods are produced in a two or more countries?; secondly, why the production in different places is conducted by the same company? The first question tends to be more about local aspects, while the second one about more internationalization ones (Krugman and Obstfeld, 1995).

David K. Eiotman (in Yeung, 1994) stated that the motives underlying foreign investment are strategic, behavior and economic ones. To be included in strategic motives are explore market efforts, raw materials searching, production efficiency, knowledge colleting and political security. While in the other hand, what to be included in the behavior motives are stimulus for external environments based on individual needs and commitments. And those included in the economic motives are efforts to maximize profits with the long-term returns and market price of the company share.

Concepts given by Dunning are slightly different from the others. Dunning explained that FDI distribution phenomenon can be understood through the framework of Ownership-Location-Internalization (OLI) (Krugman and Obstfeld, 1995), as the explanation bellows:

a. Ownership theory

According to Dunning factor ownership is the main condition that must be owned by investors who want to infuse capital in other countries. To be able to make foreign direct investment, a company

must have a product or a production process that is not owned by other companies. It's possible that the ownership is not formed as an object but can be a trademark or quality reputation. Benefits of ownership is to give the company very valuable competitiveness, so that is able to reduce things decreasing its profit in managing business abroad (Markussen, et.al., 1995).

b. Location Theory

Dunnings stated that location has a very big role in the foreign direct investment. Good abroad location will provide benefits for the investors to produce in abroad than in their own country. Krugman and Obstfeld also agreed that transportation costs and barriers to trade will determine the location selection of FDI. Further Krugman stated that a good location is usually associated with resources availability and price.

c. Internalization theory

Internalization theory stated that it will be more profitable for multinational companies to conduct transactions such as inputs, technology and management within a firm than between firms. This will guarantee the rights of ownership over specific advanced it has owned.

Review of Previous Research

Studies conducted by Beer and Cory (1996) on determinants of the of American FDI location in Europe (EU), confirmed that the market size, growth rate, labor costs, exports and tariff barriers were affecting United States FDI in the EU. This study also revealed the determinants of the of American FDI location included taxes and infrastructure, and the opportunity related to foreign investment.

Following the above research is a research conducted by Hsio and Shen (2003) that analyzed panel data from 23 developing countries from 1976 until 1997. The results found that economic growth had a significant and positive impact on FDI, the degree of openness and corruption index positively and significantly affected and infrastructure development as a proxy of phone connection also positively and significantly effected FDI.

Kuncoro (2000) also explicitly discussed the role of foreign investment in creating the concentration of industry. Furthermore, the trade liberalization as part of government policy also encourage foreign investment into Indonesia and it could further explain the changes in the pattern of industrialization in Indonesia.

Bonlarron (2001) researched the role of FDI in maping of firms location owned by multinational companies in Hungary. Through these multinational companies the location of industry concentration occurred in Hungary. In conducting the research, Bonlarron used his model, but since socialist system in Hungary is still tacky so much data that it should be used finally can not be obtained. Thus, the model can not be tested effectively in Hungary. Research conducted by Bonlarron focused on determinants of province in Hungarian, so that the data used are the data at the province level. The research focused more on employment determinants. Therefore, Bonlarron use 3 variables to explain employment determinants. The market determinants are given only at a small portion, as reflected from the usage pf only one variable as market determinants proxy i.e. demand of industry.

Maudatsu (2001), using 14 European countries tested causality hypothetical between FDI and economic growth. The results showed that 4 countries e.g. Italy, Finland, Spain and Ireland, supported the causality hypothetical that economic growth affected FDI. Or in other words, economic growth in these countries had a significant impact on multinational corporate investment decisions. Meanwhile, the proof of hypothesis claimed that FDI will encourage the growth can be seen in the 8 countries namely Belgium, Denmark, Greece, Germany, France, Netherlands, Austria, Portugal and the UK. While the hypothetis of causality relationship between FDI and growth did not apply to Sweden.

A study by Nonnemberg and Mendonça (2001) on determinants of the FDI in developing countries using panel data of 38 countries from 1975-2000, showed that the size of the economy as proxy of GDP, and the average growth rate of the previous year had a positive and significant impact effect on the flow of FDI. Level of education played an important role on FDI. The degree of economic openness also provided an important role to drive capital. Inflation, an indicator of macroeconomic stability, had negative effect. These results showed that macroeconomic stability is an important variable influencing FDI in a country.

A study by Kurniawan (2002) suggested that main factor determining Java as FDI location was the size of the access to the market, rather than aspects of employment and infrastructure. In other words, FDI into Java could be classified as a market seeker FDI.

In the line with with the researches above, Baldacci, et. al. (2003) explored that in low income countries, the factor productivity was more effective than investment as a path to increase growth through fiscal policy. The using of generalized method of moment (GMM) could prove that private investment response to fiscal contraction was relatively small, such as in tight deficit. As fiscal deficit existed, low income countries would not gain from its efforts to reduce deficit because government-factor relation was more responsive to increase economic growth.

Almasaied et. al. (2004) analyzed simultaneous impact of FDI, domestic investment, and financial intermediation trough the process of economic growth in Indonesia. Using Pesaran's autoregrsive distributed lag (ARDL), the first conclusion suggested that firstly there was a long-term relationship between real GDP, FDI and domestic investment, export and financial intermediation. Secondly, domestic investment, and financial intermediation was an important factor determining the growth process in Indonesia. Thirdly, FDI significantly and positively effected economic growth. Fourthly, financial intermediation reform was main key for the growth and fifthly there was a crucial relationship between domestic investment and economic growth, especially after the financial crisis in Indonesia.

A study by Sodik and Nuryadin (2005) found that the foreign and domestic investment affected regional economic growth, so that both investments are needed by a country to grow and develop in based on its own capacity. Foreign investment partially effected growth but only in the era before regional autonomy, not after it.

Research Method

Variable Operational Definition

Dependent Variable

This study focuses on the factors that affect investors in choosing the location for investment. Therefore, the dependent variable in this research is foreign and domestic investment. Foreign investment is calucalted from

absolute value of foreign direct investment while domestic investment is all investment in the country in 26 provinces in Indonesia.

Independent Variables

Market size. Generally hypothesis states that market potential is the main motivation behind the investor decision to select a location. The larger market potential of a region or province gives more hope for investor over demand of goods or services produced. Therefore, the sign of the positive coefficient is expected to be obtained in this research. The research uses this variable as a proxy perkapita GDP of market size (Kuncoro, 2000). Such proxy variables were also used in the studies by Beer and Cory (1996), Maudatsu (2001), Nonnemberg and Mendonça (2001), Kurniawan (2002), which results indicated that these variables determinated investment.

Infrastructure (electricity) indicator. The Indicator is used in this model because it is one of the important factors influencing investors to invest in a region since they in deed needed it. Total power consumed in the regions or provinces is used as proxy of infrastructure.

Spatial (density) indicators. The variables are used based on the agglomeration theory of New-Classical Theory (NCT) and The New Economic Geography (NEG). NCT stated that agglomeration arises because of two factors both are localization economies i.e. economies of scale as effect the spatially concentrated industries and urbanization economies i.e. economies of scale as effect the urban industries. NEG stated that the increasing agglomeration will return economies of scale and imperfect competition. Krugman suggested urban agglomeration as a central concern (Kuncoro, 2000). Therefore density or population density in the regions provinces is used as spatial proxy.

Employment indicators (laborforces and provincial minimum wage). The usage of this indicator is based on various studies on the investment both form FDI and MNCs that suggest that a country with more and cheaper labor is more interesting for investment to come (Hayter, 2000). In addition, the condition of the location a company is interested by is closely related to the benefits that can be obtained, among others are cost of production efficiency and optimizing productivity of existing resources (Hayter, 2000). Therefore, the marked negative coefficient for wages is expected to be obtained in this research. Coefficient sign on the variable wage can be debated. Several studies conducted by Smith and Florida

(1994) found that Japanese automotive companies tend to choose the location with the higher wage level. The research conducted by Kuncoro (2000) for India 1976-1996 found that wage levels have a positive relation with FDI. It can be concluded that wage as variable does not cover cost only, but it also covers skills, as an example is if the MNCs are looking for highly educated labor (Bonlarron, 2001).

Economic Indicators (net exports and the rate of inflation). The usage of this indicator is an adaptation of studies conducted by Nonnemberg and Mendonça (2001) which state that the degree of economic openness provided an important role to attract capital.

Model Derivation

Model used in this research applying panel data and the translog model (Dees, (1998); Fung, et. Al. (2000 and 2002) and Sun, et. Al. (2002)) that can be written as follows:

$$\ln Y_{it} = \alpha_i + \sum \beta_k \ln Xk_{it} + \varepsilon_{it} \quad \text{..... (1)}$$

where Y_{it} is the value of the investment, X_{it} is key factors determining the level of investment, α_{it} is the constant individual effect of time *t* and specific to each unit of cross section *i*. i = 1,2, ..., n refers to the unit cross section, and *t* = 1,2, ..., t refers to time. Ordinary least square method can provide a consistent and efficient estimation on α and β. While the key factors determining the level of investment consist of market size, telephone and electricity as infrastructure aspects, spatial aspects such as density and urban percentase, aspects of employment such as provincial minimum wage and laborforce, and aspects of the economy (net exports).

So that the determants of FDI by entering all the variables can be written as follows:

$$\begin{aligned}\ln INV_{it} &= \alpha_i + \beta_1 PDRB_{it} + \beta_2 \ln LISTRIK_{it} \\ &+ \beta_3 \ln DENSITY_{it} + \beta_4 AKT_{it} \\ &+ \beta_5 \ln UMP_{it} + \beta_6 OPENNES_{it} \\ &+ \varepsilon_{it} \quad \text{.....(2)}\end{aligned}$$

Where:
t is time (1993-2003)
i is the region / province (26 provinces)
Inv is the absolute value of the investment in each region / province and consists of foreign ad domestic investment

Market size indicators: GDP growth per capita in each regions / provinces
Indicators Infrastructure:
- ELECTRICITY is the number of installed electric power
Indicators Spasial:
- Density is the population density regions / provinces
Employment indicator:
- Labor force is the rate of growth of labor force available in the regions / provinces.
- UMP is the minimum wage in the provinces / provinces
Economic Indicators:
- OPENNESS is the level of economic (net exports).

In the Equation (2) above, β_1 is GDP elasticity that is expected to be positive. Infrastructure and spatial indicators (symbolized as β_2 and β_3) based on the theory are expected to be positive. Employment indicators i.e. workforce is also expected to have positive contribution to the level of investment, while the provincial minimum wage is still ambiguous, so that $\beta_5 \neq 0$ and β_4 are expected to be positive. Furthermore, the economic indicator including net exports is expected to be positive.

Data analysis techniques

Several advantages can be obtained using pooling data. Firstly, more number of observations for population estimation of the parameters will result larger degree of freedom and decrease the likelihood collinearity between independent variables. Secondly, pooling data make it possible to estimate the characteristics of each individual and the characteristics of the estimate each variable characteristic separately. Thus, the estimation results will be more comprehensive and closer to reality. (Hsio, 1995).

In the panel regression, the difference model, such as one-way or two-way error correction model (ECM), can be formed with considering the structure of error-term. In one-way error component regression model, there is only one effect, that is, the individual effect or time effect, but in two-way error component model there will be both individual and time effect. In one-way error component model, μ_i is notated as unobservable individual specific effects, while ν_{it} is the disturbance $(u_{it} = \mu_i + \nu_{it})$. On the other hand, in the two-way error component model, μ_i notated as unobservable individual specific effects, λ_t notated as the unobservable time effect and ν_{it} is a stochastic disturbance term. Furthermore, to

determine which model is most appropriate, the existence of the individual and or the time effect must be tested. In this test, the null hypothesis tested as follows:

$$Ho1 : \sigma_{\mu}^2 = \sigma_{\lambda}^2 = 0 \text{ (No time and individual effects)} \quad (3)$$

$$Ho2 : \sigma_{\mu}^2 = 0 \text{ (No individual effects)} \quad (4)$$

Two null hypotheses above can be tested using the F-test or Hausman-test. In this research, Hausman test will be be allpied to determine hypothetical test whether there is a time component and the individual effect or individual effect (Baltagi, 2003).

Test Panel Data Unit Roots

In order to establish the dynamic model of all variables in equation (2) firstly stationarity must be tested procedures through the Augmented Dickey-Fuller (ADF) unit root test. Conventional unit root test is based on the null hypothesis with a single equation method. Levin and Lin (1992) showed that the unit root test on a number of pooled cross section data can increase statistical power rather than individual series unit root test. Wu (1996), Oh (1996), Mac Donald (1996), and Frankel and Rose (1996) revealed that applying panel unit root test data through the DF, ADF or Philips-Perron (PP) can improve the strength of the unit root test based on single time series.
Regression equation to test the unit root panel data can be written as follows: (Levin and Lin 1992),

$$\Delta y_{i,t} = \rho y_{i,t-1} + \alpha_0 + \delta_t + \alpha_i + \theta_t + \varepsilon_{i,t},$$

$$i = 1,2,\ldots, N \quad t = 1,2,\ldots T \quad \ldots\ldots\ldots (8)$$

The model above includes the trend component and individual specific effect and time effect. All models is estimated with OLS panel data regression model. Difference in each submodel is located on the specifications of its regression (such as the individual specific intercept and trend components). First submodel component does not include intercept and trend, while the second includes both the intercept and trend.

Data Panel Cointegrartion Test

There are different methods to test panel data cointegration. The first method with the null hypothesis that state there is no cointegration and use the residual value obtained from the panel regression, known as the Engle and Granger method (1987). Pedroni (1995 and 1997), McCoskey and Kao (1998) tested panel data cointegration with this method. Another method with the null hypothesis states there is no cointegration and based on the test developed by Harris and Inder (1994), Shin (1994), Leybourne and MacCabe (1994) and Kwiatowski, et.al (1992). This method stated that cointegration test data on the entire panel data follows the heterogenity in cointegration coefficient. Important issue related to this method is that the null and alternative hypotheses mean that all forms of relationships are cointegrated or all forms of relationships are not cointegrated.

Firstly, panel data cointegration test was conducted with the panel unit root test through residual value, which was then known as the Engle-Granger two steps method. But, the latest development of the literature suggested that the test statistics using this method will be biased towards the acceptance of stationarity hypothetis. Pedroni (1995) showed that applying the unit root test panel data directly through regression residual value is less precise due to various reasons such as lack exogenity regressor and the residual dependence to distribution coefficient estimation. Thus, it is reasonable to use cointegration test procedures that appropriately include heterogeneity elements. This study will use panel data cointegration test developed by Pedroni (1995). Furthermore, cointegration system can be written as follows:

$$y_{i,t} = \alpha_i + \delta_i t + \gamma t + \beta_{1i} x_{1i,t} + \beta_{1i} x_{1i,t} + ... + \beta_{Mi} x_{Mi,t} + e_{i,t}, ...(9) \quad t = 1,...,T;\ i = 1,...,N;\ m = 1,...,M$$

where the T number of observations (over time), N is the total number of individual units in the panel and M is the number of variables in the regression. In equation (9) above, α_i is spesific intercept, γ_t is the time dummy for the number of panels and $\delta_i t$ is a deterministic time trend for a specific number of individual panels.

Pedroni showed seven cointegration panel statistical forms, consists of four tests based on the pooling within-dimension and hereinafter referred as the first category. The last three tests are based on pooling between-dimension. In the first category, three of the four forms of testing use non-paramatric correction that can be obtained from the Philip-Peron method (1988). The fourth test is parametric test applied with the ADF-test. Statistical test for the first category is based on the estimator in which the

coefficient effectiveness of pool autoregressive differences between members of the unit root test residual estimates, while the statistical test for the second category is based on the estimator in which the average coefficient estimates on each individual member (i).

Cointegration relationship between the variables can be known through error term stationarity in equation (9). For non-parametric test, the equation used can be written as follows:

$$\hat{e}_{i,t} = \hat{\rho}_i \hat{e}_{i,t} + \hat{u}_{i,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (10)$$

Meanwhile, to estimate parametric test the following equation can be used:

$$\hat{e}_{i,t} = \hat{\rho}_i \hat{e}_{i,t-1} + \sum_{k=1}^{k_i} \hat{\rho}_{i,k} \Delta \hat{e}_{i,t-k} + \hat{u}_{i,t} \quad .. \quad (11)$$

For the first category, null hypothesis (no cointegration) is defined as follows:

$H_0 : \rho_i = 1$ for all individuals

$H_1 : \rho_i = \rho < 1$ for all individuals

For the second category, null hypothesis (No cointegration) are as follows:

$H_0 : \rho_i = 1$ for all individuals

$H_1 : \rho_i < 1$ for all individuals

However, alternative hypothesis in the second category can not be applied for first order autoregressive coefficients. So that the test statistics for the second category will assymtotic with the standard normal distribution;

$$\frac{x_{N,T} - \mu\sqrt{N}}{\sqrt{v}} \Rightarrow N(0,1) \quad \ldots\ldots\ldots\ldots \quad (12)$$

where $x_{N,T}$ is the statistical test form. μ and v refer to the average and variants of each test cited by Pedroni (1999).

The Results Discussion

Estimation results of regression equation

Based on the results of panel data estimation using fixed effect method, the results obtained can be viewed as presented in Table 4. From this table, can be noted that market size indicator i.e. GDP growth, effects on the location of choice to invest in the region but with a negative direction. This means that the GDP growth in an area does not directly increase investors interest. This result does not match the findings in previous research, such as Beer and Cory (1996), Maudatsu (2001), Nonnemberg and Mendonça (2001), Kurniawan (2002), where the results indicate that these variables affect the investment.

Infrastructure indicator, i.e. electric power installed does not affect the choice of location to invest in the region. This is not in accordance with the theory that the infrastructure does not affect the location choice in investing in Indonesia. Spatial indicators, namely population density also does not affect the choice of location to invest in the region. This is also not in accordance with NEG theory that states increasing agglomeration effect increasing return, economies of scale and imperfect competition.

Table 4: Regression Estimation Results with Fixed Effect Method

Variables	**Period of 1993-2003**
GDP	-0.002762*
	(-1.854674)
Electicity	-0.899882
	(-1.332569)
Density	0.273821
	(0.257485)
Labor Force	-0.643413*
	(-1.835514)
Wage	-0.221693
	(-0.989656)
Nett Export	0.224526**
	(2.409866)
R-squared	0.574154
S.E. Regression	1.249037
DW-statistic	1.893712
F-statistic	9.916300
(Prob. F-statistic)	0.000000

Source: estimation result.

Notes: - *** significant at α = 0,01; ** significant at α = 0,05; * significant at α = 0,10

While the labor indicators, i.e. employment and wages, only employment that affect the choice of location to invest even with the negative direction. This is in accordance with a study on the investment that have FDI, or that MNCs are more interested to a country with more and cheaper labor (Hayter, 2000). For wage that does not affect the choice of location to invest, is because the investors nowdays do not consider cheap wages as interesting cause, but focus on production cost efficiency and resources productivity optimalisation (Hayter, 2000). Thus, it indicates that what explained by wage does not include only the cost, but also skills.

For economic openness indicator, namely export, it has positive and significant effect on the choice of location to invest in the region. This is consistent with studies of Nonnemberg and Mendonça (2001) that stated the degree of economic openness also provided an important role to attract investment.

Panel Data Unit Root Test Results

Panel data unit root test results of the variables used in this research are presented in Table 5. From the table, stasionarity test indicates that the investment has a coefficient of -7.649 while GDP growth has a coefficient of -2572.42, with a probability smaller than 0.05 so that the null hypothetis stating that daya do not stationer is rejected. Test results on electricity and density, with coefficients of -3.03 and -7.23 repectively and with probability less than 0.05, also reject the null hypothesis. Each of UMP, the laborforce growth and the degree of economic openness has a smaller probability than 0.05, so that the three variables reject the null hypothesis. From the next test results can be drawn the conclusion that the variables used in research are stationer at data level (I0), or in other words all of the variables have the same degree of integration.

Table 5: Panel Data Unit Root Test Results

Panel Unit Root : Levin, Lin & Chu		
Variables	Statistic	Prob.**
Investments	-7.64970	0.0000
PDRB Growth	-2572.43	0.0000
Electricity	-3.03507	0.0012
Density	-7.23375	0.0000
UMP	-6.36685	0.0000
Labor growth	-8.95948	0.0000

Openness	-7.08713	0.0000

Source: Attachements

Pedroni Cointegration Test Result

Table 6: Pedroni Cointegration Test

	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	-1.672726	0.0985	-2.230514	0.0332
Panel rho-Statistic	6.646861	0.0000	6.494274	0.0000
Panel PP-Statistic	-6.244258	0.0000	-8.035084	0.0000
Panel ADF-Statistic	3.268178	0.0019	2.190334	0.0362
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	8.432890	0.0000		
Group PP-Statistic	-9.193962	0.0000		
Group ADF-Statistic	2.540519	0.0158		

Source: Attachements

As all variables in this research have the same degree of integration, next test is to know the presence of long-term relationship using Pedroni panel cointegration approach (Table 6). Cointegration panel test result with non parametrics approach indicates that the *Panel v-Statistic* has a coefficient -1.67, while the *Panel rho-Statistic* cointegration has a coefficient of 6.646. Cointegration coefficient with the Panel PP-Statistic as obtained from the test is -6.244 and coefficient with Panel ADF-Statistic is 3.268. Probablity of each test method shows that the variables used are cointegrated at significance level of 5% except in the test with the Panel v-Statistic which is significant at the level of 10%.

Cointegration panel test result with parametrics approach indicates that *Group rho-Statistic* has a coefficient of 8.432 while *Group PP-Statistic* has a cointegration coefficient of -9.193. Cointegration coefficients obtained using the Group ADF-Statistic shows result of 2.540. Probablity of each test method indicates that the variables used are cointegrated at

significance level of 5%. From seven panel tests all the variables are cointegrated or in long-term have the same movement direction.

Conclusion

Based on fixed effect method, only three indicators are significant to the choice of location investment, namely market size represented by GDP, infrastructure indicator represented by electricity, and economic openness indicator represented by export. Among three indicators, GDP and electricity show significant effect but with the opposite direction to the theory. Regional economic openness indicator as expressed in export has consistent relationship with the theoretical framework applied even with relatively small coefficient. It indicates that the level of regional economic openness has not contributes to attract investment. The result of this study partially confirms the study of Nonnemberg and Mendonça (2001) that the degree of economic openness also provided an important role to attract investment.

Recommendations

1. Local governments are expected to create a new policy that encourages investment from both local and foreign iinvestors to increase regional economic growth.
2. Local governments also need to coordinate the implementation of regulations in both vertical level (i.e. between central government, province and city) and horizontal level (i.e. between departments and other bodies related). Therefore, fundamental reform related to the improvement of business climate, export and investment in Indonesia is required. Reform agenda to be done are firstly reviewing all the regulation from the local government district or city and secondly working together with government and other provinces in developing procedures and standards of regulation.

Bibliography

Baltagi, B. H. (2003). *Econometric Analysis of Panel Data*. Second Edition. John Wiley & Sons, LTD, The Atrium, Southerm Gate, Chichester West Sussex PO198SQ, England.

Baldacci, E. et. al. (2003). "Growth, Governance, and Fiscal Policy Transmission Channels in Low-Income Countries". *IMF Working Paper*. December 2003 (WP/ 03/ 237).

Beer, Francisca, M., Cory, Suzanne, N. (1996). "The Locational Determinant of U.S. Foreign Direct Investment in European Union". *Journal of Financial And Strategic Decisions*. Vol. 9, No. 2.

Bonlarron, Anne, G. (2001). "Location Choice and Polarisation: Evidence from FDI in Hungary". *International Conference Paper Faculte des Affaires Internationales, University of Le Havre*, 26-27 September 2001. France

Blomstrom, Magnus, Robert, E., Lipsey., M., Zejan. (1993). "Is Fixed Investment The Key To Economic Growth". *Working Paper*. No. 4436, NBER, 1050 Massachusett Avenue Cambridge, MA 02138 August

Dees, S. (1998). "Foreign Direct Investment in China: Determinan and Effects". *Economics of Planning*. 31: 175-194

Engle, R.F., and Granger, C.W.J. (1987). "Cointegration and Error Correction: Representation, Estimation and Testing". *Econometrica*. 55, 2:251-276.

Engle, R.F., and Yoo, B.S. (1987). "Forecasting and Testing in Cointegrated System". *Journal of Econometrics*. 35:143-159.

Evren Erdogan, C. (2002). *Price and Income Elasticities of Turkish Export Demand: A Panel Data Apllication*. Central Bank of Republic of Turkey Department of Statistics.

Frankel, J.A. and Rose, A.K. (1996). "A Panel Project on Purchasing Power Parity: Mean Reversion Within and Between Countries". *NBER Working Paper*. 5006.

Fung, K. C., Iizaka, H., Lee, Jand Parker, S. (2000). *Determinant of U.S. and Japanese foreign investment in China*. Asian Development Bank Institute.

Fung, K. C., Iizaka, H., Lin, C. and Siu, A. (2002). *An Econometric Estimation of Locational Choices of Foreign Direct Investment: Thecase of Hong Kong and U.S. Firm in China*. Asian Development Bank Institute.

Gujarati, D. (2003). *Basic Econometrics*. Third Edition. New York: Mc Graw-Hill, Inc.

Harris, D., and Inder, B. (1994). *A Test of the Null Hypothesis of Cointegration, Non-Stationary Time Series Analysis and Cointegration*. New York: Oxford University Press.

Hayter, R. (2000). *The Dynamic of Industrial Location: The Factory, the Firm, and the Production System*. Chichester John Wiley & Sons.

Hoolis B. Chenery and Nicholas G. Carter. (1973). "Foreign Assistance and Development Performance 1960-1970". *American Economic Review*. Vol. 63, No.2 Mei

Hsiao, C. (1986). *Analysis of Panel Data*. Cambridge, England: Cambridge University Press.

Hsiao, C, and Shen, Y. (2003). "Foreign Direct Investment and Economic Growth: The Importance of Institutions and Urbanization". *Economic Development and Cultural Change*. University of Chicago

Im, K.S, Pesaran, M.H., and Shin.,Y.(1997). *Testing for Unit Root in Heterogenous Panels*. University of Cambridge, Department of Apllied Economics.

Kang, Y., and Du, Juan. (2005). *Foreign Direct Investment and Economic Growth: Empirical Analysis on Twenty OECD Countries (Draft)*. March 4, 2005

Kao, C., and Chiang, M. (1999). "On the Estimation and Inference of a Cointegrated Regression in Panel Data". *Working Paper*. Center for Policy Research, Syracuse University, New York.

Kang, Y., and Du, Juan. (2005). *Foreign Direct Investment and Economic Growth: Empirical Analysis on Twenty OECD Countries (Draft)*. March 4, 2005.

Kuncoro, M. (2000). *The Economics of Industrial Aggglomeration and Clustering, 1976-1996: the Case of Indonesia (Jawa)*. Unpublished PhD thesis, the University of Melbourne, Melbourne.

Kurniawan, Budi, A. (2002). *Faktor-Faktor Penentu Investasi Asing Langsung Dalam Memilih Lokasi Industri Manufaktur di Pulau Jawa, 1994-1999.* Tesis S2 Program Pascasarjana UGM, tidak dipublikasikan.

Krugman, Paul R. and Maurice Obsteld. (1995). *International Economics Theory and Policy*. 3rd ed., Harper Collins, Chicago.

Kwiatowski, D., Philips, P.C.B., Schmidt, P., Shin, Y. (1992). "Testing the Null Hypothesis of Stationary Againts the Alternative of a Unit Root". *Journal of Econometrics*. 54:91-115.

Leybourne, S. J., and McCabe, B.P.M. (1994). "A Consistent Test for a Unit Root". *Journal of Bussiness and Economic Statistics*. 12:157-166.

Levin, A., and Lin, C.F. (1992). *Unit Roots test in Panel Data: Asymtotic and Finite Sample Properties*. University of California, San Diego, Discussion Paper. No:92-93

LPEM. (2000). *Construction of Regional Index of Cost of Doing Business in Indonesia*.

Markussen, James R (1995). *Internasional Trade Theory and Evidence*. New York: Mc Graw Hill, Inc.

McCoskey, S., and Kao, C. (1998). "A Residual-based Test for the Null of Cointegration in Panel Data". *Econometric Reviews*. 17:57-84.

Maudatsu, A. (2001). "Foreign Direct Investment and Economic Growth Evidence From 14 European Union Countries". *TEI OF CRETE*. January 2001.

Nonnemberg, Marcelo, B., Mendonca, Mario, J, C. (2003). *The Determinant Of Foreign Direct Investnebt In Developing Countries.* Instituto de Pesquisa Economica Aplicada.

Oh, K.Y. (1996). "PPP and Unit Root Tests Using Panel Data". *Journal of International Money & Finance.* 15,3:405-418.

Pedroni, P. (1995). *Panel Cointegration, Asymtotic and Finite Sample Properties fo Pooled Time Series Test with an Apllication to the PPP Hypothesis.* Indiana University.

Pedroni, P. (1997). *Panel Cointegration, Asymtotic and Finite Sample Properties fo Pooled Time Series Test with an Apllication to the PPP Hypothesis*. New Results, Indiana University.

Pedroni, P. (1999). "Critical Values for Cointegration Test in Heterogneous Panels with Multiple Regressors". *Oxford Bulletin of Economics and Statistics*. Spasial Issue, 61: 653-670.

Statistik Indonesia, BPS, berbagai edisi.

Sodik, J. dan Nuryadin, D. (2005). "Investasi dan Pertumbuhan Ekonomi Regional (Studi Kasus Pada 26 Propinsi di Indonesia, Pra dan Pasca Otonomi)". *Jurnal Ekonomi Pembangunan, Kajian Ekonomi Negara Berkembang*. Fakultas Ekonomi UII, Vol. 10. No.2.

Shin.,Y. (1994). "A Residual-based Test of the Null of Cointegration Against the Alternative of No Cointegration". *Econometric Theory*. 19:91-115.

Smith, D.F. Jr, and Florida, R. (1994). "Agglomeration and Industrial Location: An Econometric Analysis of Japanese-Affiliated Manufacturing Establishments in Automative-Related Industries". *Journal Of Economic* 36:23-41.

Suleiman W. Almasaied, Ahmad Zubaidi Baharumshah, Zulkornain Yusop, and Mariam Abdul Aziz. (2004). "The Impact of Investment and Financial Intermediation on Economic Growth: Evidence From Indonesia". *The 6TH IRSA INTERNATIONAL CONFERENCE, Regional Development in Transition : Governance, Public Service and Eco-Tourism.* Yogyakarta, August 13-14th

Sun, Q., Tong, W. And Yu, Q. (2002). "Determinant of Foreign Direct Investment Across China". *Journal of International Money and Finance*, 21: 79-113

Wu, Y. (1996). "Are Real Exchange Rates Non Stationary? Evidence From Panel Data Test". *Journal of Money, Credit and Banking*. 28, 1:54-63.

_____. Nota Keuangan dan RAPBN tahun 1999/ 2000

_____. (2005). Harian Kompas.

_____. Majalah Warta Ekonomi.

_____. (2003). *Pengelolaan Fundamental Ekonomi Daerah Jakarta.* Badan Diklat Depdagri dan JICA.

_____. (2004). *Otonomi dan Pembangunan Daerah, Reformasi, Perencanaan, Strategi dan Peluang*. Jakarta: Erlangga.