Foreign Direct Investment and Economic Growth: Empirical Evidence from Indonesia

by

Abdul KHALIQ

A final Project submitted in partial fulfillment of
the requirements for degree of

Master of Arts in Economics

University of Hawai'i at Manoa
Masters Program in Economics

Fall 2006

Approved by _____
Ilan Noy (Professor in Department of Economics)

Date _____

Department Economics
University of Hawai'i at Manoa

Foreign Direct Investment and Economic Growth: Empirical Evidence from Indonesia

by Abdul KHALIQ

Academic Advisor: Ilan Noy
Professor in Department of Economics

Abstract

The paper investigates the impact of foreign direct investment (FDI) on economic growth using sectoral data for FDI inflows to Indonesia over the period 1997-2006. The results present that, on the aggregate level, FDI has a positive effect on economic growth. However, on the differential sectors, the results show that the effects of composition of FDI on economic growth vary across sectors by examining the twelve sectors of economy; namely, farm food crops, livestock product, forestry, fishery, mining and quarrying, non-oil and gas industry, electricity, gas and water, construction, retail and wholesale trade, hotels and restaurant, transport and communications, and other private and services sectors. Interestingly, the results seem to support the argument that extractive FDI, e.g. forestry and mining, might not enhance economic growth.

Keywords: Foreign direct investment, economic growth, and Indonesia.

CONTENTS

	Page
Abstract	i
Contents	ii
List of Figures and Tables	iii
1. Introduction	1
2. Theoretical framework	2
2.1 Theoretical developments on growth and foreign direct investment	3
2.1.1 Theories of growth	3
2.1.2 FDI-growth nexus	5
2.2 Empirical studies on FDI-growth nexus	7
2.2.1 Cross-country evidence	8
2.2.2 ASEAN-countries evidence	11
2.2.3 Other-countries evidence	13
3. Foreign direct investment and economic growth in Indonesia	15
3.1 An overview of Indonesian economy	15
3.2 Economic growth and structural change	15
3.3 Foreign direct investment in Indonesia	19
3.3.1 An overview	19
3.3.2 Investment policy	20
3.4 Trend and composition of FDI	22
3.4.1 Approved FDI	22
3.4.2 Realized FDI	24
4. Methodology and data	27
4.1 Methodology	27
4.2 Data	29
5. Empirical results and analysis	30
6. Conclusion	34
References	36
Appendix	40

LIST OF FIGURES AND TABLES

Page

Figure

1. Gross Domestic Product by Industrial at Constant 2000, Structure, 1986-2005 (percent) 18

Tables

1. Gross Domestic Product by Industrial at Constant 2000 Prices, Growth Rate, 1984-2005 (Y-o-Y Growth Rate, Percent) 16
2. Trend of Foreign Investment Planning Approvals by Sector, 1997 - July 31, 2006 (Millions of US$) 23
3. Trend of Foreign Investment Realization (Permanent Licenses) by Sector, 1997 - July 31, 2006 (In Millions of dollars) 25
4. Aggregate, Sectoral and Time Effects of FDI in Indonesia 31

1. Introduction

Foreign direct investment (FDI) has been playing a key role in the changing nature of economic development of developing countries. Currently, many countries compete for foreign investment. Every country, including Indonesia, is aggressively encouraging FDI inflows to accelerate economic growth. Due to the effects of FDI are relatively various on economic growths of developing countries, this study examines the roles of FDI inflows on economic growth in Indonesia.

Since the Government of Indonesia (GOI) liberalized its economy, started by introducing the Foreign Investment Law No. 1/1967 in the year 1967, adopting a free foreign exchange system in 1970 then followed by liberalization of the financial sector in 1980s, a number of foreign investors have invested in Indonesia. These investors have contributed a lot in the development of Indonesian economy. As it happened, before the economic crisis on July 1997, Indonesia has experienced rapid economic growth rate with amounted to around 7% over the period 1970-1996 and has been reported as the sixth destination to foreign direct investment inflows in 1995[1].

Although Indonesian has been an attractive destination for foreign investment and experienced remarkable economic growth, when compared with other regions, e.g. China, Thailand, and Vietnam, not many studies have been conducted on the effects of FDI on economic growth. Moreover, most existing studies have been concentrated on the aggregate effects growth of FDI. No known study to the best of our knowledge has been documented on the effects of the sectoral composition of FDI inflows on economic growth in the case of Indonesia.

[1] World Investment Report 1995

Two important questions are posed: Does FDI lead to Indonesia's economic growth? What differences the impacts of sectoral composition of FDI on Indonesian economy? To explore these issues, this study utilizes an empirical estimation methodology to investigate and analyze the effects of FDI inflows on economic growth in Indonesia as well as other related variables. A comprehensive review of FDI is beyond the scope of this study, but it highlights the general trends and common features of foreign direct investment in Indonesia over the period 1997-2006.

The remaining discussion is organized into five sections. The second section provides a brief review of the theoretical and empirical studies on the relationship between FDI inflows and economic growth. An overview of economic growth and FDI inflows in Indonesia is presented in the third section. In the fourth section contains the specification of the model and data. The fifth section provides the empirical results. Concluding remarks is gathered in the last section.

2. Theoretical Framework

The objective of this section is to review the literature on the interaction between foreign direct investment (FDI) inflows and growth. The discussions on the impact of FDI on growth are not only heated, but also entail significant policy ramifications. On theoretical grounds there is a significant basis for expecting FDI to have a positive relationship on economic growth, while the empirical evidences are complex and often contradictory. This section discusses together the theoretical framework and empirical evidence on the links between FDI inflows and economic growth.

2.1. Theoretical Developments on Growth and Foreign Direct Investment

Growth theories provide the theoretical frameworks for analysis of foreign direct investment and economic growth. In this section briefly surveys the main features of growth theories that are commonly used to analyze the interaction between FDI and economic growth.

2.1.1. Theories of Growth

For centuries, economists have paid much attention to economic growth of nations. Since the days of Adam Smith (1776) this subject has been studied continually such as Thomas Malthus (1798), and David Ricardo (1817), and, much later, Frank Ramsey (1928), Allyn Young (1928), Frank Knight (1944), and Joseph Schumpeter (1934). Those classical economists' ideas provide basic ingredients of economic growth studies. These ideas have included the basic approaches of competitive behavior such as the importance of accumulating basic factors of production, i.e. capital, labor and land; and encouraging efficiency and productivity by expanding markets (Bende-Nabende, 1999). These ideas also emphasized the function of diminishing returns and its relation to the accumulation of physical and human capital, the interchange between per capita income and the growth rate of population, the role of technological advance in increasing labor specialization, and the discovery of new goods and methods of production (Barro and Sala-i-Martin, 1995).

Solow (1957), who is recognized as the founder of neoclassical growth theory, has developed an important contribution to growth theory, known as growth accounting. The main idea behind growth accounting method is that the output growth can be

decomposed into the contribution of the growth rate of inputs such as technology, capital, labor, inward FDI, or by incorporating a vector of additional variables in the estimating equation, such as imports, exports, institutional dummies etc. The growth accounting approach can be derived from the following equation:

$$Y = A\Phi(K, L, \Omega), \tag{1}$$

where Y, K, L, and A are output, capital, labor, and the efficiency of production, respectively; Ω is a vector of ancillary variables.

Taking the logarithms and time derivatives of equation (1) yields:

$$g_y = g_A + \zeta g_k + \psi g_l + \gamma g_\omega, \tag{2}$$

where g_i is the rate of growth of $i = A, y, k, l, \omega,$ (the subscripts are defined per capita terms), and $\zeta, \psi,$ and γ are, respectively, the elasticities of output with respect to physical capital, labor and the ancillary variables.

In fact, in equation (2) the contribution of inputs to output growth does not necessarily equal the rate of output growth. The gap between the rate of output growth and the contribution of input growth defines the rate of total factor productivity (TFP) growth, or the Solow residual. That is, it represents the conventional measure of the various forms of technological change.

However, Solow's model might be deficient because it does not really explain the rate of exogenous technological progress, and consequently led to the birth of *new* or *endogenous*-growth theory in the mid-1980s. Endogenous growth models introduce a theory of technological change into a production process. In contrast to Solow's model based on diminishing returns to capital, endogenous-model growth rates can be increasing over time (Romer, 1986). According to Helpman (2004) endogenous growth

theory emphasized two critical channels of investment which affect economic growth. Firstly, through the impact on the range of available products, and secondly, through the impact on the stock of knowledge accessible for research and development (R&D).

Mankiw, Romer, and Weil (1992) have analyzed another implication of Solow's model. According to them, omitting human capital accumulation in Solow's model would cause biased estimation of the coefficient on saving and population growth. Next, they modified Solow's model by adding human capital as well as physical capital. They assumed that all countries have the same Cobb-Douglas production function applies to human capital and physical capital. They also assumed the same rate of technological change. In addition, they assumed the same rate of human and physical capital depreciation. Based on these assumptions they presented that income per capita variation of cross-country is a function of variation in the rate of saving, the rate of population growth, and the level of labor productivity. Thus, they recommend that using an augmented Solow growth model has the potential to clarify international differences in income per capita.

2.1.2. FDI-Growth Nexus

Economic models of endogenous growth have been applied to examine the effect of FDI on economic growth through the diffusion of technology (Barro, 1990; Barrel and Pain, 1997). FDI can promote economic growth through creation of dynamic comparative advantages that lead to technology progress. Hence, foreign direct investment is usually viewed as an effective channel of technological transmission from developed country into

developing countries and foster economic growth in developing countries (Solow, 1956; Balasubramanyam *et al.,* 1996; Borensztein *et al.,* 1998).

Romer (1990) and Grossman and Helpman (1991) have calibrated Romer's (1986) model and assume that endogenous technological progress is the main engine of economic growth. They classify that knowledge is a factor of production, whereas Romer (1986) reflected on knowledge as a parallel by product of investment. Romer (1990) argues that FDI accelerates economic growth through strengthening human capital, the most essential factor in R&D effort. He also emphasizes that an economy will experience faster economic growth with large stock of human capital rather than a large population. Moreover, Grossman and Helpman (1991) conclude that endogenous technological change drives economic growth. An increasing in competitions and innovations as a results of technological progress encourage increasing productivity and, thus, promoting economic growth in long run.

Findlay (1978) has developed Solow's model and assume that the growth rate of technology diffusion as an increasing function of FDI. By distinguishing between inputs into foreign capital (a developed country) and domestic capital (a developing country), he verifies that an increase in foreign capital increases domestic capital. However, he argues that the rate of technological transfer in a developing country is a decreasing function rather than an increasing function of both the relative technology gap and the share of FDI in the total capital stock.

Reis (2001) have formulated a model to draw the effects of FDI on economic growth when investment returns may be repatriated. She states that after the opening of the economy domestic firms will be replaced by foreign firm in the R&D sector. This

may decrease domestic welfare due to the transfer of capital returns to foreign firms. In this model, the effects of FDI on economic growth depend on the relative strength of interest rate effects. If the world interest rate is higher than domestic interest rate, FDI has a negative effect on growth, while if the world interest rate is lower than domestic interest rate, FDI has a positive effect on growth.

Furthermore, Firebaugh (1992) lists several points why FDI inflows may be less profitable than domestic investment and why FDI may even be detrimental. The country may gain less from FDI inflows than domestic investment, because of MNCs are less likely to contribute to government revenue (due to tax incentives or transfer pricing); FDI is less likely to encourage local entrepreneurship; MNCs are less likely to reinvest profits; MNCs are less likely to develop linkages with domestic firms; MNCs are more likely to use inappropriately capital-intensive techniques. However, FDI may be having negative effect on economic growth, when it: "crowd out" domestic businesses; and stimulates inappropriate consumption pattern thus reducing domestic savings.

2.2. Empirical Studies on FDI-Growth Nexus

Although, theoretically, much attention has devoted to the relationship between FDI and growth, the empirical evidence on the issue remains controversial. The controversy has arisen partially due to the lack of a conceptual design and a succinct testable hypothesis (Balasubramanyam *et al.*, 1996), partly because of data insufficiency, either in cross-country or time series during investigations, and an endogeneity problem (Li and Liu, 2005).

2.2.1. Cross-Country Evidence

Borensztein *et al.* (1998) examine the interaction of FDI on economic growth in cross country regression framework, using data on FDI flows from OECD countries to sixty-nine developing countries over the period 1970-1989. They propose that FDI is an important vehicle for adoption of new technologies, contributing relatively more to growth than domestic investment. In addition, they find, through the relationship between FDI and the level of human capital, that FDI has a significant positive effect on economic growth. However, they qualify their results in as much as the higher productivity of FDI only holds if the host country has a minimum threshold stock of human capital.

Within a new growth theory Bulasubramanyam *et al.* (1996) have observed the relationship between FDI and growth in the context of differing developing countries trade policy regimes, i.e. export promoting and import substituting countries. Using cross section data to analyze forty-six developing countries over the period 1970-1985, they support the Bhagwati's hypothesis that FDI increases growth in countries which adopt outward oriented trade policy than in those following an inward oriented policy. They also find positive interaction between FDI and human capital in the economic growth process.

Liu and Liu (2005) apply both single equation and simultaneous equation system techniques to investigate endogenous relationship between FDI and economic growth. Based on a panel of data for 84 countries over the period 1970-1999, they find positive effect of FDI on economic growth through its interaction with human capital in developing countries, while that negative effect of FDI on economic growth via its interaction with the technology gap.

Bengoa *at al.* (2003) has illustrated the relationship between FDI and economic growth using panel data for eighteen Latin American countries over the period 1970-1999. They show that FDI has positive and significant impact on economic growth in the host countries. However, to get positive effects of FDI on growth in the long term, the host country requires adequate human capital, political and economic stability and liberalized market environment.

Moreover, the volatility of FDI and financial adjustment has been observed by several economists such as De Gregrio and Guidotti (1995), Alfaro *et al.* (2004), and Durham (2004). De Gregrio and Guidotti (1995) highlight that financial liberalization and stabilization must be applied to host country in attempt to attract FDI inflows. Alfaro *et al.* (2004) argue that countries with well-developed financial markets not only magnetize FDI inflows but also allow host countries to gain extensively from FDI.

Meanwhile Carkovic and Levine (2002) utilize General Method of Moment (GMM) to observe the relationship between FDI and economic growth. They use World Bank and IMF data for 1960-1995 for large cross-country data set, and find the FDI inflows do not exert influence on economic growth. They also highlight that interaction between FDI and growth does not rely on the stock of human capital. In addition, they argue that there is no significant correlation when allowing for the FDI effects on growth to rely on the income per capita level.

Choe (2003) adapts a panel VAR model to explore the interaction between FDI and economic growth in eighty countries in the period 1971-1995. He finds Granger causality relationship between FDI and economic growth in either direction. However, the effects are rather more visible from economic growth to FDI than FDI to economic

growth. These results imply that significant relationship between FDI inflows and growth does not indicate that high FDI inflows stimulate high economic growth.

In addition, Agosin and Mayer (2000) has examined a panel of data for 32 countries (12 in Africa, eight in Asia, and 12 in Latin America) over the period 1970–1996 and conclude that FDI is not always good for a host country's development. In some cases, FDI inflows can harm the host country by creating "crowding out" effect for domestic investment and displace domestic enterprises that go bankrupt. However, they are unable to examine what types of policies will maximize the FDI share to total investment in attempt to have positive effects of FDI inflows on total investment. Meanwhile, Lumbila (2005), who conducts a panel analysis of economic growth effects of FDI using data for 47 African countries, finds a positive impact of FDI on growth in Africa.

Based on Levine and Renelt's model (1992), Stocker (2000) empirically tests economic effects of FDI for a large cross-section and in each country individually. Using data for seventy-two countries over the period 1980-1995 he finds that the role FDI on overall growth, domestic capital formation or export performance has no significant correlations. These results contrast to the empirical evidences of Borensztein *et al.* (1998) and Bulasubramanyam *et al*. (1997) that argue that FDI inflows boost economic growth.

Alfaro (2003) investigates the direct interaction between FDI and economic growth by dividing the types of FDI inflows in the major sectors of economy, namely, primary, manufacturing, and services. Using cross section regressions with forty-seven countries data for the time period 1980-1999, she finds different effects of FDI exert different sectors of economy on economic growth. FDI inflows in primary sector have a negative effect on growth, whereas FDI inflows in manufacturing tend to have positive

correlation on growth. Furthermore, FDI inflows in service sector have an ambiguous effect.

2.2.2. ASEAN-Countries Evidence

Bende and Nabende *at al.* (2001) study the impact of FDI through spillover effects on economic growth of the ASEAN-5 for the period 1970-1996. They find that FDI accelerates economic growth either directly or through spillover effects. In detail, they show that impact of FDI on economic growth is positively signed and significant for Indonesia, Malaysia, and Philippines, while negative relationship for Singapore and Thailand. Similarly, Marwah and Tavakoli (2004) test the effect of FDI on economic growth of the ASEAN-4, namely, Indonesia, Malaysia, Philippines, and Thailand. Using time series annual data over the period 1970-1998, they find that FDI has positive correlation with economic growth for all four countries.

Moreover, Damooei and Tavakoli (2006) examine Thailand and Philippines. They utilize the CES generalization of Cob-Douglas production function to test how robust is the elasticity of FDI inflows on growth over the period 1970-1998. They show a positive relation between FDI and economic growth for Thailand and Philippines when both countries faced identical foreign capital intensities. In similar results, Vu (2006) presents a positive effect of FDI on growth for Vietnam. On the other hand, Chowdhury and Mavrotas (2003) find different result. Indeed, they point out that Malaysia and Thailand have bidirectional causality between FDI and economic growth.

In similar vein, Choong *et al.* (2005) have explored the role of domestic financial system in transmitting the technological diffusion embodied in FDI inflows on

Malaysia's economic growth. They employ *unrestricted error correction model* (UECM) in testing cointegration relationship between economic growth and FDI as well as some ancillary variables over the period 1970-2001. They find that FDI stimulates a positive technological diffusion in both short- and long-run when the evolution of domestic financial institutions has reached a certain minimum level. It means that FDI would promote economic growth if a host country has a well-developed and well-functioning financial sector.

Kohpaiboon (2003) studies trade policy effect on FDI contribution to Thailand's economic growth. Using macroeconomic time series data over the period 1970-1999, he also shows consistent results with Bulasubramanyam *et al.* (1996) who supports Bhagwati's hypothesis. The impact of FDI on growth tends to be higher under export promotion trade policy in contrast to import substitution trade policy. These findings propose liberalization of trade and investment to maximize the benefit of FDI on economic growth.

Most recently, Vu *et al.* (2006) have enriched empirical study on the impact of FDI on growth by studying sector-specific FDI inflows for both China over the period 1985-2002 and Vietnam over the period 1990-2002. Applying augmented production function they conclude that FDI has positive and statistically significant impact on economic growth. They also show positive effect of FDI through labor productivity on economic growth. Furthermore, they show different effects cross economic sectors of FDI on economic growth. They find that the manufacturing sector appears to gain more than other sectors from sector-specific FDI.

Regarding Indonesia in particular, few detailed studies on the impact of FDI on economic growth have been conducted. Although Bende and Nabende *at al.* (2001) and Marwah and Tavakoli (2004) have documented the effects of FDI on the economic growth of ASEAN, there are no studies of which we are aware that focus on Indonesia. Only Bachtiar (2003) has examined the impact of FDI on the growth rate of Indonesia. Using time series data (1970-2000) and employing a single equation model, he finds an important contribution of FDI to economic growth that indicated by a positive sign of FDI's coefficient in gross domestic product (GDP).

2.2.3. Other-Countries Evidence

With regard to one specific country, the role of FDI in promoting economic growth has been widely conducted. Various studies provide some evidence of FDI effects on economic growth of China. Using provincial data Chen *et al.* (1995), Berthelemy *at al*. (2000) and Zhang (2001) find that, generally, FDI has a positive effect on economic growth of China. This result supports the hypothesis that productive foreign capital promotes economic growth. However, Wen (2003) only gets positive relationship between FDI and growth for China's coastal provinces.

Shan *et al.*, (1997) investigate the causality linkage between inflow of FDI on real output growth in China based on the Granger no-causality procedure, developed by Toda and Yamamoto (1995), using quarterly and seasonally-adjusted data. The results show a two-way causality running between industrial growth and inflow of FDI growth. It means that the result does not support the FDI-led growth hypothesis because FDI and industrial growth have reinforced each other. Furthermore, Charaborty and Basu (2002) apply the

technique of cointegration and error-correction modeling to test the effect of FDI on growth in India using annual data over the period 1974-1996. They conclude that economic growth is not Granger caused by FDI, but economic growth attracts FDI inflows.

Balamurali and Bogahawatte (2004), with different perspectives, have studied the interaction of FDI on economic growth in Sri Lanka using Johansen's full information maximum likelihood for the period 1977-2003. They find that foreign direct investments have responded positively to economic growth and there is bidirectional Granger causality between foreign direct investment and domestic investment. Similarly, Liu *at al.* (2002) show bidirectional causality between economic growth, FDI inflows and exports for China. In contrast, Athukorala (2003) notices no strong correlation between FDI and economic growth of Sri Lanka.

Another empirical study by Bende-Nabende and Ford (1998) develop a simple dynamic model to examine the effects of FDI on endogenous growth in Taiwan. Using macroeconomic data for the period 1959-1995, they prove a positive correlation of FDI on output. In addition, they state that human capital and technological change influence economic growth indirectly. Using the Augmented Dickey-Fuller test (ADF), Akinlo (2004) has investigated the relationship between FDI inflows and economic growth in Nigeria over the period 1970-2001. He has concluded that FDI inflows have a small positive effect, not a statistically significant effect, on economic growth. In contrast, he presents that human capital has a positive and statistically significant effect on economic growth.

3. Foreign Direct Investment and Economic Growth in Indonesia

3.1. An Overview of Indonesia Economy

The Government of Indonesia (GOI) progressively liberalized its economic system. It was started by reforming foreign exchange system in 1970. Then it was followed by liberalization of the financial sector in 1980s, particularly in banking sector. In attempt to attract foreign capital, Indonesia enacted the investment law No. 1 in 1967. As it happened, Indonesia has become preferred destination for foreign investment. Indonesia has experienced rapid economic growth rate with amounted to around 7% over the period 1970-1996 and has been identified as the sixth place for foreign direct investment inflows in 1995[2]. Unfortunately, the economic crisis resulted in net private capital outflows from Indonesia. Data from Bank Indonesia presents negative foreign direct investment, on average about US$ 3 billion for each year over the period 1998-2002.

3.2. Economic Growth and Structural Change

Indonesia, before the 1997 economic crisis, has experienced remarkable economic development. Per capita real GDP has increased from US$ 70 in 1966, one of the world's poorest countries, to US$ 1,071 in 1997. The GDP growth rate has increased consistently at annual rate of more than 7 per cent from 1990 up to the second half of 1997. At the time, Indonesia came to be among the "Asian Tigers". However, economic growth rate fell suddenly in 1998 when East Asian Crisis hit Indonesia. GDP contracted by 13 percent in 1998. In general all sub-sectors of economy had decreased dramatically from

[2] World Investment Report 1995

their high-growth trajectories except for farm food crops, non-food-crops, fishery, oil and gas mining, electricity and water, and communications sectors (see Table 1).

The worst hit sectors were construction, services, and financial sectors. These sectors have experienced high growth rate before mid 1997 due to financial liberalization. Moreover, financial liberalization has attracted huge capital inflows to Indonesia, including short term capital, such as portfolio investment. These massive capital inflows were an important potential engine of economic growth and led to over investment (Nasution, 1998). However, due to poor financial control and weak prudential regulations has led to deterioration of bank and finance, transport, construction, and services sectors when the Asian Crisis hit Indonesia.

Table 1 Gross Domestic Product by Industrial at Constant 2000 Prices, Growth Rate, 1984-2005 (Y-o-Y Growth Rate, Percent)

No.	Sector	1986-1990	1991-1996	1997-1999	2000-2003	2004-2005
1	Agriculture, Livestock, Forestry and Fishery	2.80	2.87	0.70	3.07	2.87
	a. Farm food crops	2.32	1.75	0.43	1.97	2.73
	b. Non-food-crops	3.65	4.92	1.23	5.57	2.22
	c. Livestock product	2.53	5.58	-0.91	5.43	3.11
	d. Forestry	3.24	0.15	-0.07	0.34	-0.67
	e. Fishery	5.22	5.26	4.64	4.13	5.58
2	Mining and Quarrying	2.39	4.71	-0.56	1.28	-1.44
	a. Oil and natural gas	1.88	1.35	-2.69	-2.51	-3.26
	b. Oth. mining and quarrying	9.10	19.42	3.08	8.70	1.46
3	Manufacturing	10.52	10.58	-0.72	5.03	3.38
	a. Refinery oil	7.43	3.67	1.84	0.69	-2.69
	b. LNG	6.91	3.86	4.44	-3.00	-4.32
	c. Non-oil and gas mfg	11.77	11.88	-1.12	5.95	4.29
4	Electricity, gas and water	14.83	12.87	8.21	7.65	5.86
5	Construction	8.07	12.38	-10.31	5.44	7.41
6	Trade, hotel and Restaurant	8.22	7.44	-4.07	4.84	7.14
	a. Retail and wholesale trade	7.99	7.28	-4.38	4.77	7.32
	b. Hotels and Restaurant	9.42	8.12	-2.84	5.16	6.30
7	Transport and Communications	7.10	8.81	-2.93	9.54	13.18
	a. Transport	6.62	7.67	-6.28	7.52	7.54
	b. Communications	10.98	15.72	10.36	14.43	23.97
8	Banks and Finance	7.41	9.67	-3.38	6.16	7.41
9	Other services	5.59	4.17	-4.40	3.42	5.00
	a. Public	6.17	1.92	-1.45	0.97	1.78
	b. Other private and services	4.41	7.78	-7.39	6.17	8.02
Gross Domestic Products		6.26	7.27	-2.60	4.45	4.72

Source: Annual Report BPS, 2006

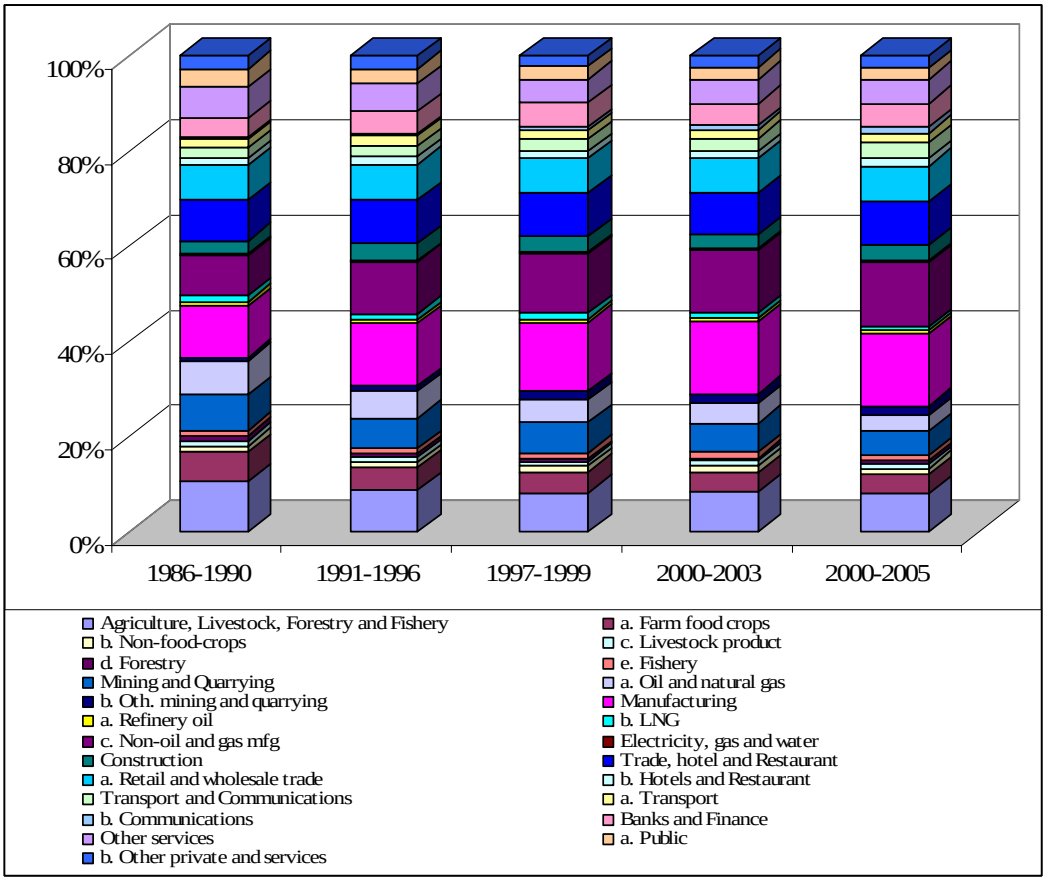
The construction sector growth rate has decreased from 7.16 percent in 1997 to negative 36.36 percent in 1998. Nevertheless, the construction sector increased slightly in 1999. An increasing in construction sector was actually due to rebuilding of building destroyed in “May 1998” demonstrations, but its growth rate still reached negative 1.73 percent due to the capacity constraint. Prior to economic crisis, transport and services sectors increased more than 8 percent and 4 percent per year over the period 1986-1996, respectively, yet these sectors decreased to negative 6 percent and negative 4 percent in the period 1997-1999, respectively.

Other badly hit sectors were trade, hotel and restaurant, and transport sectors. Trade, hotel and restaurant sector experienced contraction by -4.07 percent per year in the period 1997-1999. The transport sectors were contracted by -6.28 percent in the period 1997-1999. Furthermore, the recovery of these sectors depend on the recovery of financial sector, while financial sector experienced a deep plunge in the period 1997-1999, where its contraction was -3.38 percent per year. In addition, financial sector faced largest contraction -26.54 percent in 1998 due to the increasing in losses in banking sector because of negative spread, increasing in bad loans, and losses on foreign exchange transactions.

After reaching its lowest growth in 1998, the Indonesian economic sectors started to recover continually, some dramatically. The economic growth rate was slightly positive, 0.8 percent in 1999. According to Feridhanusetyawan and Pangestu (2004) the positive economic growth represents the natural rebound effects of the economy after experiencing a massive contraction. This positive economic growth has continued in 2000. Although Indonesian political situation was unstable at the time, the economic

growth increased 4.9 percent. This performance was principally still a rebound effect, led by exports and household consumption but restrained by investment. The growth rate decreased to 3.83 percent in 2001 when the global economy was concurrently slowdown and the September 11th attacks.

Figure 1 Gross Domestic Product by Industrial at Constant 2000, Structure, 1986-2005 (percent)



Source: Annual Report BPS, 1986-2005

Economic growth in Indonesia was accompanied by significant structural change over the period 1986-2005 (see Figure 1). Since the beginning of the mid-1980s, the importance of the agriculture sector and mining sector has declined. Over the period

1986-1990, the shares of agriculture and mining sector have averaged 20.03 percent per year and 14.08 percent per year, respectively. Meanwhile, by the period 2000-2005, the shares of these sectors averaged 14.85 percent per year and 9.83 percent per year, respectively.

The share of manufacturing sector had improved from averaged 19.96 percent per year over the period 1986-1990 to 27.82 percent per year in the period 2000-2005. Moreover, transport and communication sectors, service sectors, and bank and finance sectors had seen concurrent rapid growth and development. These achievements were as a consequence of changing in economic development strategies – a move away from inward-oriented strategy, public-sector-led growth towards outward oriented strategy, private-sector-led growth (Bachtiar, 2003).

3.3. Foreign Direct Investment in Indonesia

3.3.1. An Overview

FDI in Indonesia has a long and unique history. It began with the Dutch Colonial era from 1870s to 1941. It was followed by the Japanese Colonial era in the period 1942-1945, the "Old Order" era (Indonesian: *Orde Lama*) over the period 1945-1965, the "New Order" era (Indonesian: *Orde Baru*) in the period 1966-1999, and the "Reformation" era starting in 1999, respectively.

In the Dutch Colonial era, although FDI has played an essential role in the Indonesian economic development, FDI did not guarantee to make Indonesia prosperous. FDI was treated as a medium to exploit Indonesian natural resources. This condition was continued in the Japanese Colonial era. The Indonesian economy was devastated due to

prohibition many raw material imports, shipping equipment out, and labor supplies disrupted. Thus, there was a vacuum of new foreign direct investment inflows.

Under the “Old Order” regime, the government paid little attention to economic development. The government was grappling with the transition from colonialism to independence. The government also faced many domestic political and military problems. Most potential resources were not utilized wisely to accelerate economic development. In the event, there was no new inward foreign direct investment.

Since the “New Order” regime, the government saw a sharp change in economic policy, with introducing multi-year economic plan (Indonesian: *Rencana Pembangunan Lima Tahun*, REPELITA) to maintain economic development. The economic policy became much more market oriented. The government adopted a positive political attitude toward the role of FDI in economic development. The government believed that FDI is an essential medium to transform Indonesia’s abundant resources to boost the Indonesian economic development. FDI was seen to bring capital, technological innovations, and skills needed for Indonesian development. Now in the “Reformation” era, the government has continued to attract foreign investment.

3.3.2. Investment Policy

In attempt to stimulate foreign confidence and investment, the government of Indonesia has enacted the Foreign Investment Law No. 1 of 1967, the Law No. 11 of 1970, government regulation No. 20 of 1994, and government regulation No. 83 of 2001. The laws and regulations contained a number of attractive provisions which apply to all

firms under the jurisdiction of the Indonesian Coordinating Board for Investment (*Badan Koordinasi Penanaman Modal*, hereafter referred to as BKPM)[3], such as:

1. a guarantee for foreign companies to freely transfer profits and repatriate their capital after a certain period;
2. granting a basic tax holiday for foreign investors;
3. exemption from payment of import duties and sales taxes on machinery and equipment; and
4. granting foreign company to operate for a period of 30 years after its legal formation.

To provide legal protection for foreign investors, up to 2005, the GOI has concluded Investment Guarantee Agreement (IGA) with 61 countries[4]. Indonesia has also signed bilaterally the Investment Promotion and Protection Agreements with 55 countries[5]. Furthermore, to avoid incidental double taxation on certain income such as profits, dividends, interests, fees, and royalties, Indonesia has signed agreements (tax treaties) with the 50 countries[6]. In addition, the GOI has participated in and signed an agreement on the Convention on the Settlement of Investment Disputes in 1970[7] and joined in the Multilateral Investment Guarantee Agency (MIGA) in 1986[8].

By 1998, the GOI has introduced new policies on private investment. For example, the approval of foreign investment over US$ 100 millions is no longer authority of the President of Indonesia, but could be issued by the Minister/Chairman of the BKPM. The

[3] Established in 1973 (Presidential Decree No. 20/1973).
[4] http://www.aseansec.org/IAP/Indonesia.pdf
[5] http://www.bkpm.go.id/en/info.php?mode=baca&cat=7&t=Investment&info_id=16
[6] http://www.bkpm.go.id/en/info.php?mode=baca&cat=7&t=Investment&info_id=16
[7] http://www.worldbank.org/icsid/treaties/ii-country.pdf
[8] http://www.miga.org/sitelevel2/level2.cfm?id=1152

government also introduces "one roof services" for the approval and evaluation of projects. Under “one roof services” system, the investor need not go to various Government institutions in order to get investment license/approval either at the preparation or implementation stage. Moreover, the GOI has streamlined and simplified investment license/approval services by reducing the time-frame to issue foreign investment approvals from 42 days to only 10 working days.

However, some business fields are restricted to both domestic and foreign investment. According to Presidential Decree (*Keputusan Presiden,* KP) No. 96 of 2000 jo.118 of 2000, published by Indonesia’s Investment Coordinating Board, there are some “negative investment lists” to domestic and foreign investment. There are 11 sectors that are absolutely closed to all domestic private investment and foreign investment, while there are eight business fields that are closed only to foreign investment. Those closed business fields are germ plasma cultivation, concession for natural resources, contractors in the field of lumbering, taxi and/or bus transportation, small scale sailing, trading and trading supporting services, radio and television broadcasting services providers, and motion picture production industry (see detailed list in appendix I).

3.4. Trend and Composition of FDI

3.4.1. Approved FDI

Since the Foreign Investment Law was enacted in 1967 until July 2006, the government of Indonesia has approved FDI inflows with total value of US$ 315.22 billion and the number of approvals has reached 15,395 projects. The trend of approved FDI inflows increases during the last three decades from US$ 38.6 billion in 1967 to US$

119.3 trillion in 1997. This trend has decreased to 53.9 trillion in 1999, but gradually increased to 318.3 trillion on July 2006. The tremendous increase in approved FDI inflows can be attributed to the following factors: restoration of political and economic stability, consistent macroeconomic policies, a relatively large domestic market, availability of cheap labor, and abundant natural resources.

Table 2 Trend of Foreign Investment Planning Approvals by Sector, 1997 - July 31, 2006 (Millions of US$)

No	Sector	1997-1999		2000-2003		2004-2006		1997-2006	
		Acc.	Annual	Acc.	Annual	Acc.	Annual	Acc.	Annual
I	Primary Sector	26,042.1	8,680.7	1,898.3	474.6	2,332.8	777.6	30,273.2	3,027.3
1	Food Crops & Plantation	19,865.9	6,622.0	1,263.2	315.8	917.0	305.7	22,046.1	2,204.6
2	Livestock	656.7	218.9	92.5	23.1	86.0	28.7	835.2	83.5
3	Forestry	1,317.2	439.1	211.1	52.8	129.3	43.1	1,657.6	165.8
4	Fishery	1,361.6	453.9	89.2	22.3	226.6	75.5	1,677.4	167.7
5	Mining	2,840.7	946.9	242.3	60.6	973.9	324.6	4,056.9	405.7
II	Secondary Sector	166,660.6	55,553.5	25,985.8	6,496.5	15,889.2	5,296.4	208,535.6	20,853.6
6	Food Industry	29,791.3	9,930.4	1,853.9	463.5	2,030.6	676.9	33,675.8	3,367.6
7	Textile Industry	9,820.8	3,273.6	850.9	212.7	644.4	214.8	11,316.1	1,131.6
8	Leather Goods & Footwear Industry	278.7	92.9	289.8	72.5	132.3	44.1	700.8	70.1
9	Wood Industry	3,698.4	1,232.8	431.9	108.0	172.2	57.4	4,302.5	430.3
10	Paper and Printing Industry	44,748.9	14,916.3	2,146.6	536.7	586.8	195.6	47,482.3	4,748.2
11	Chemical and Pharmaceutical Industry	36,690.5	12,230.2	14,548.2	3,637.1	6,945.1	2,315.0	58,183.8	5,818.4
12	Rubber and Plastic Industry	3,651.4	1,217.1	761.9	190.5	409.5	136.5	4,822.8	482.3
13	Non Metallic Mineral Industry	12,787.4	4,262.5	876.0	219.0	1,171.8	390.6	14,835.2	1,483.5
14	Metal, Machinery & Electronic Industry	18,790.7	6,263.6	2,869.6	717.4	2,239.5	746.5	23,899.8	2,390.0
15	Medical Preci. & Optical Instru, Watches & Clock Industry	189.5	63.2	47.8	12.0	20.9	7.0	258.2	25.8
16	Motor Vehicles & Other Transport Equip. Industry	4,317.9	1,439.3	1,048.5	262.1	1,388.6	462.9	6,755.0	675.5
17	Other Industry	1,895.1	631.7	260.7	65.2	147.5	49.2	2,303.3	230.3
III	Tertiary Sector	38,547.8	2,849.3	27,666.4	6,916.6	13,271.5	4,423.8	79,485.7	7,948.6
18	Electricity, Gas & Water Supply	11,789.5	3,929.8	491.6	122.9	902.6	300.9	13,183.7	1,318.4
19	Construction	2,759.9	920.0	1,497.6	374.4	4,331.3	1,443.8	8,588.8	858.9
20	Trade & Repair	372.6	124.2	3,776.6	944.2	2,065.6	688.5	6,214.8	621.5
21	Hotel & Restaurant	5,160.7	1,720.2	7,977.2	1,994.3	976.9	325.6	14,114.8	1,411.5
22	Transport, Storage & Communication	7,735.8	2,578.6	9,856.3	2,464.1	3,869.1	1,289.7	21,461.2	2,146.1
23	Real Estate, Ind. Estate & Business Activities	8,344.1	2,781.4	410.9	102.7	485.6	161.9	9,240.6	924.1
24	Other Services	2,385.2	795.1	3,656.2	914.1	640.4	213.5	6,681.8	668.2
Total		231,250.5	77,083.5	55,550.5	13,887.6	31,493.5	10,497.8	318,294.5	31,829.5

Note :
1 Excluding of Oil & Gas, Banking, Non Bank Financial Institution, Insurance, Leasing, Mining in Terms of Contracts of Work, Coal Mining in Terms of Agreement of Work, Investment which licenses issued by technical/sectoral agency, Porto folio as well as Household Investment.
2 Value of Investment Planning in Million US$. = New Project + Expansion + Change of Status
3 Data of Investment Planning Approvals in 2002 until 2004 change from data published by BKPM in the period of June 2006 since in July 2006 BKPM received Investment Planning Approvals issued by regions.
4 Tentative data, including investment planning approvals issued by regions received by BKPM until July 31, 2006.
5 Acc. refers to accumulation.
Source: BKPM, 2006

Table 2 shows the trend of favorable sectors for foreign investments based on approval up to 2006. During the period 1997-2006, the largest amount in terms of value

of approved investment was to the secondary sector reaching the value US$ 208.5 billion. It has contributed 65.5 percent of total approval value of FDI. Moreover, approved Investments in both tertiary and primary sectors was very small with total value US$ 7.95 billion and US$ 3.03 billion or 25 percent and 9.5 percent of total, respectively.

Of the approved FDI inflows in secondary/manufacturing sector, the chemical and pharmaceutical, paper and printing, food, and metal, machinery & electronic industries reached the largest approved FDI inflows. The total value was amounted US$ 163.2 billion or 51.29 percent of total approved FDI inflows. The other was less than 5 percent of total approved FDI inflows.

Meanwhile, over the period 1997-2004, the largest amount of approved FDI inflows was from Asia and Europe with total value US$ 58.2 billion and US$ 29.7 billion, the share of 47.05 percent and 24.01 percent of total approved FDI inflows, respectively. Moreover, a closer look at the countries, the largest amount of approved FDI inflows was from United Kingdom amounting to 553 projects. It has reached the value of US$ 18.25 billion and contributed 14.76 percent of total approved FDI inflows. The other leading investors were Japan, Singapore, and Malaysia with the share of 10.87 percent, 8.7 percent, and 5.55 percent, respectively.

3.4.2. Realized FDI

Compared with approved FDI, realization of FDI was relatively a small part or only 17.5 percent of total approval value of FDI over the period 1997-2006. Of the twenty-four sectors – leather goods & footwear industry, rubber and plastic industry, motor vehicles & other transport equipment industry, transport, storage & communication,

and trade & repair – have received the largest investment with the share of 62.4 percent, 46.2 percent, 44.1 percent, 40.6 percent, and 35.8 percent of total value realized FDI inflows, respectively. The remaining was less than 35 percent of total realized FDI inflows.

Table 3 Trend of Foreign Investment Realization (Permanent Licenses) by Sector, 1997 - July 31, 2006 (In Millions of dollars)

No	Sector	1997-1999		2000-2003		2003-2006		1997-2006	
		Acc.	Annual	Acc.	Annual	Acc.	Annual	Acc.	Annual
I	Primary Sector	219.9	73.3	616.0	154.0	1,012.1	337.4	1,848.0	184.8
1	Food Crops & Plantation	79.5	26.5	369.3	92.3	590.3	196.8	1,039.1	103.9
2	Livestock	60.0	20.0	28.3	7.1	84.3	28.1	172.6	17.3
3	Forestry	17.5	5.8	-	-	118.8	39.6	136.3	13.6
4	Fishery	22.4	7.5	27.4	6.9	26.9	9.0	76.7	7.7
5	Mining	40.5	13.5	191.0	47.8	191.8	63.9	423.3	42.3
II	Secondary Sector	12,295.3	4,098.4	10,391.0	2,597.8	8,982.1	2,994.0	31,668.4	3,166.8
6	Food Industry	899.3	299.8	1,074.8	268.7	1,361.6	453.9	3,335.7	333.6
7	Textile Industry	367.8	122.6	727.3	181.8	613.1	204.4	1,708.2	170.8
8	Leather Goods & Footwear Industry	203.7	67.9	120.5	30.1	112.8	37.6	437.0	43.7
9	Wood Industry	61.4	20.5	351.6	87.9	122.4	40.8	535.4	53.5
10	Paper and Printing Industry	316.7	105.6	874.6	218.7	863.5	287.8	2,054.8	205.5
11	Chemical and Pharmaceutical Industry	3,241.4	1,080.5	2,877.0	719.3	1,868.6	622.9	7,987.0	798.7
12	Rubber and Plastic Industry	982.8	327.6	670.5	167.6	572.5	190.8	2,225.8	222.6
13	Non Metallic Mineral Industry	330.4	110.1	220.4	55.1	264.6	88.2	815.4	81.5
14	Metal, Machinery & Electronic Industry	4,836.4	1,612.1	2,289.3	572.3	1,652.1	550.7	8,777.8	877.8
15	Medical Preci. & Optical Instru, Watches & Clock Industry	57.5	19.2	21.6	5.4	16.3	5.4	95.4	9.5
16	Motor Vehicles & Other Transport Equip. Industry	881.9	294.0	961.1	240.3	1,137.6	379.2	2,980.6	298.1
17	Other Industry	116.0	38.7	202.3	50.6	397.0	132.3	715.3	71.5
III	Tertiary Sector	4,053.8	1,351.3	10,920.3	2,730.1	7,234.9	2,411.6	22,209.0	2,220.9
18	Electricity, Gas & Water Supply	209.8	69.9	3,231.2	807.8	173.2	57.7	3,614.2	361.4
19	Construction	442.9	147.6	554.9	138.7	1,355.2	451.7	2,353.0	235.3
20	Trade & Repair	89.5	29.8	775.5	193.9	1,359.1	453.0	2,224.1	222.4
21	Hotel & Restaurant	895.5	298.5	584.5	146.1	346.5	115.5	1,826.5	182.7
22	Transport, Storage & Communication	1,142.0	380.7	4,503.5	1,125.9	3,073.3	1,024.4	8,718.8	871.9
23	Real Estate, Ind. Estate & Business Activities	900.7	300.2	510.9	127.7	383.8	127.9	1,795.4	179.5
24	Other Services	373.4	124.5	759.8	190.0	543.8	181.3	1,677.0	167.7
Total		16,569.0	5,523.0	21,927.3	5,481.8	17,229.1	5,743.0	55,725.4	5,572.5

Note :
1. Excluding of Oil & Gas, Banking, Non Bank Financial Institution, Insurance, Leasing, Mining in Terms of Contracts of Work, Coal Mining in Terms of Agreement of Work, Investment which licenses issued by technical/sectoral agency, Porto folio as well as Household Investment.
2. Tentative data, including permanent licenses issued by regions received by BKPM until July 31, 2006.
3. Acc. refers to accumulation.

Source: BKPM, 2006

Table 3 presents recent trends in favorable sectors of realization of FDI inflows. Over the period 1997-2006, the realization of FDI has reached 5,367 projects with a total investment value of US $ 55.7 billion, on average per year US$ 5.57 billion. A closer look at theses sectors, secondary/manufacturing sector has the largest received foreign

investment with total value US$ 31.67 billion or 57.83 percent of total realized FDI inflows. The heavy concentration of realized FDI inflows in manufacturing sectors is due to pursuing the policy industrializations since 1960s.

Of the twelve major industry groups of manufacturing sector, four sectors – metal, machinery and electronic industry, chemical and pharmaceutical industry, food industry, and motor vehicles and other transport equipment industry – have received the largest foreign investment. For the period 1997-2006, they accounted for about 67 percent of realized FDI inflows in manufacturing or 41.42 percent of total realized FDI inflows. They have also been quite large FDI inflows into the paper and printing, textile, and rubber and plastic industries. The remaining five industries – leather goods & footwear, wood, non metallic mineral, medical prescription and optical instrument, watches and clock, and other – have received less than 5 percent of realized FDI inflows in manufacturing.

Furthermore, there have been structural changes in the realization of FDI inflows over the period 1997-2006. During the period 1997-1999, manufacturing sector alone received for almost two-third of the total of realized FDI inflows, but its share declined markedly thereafter. In contrast, the share of tertiary/service sectors has increased from 24.5 percent of total realized FDI inflows over the period 1997-1999 to 39.9 percent of total realized FDI inflows over the period 2004-2006. In fact, the share of transport, storage & communication services has increased significantly from 6.89 percent of total realized FDI in the period 1997-1999 to 15.65 percent of total realized FDI in the period 2004-2006.

4. Methodology and Data

4.1. Methodology

In order to investigate the impact of sectoral FDI inflows on the economic growth rate of Indonesia, we follow the model used in Tam *et al.* (2006). The starting point of the augmented Cobb-Douglas production function framework in which FDI is incorporated as one of factor inputs is derived from the following equation:

$$Y = AL^{\alpha}F^{\beta}D^{\gamma} \tag{3}$$

where A captures the exogenous state of 'environment', Y is the real gross domestic product (GDP), L represents the level of labor, F denotes foreign direct investment (FDI), and D stands for domestic investment (DOM).

Assuming equation (3) to be linear in logs and taking the natural logarithms and time derivatives equation (3) yields:

$$g_y = g_A + \alpha g_l + \beta g_f + \gamma g_d \tag{4}$$

where g_n is the growth rate of $n = A, y, l, f, d,$ (the subscripts are defined sectoral terms), and $\alpha, \beta,$ and γ are, respectively, the elasticities of output with respect to labor, FDI and DOM.

Next, letting sector *i* and time *t* operate within the theoretical framework, the following equation is used for empirical study:

$$g_{y_{it}} = g_A + \alpha g_{l_{it}} + \beta g_{f_{it}} + \gamma g_{d_{it}} + a_i + u_{it} \tag{5}$$

$$i = 1,..., N; t = 1,..., T$$

where *i* subscripts refer to different sectors and *t* refers to different time within sectors – i.e. different sectoral outputs measured at different time. The a_i term is treated as a set of

an unobserved sectoral effect or a sectoral fixed effect and u_{it} is time varying error or idiosyncratic, representing unobserved factors that change over time and affect $g_{y_{it}}$ (Wooldridge, 2003).

Applying the fixed effect estimator in the panel data for each *i*, average the equation over time, we obtain:

$$\overline{g_{y_{it}}} = g_A + \alpha \overline{g_{l_{it}}} + \beta \overline{g_{f_{it}}} + \gamma \overline{g_{d_{it}}} + a_i + \overline{u_{it}} \tag{6}$$

where $\overline{g_{y_{it}}} = \frac{1}{T} \sum \overline{g_{y_{it}}}$, with *t* = 1, … T and so forth. Due to a_i fixed overtime appears in equation (5) and (6), respectively, we factor equation (4) out from equation (3) for each *t* and end up with:

$$\left(g_{y_{it}} - \overline{g_{y_{it}}}\right) = \left(g_A - \overline{g_A}\right) + \alpha\left(g_{l_{it}} - \overline{g_{l_{it}}}\right) + \beta\left(g_{f_{it}} - \overline{g_{f_{it}}}\right) + \gamma\left(g_{d_{it}} - \overline{g_{d_{it}}}\right) + \left(u_{it} - \overline{u_{it}}\right) \tag{5}$$

which can be rewritten as

$$g^*_{y_{it}} = g^*_A + \alpha g^*_{l_{it}} + \beta g^*_{f_{it}} + \gamma g^*_{d_{it}} + u^*_{it} \tag{7}$$

where $g^*_{y_{it}} = g_{y_{it}} - \overline{g_{y_{it}}}$, and so on.

Adapting equation (7) into an empirical one presents, as a benchmark, the following equation:

$$GDP_{it} = \beta_1 + \beta_2 FDI_{it} + \beta_3 DOM_{it} + \beta_4 LAB_{it} + u_{it} \tag{8}$$

where GDP is the economic growth rate and LAB, FDI, DOM are level of foreign direct investment, domestic investment, and labor, respectively. The *i* term corresponds to the twelve sectors; namely, farm food crops, livestock product, forestry, fishery, mining and quarrying, non-oil and gas industry, electricity, gas and water, construction, retail and wholesale trade, hotels and restaurant, transport and communications, and other private and services sectors, respectively. The expected signs for all variables are positive.

4.2. Data

This study uses the yearly cross section time series data (panel data) for 12 sectors from 1998 to 2006. Some advantages using panel data are: (1) dealing with heterogeneity (Kennedy, 1998); (2) more informative data (Baltagi, 1995); and (3) alleviating measurement error and endogeneity (Temple, 1999). All data are compiled from Central Bureau Statistics (*Biro Pusat Statistik*, BPS) and Investment Coordinating Board (*Badan Koordinasi Penanaman Modal*, BKPM). The data on gross domestic product are compiled from Central Bureau Statistics. The GDP growth rate is calculated based on GDP in 2000 constant price. While the data on foreign direct investment (FDI), domestic investment (DOM), and labor (LAB) are obtained from Indonesian Coordinating Board for Investment.

Basically, there are 3 indicators generally used to seek Indonesian investment trend. Firstly, gross fixed capital formation which is taken from the national account published by the BPS. However, gross fixed capital formation excludes all kinds of financial assets. Thus, gross fixed capital formation can not simply stand for actual investment. Secondly, from balance of payments (BOP) data issued by Bank Indonesia that includes foreign direct investment. Nevertheless, FDI data in the BOP also contain non-FDI objects such as financial transactions with commercial banks. But it does not include FDI in oil and gas sectors. Hence, we can not decide whether the BOP tends to overestimate or underestimate the FDI figures. Thirdly, approved FDI and realized FDI data issued by the BKPM. These data are widely used to evaluate investment trends. However, data from BKPM does not include the oil and gas, and financial sector. Also,

the approval data sometimes include unrealistic projects with huge amounts, which distort figures. Therefore, we utilize realized FDI data.

5. Empirical Results and Analysis

The purpose of this empirical analysis is to examine the differential effects of FDI on economic growth in Indonesia. The twelve main sectors of investment has been investigated; namely, farm food crops, livestock product, forestry, fishery, mining and quarrying, non-oil and gas industry, electricity, gas and water, construction, retail and wholesale trade, hotels and restaurant, transport and communications, and other private and services sectors. In other words, this study is observing the effects of not only the level of FDI inflows but also the possible effects of the sectoral composition of FDI inflows on the economic growth.

Following Alfaro (2003) and Tam *et al.* (2006), this study looks at the direct effects of the different sectors of FDI inflows on economic growth utilizing a fixed effect estimation method. This method allows us to control unobserved sector heterogeneity and the associated omitted variable bias. We have 108 observations in the model from 12 sectors for the time period 1998-2006.

Empirical estimations have been conducted on the basis of the theoretical model discussed in section 2 and section 4. The ordinary least square (OLS) regressions involved several steps of estimation which started by testing a benchmark model and followed by adding time-fixed effect, sectoral-fixed effect, and interaction FDI and dummies variable, respectively. The estimation results have been documented in Table 4, for every step specification respectively.

Table 4 Aggregate, Sectoral and Time Effects of FDI in Indonesia

	(1)	(2)	(3)	(4)	(5)
FDI	0.0058177***	0.0019138*	0.0066765***	0.0009805	
	(1.32)	(2.13)	(1.23)	(0.98)	
DOM	0.001658	0.0000771	0.0019036	-8.31e-06	-0.0000706
	(0.81)	(0.18)	(0.84)	(-0.02)	(-0.16)
LAB	-0.0002284***	-0.0000412***	-0.0002358	3.50e-06	0.0000526
	(-1.32)	(-1.16)	(-0.67)	(0.05)	(0.60)
DFFC			6.567644	-2.24934	-1.65005
			(0.42)	(-0.79)	(-0.44)
DLP			3.660765	-2.304383	-0.6640917
			(0.27)	(-0.96)	(-0.20)
DFtry			-0.550428	-6.499638*	-4.782858*
			(-0.04)	(-2.69)	(-1.74)
DFish			5.125106	-0.8169081	-0.436855
			(0.38)	(-0.34)	(-0.11)
DMQ			1.026033	-4.827188*	0.4938888
			0.08)	(-2.00)	(0.15)
DNOG			-2.458393	-5.55117	-4.865807
			(-0.06)	(-0.75)	(-0.61)
DEGW			3.888237	0.9861025	2.709898
			(0.30)	(0.43)	(0.97)
DConst			-1.027617	-4.985861*	-6.246788*
			(-0.08)	(-2.13)	(-2.04)
DRW			3.472162	-3.276088***	-4.156869***
			(0.25)	(-1.32)	(-1.22)
DHR			2.262471	-2.690811	-1.567009
			(0.17)	(-1.13)	(-0.50)
DOPS			4.688946	0.1426545	0.8262029
			(0.36)	(0.06)	(0.20)
FDIxDFFC					-0.0009353
					(-0.05)
FDIxDLP					-0.0107348
					(-0.10)
FDIxDFtry					-0.0202444
					(-0.45)
FDIxDFish					0.126183
					(0.38)
FDIxDMQ					-0.0891473*
					(-2.07)
FDIxDNOG					-0.0008724
					(-0.44)
FDIxDEGW					0.0003341
					(0.18)
FDIxDConst					0.0115287*
					(1.82)
FDIxDRW					0.0085277
					(0.92)
FDIxDHR					0.0018495
					(0.22)
FDIxDTC					0.0023655***
					(1.51)
FDIxDOPS					0.0022188
					(0.26)
Obs	108	108	108	108	108
Prob > F	0.4418	0.000	0.9980	0.000	0.000
R^2	0.0254	0.9645	0.0341	0.9716	0.9754
Adj R^2	-0.0027	0.9604	-0.1113	0.9643	0.9644
Root MSE	25.238	5.015	26.569	4.7617	4.7528

Notes: t-ratios in parentheses. *significant at 5%; **significant at 10%;***significant at 25%.

Farm food crops (FFC); livestock product (LP); forestry (Ftry); fishery (Fish); mining and quarrying (MQ); non-oil and gas industry (NOG); electricity, gas and water (EGW); construction (Const); retail and wholesale trade (RW); hotels and restaurant (HR); transport and communications (TC); and other private and services sectors (OPS).

Column (2), (4), and (5) have time fixed effects.

Table 4 presents the main results which are the effects of FDI inflows, domestic investment, and labor on economic growth. The regressions show FDI inflows, domestic investment, and labor to have positive and insignificant correlation on economic growth. Column (1) shows FDI to have a positive moderate correlation on growth, but is not statistically significant. It seems that FDI inflows do not have an impact on economic growth when correlations are not controlled. Domestic investment and labor have positive effects; however, the effects are not significant.

Column (2) is the regression result using time-fixed effects. The effect of FDI remains positive and becomes statistically significant at the 5% level of confidence. It means that FDI inflows affect the economic growth of Indonesia in positive way. Moreover, D98 turn out with a negative effect and statistically significant at 5% level of confidence (see also column 4 and 5). It means that some factors in the year 1998 have negative effects on Indonesian economic growth. As it happened in 1998, financial crisis hit ASEAN countries; its effects have been so much more devastating in Indonesia than in the other ASEAN countries. FDI inflows in Indonesia have decreased in value from US$ 119.3 billion in 1997 to US$ 58 billion in 1998.

Column (3) is tested with the sectoral-fixed effects. The effect of FDI itself does have a moderate positive effect on growth; however the sectoral compositions of these FDI are found to be insignificant. We find a positive effect of farm food crops, livestock product, fishery, mining and quarrying, electricity, gas and water, retail and wholesale trade, hotels and restaurant, transport and communications, and other private and services sectors, respectively. Although not significant, forestry, non-oil and gas industry, and construction sectors have a negative effect on economic growth. Moreover, the

manufacturing (non-oil and gas industry) sector investments are expected to have a positive effect on economic growth through backward and forward linkages in Indonesian economy does not arise (see also column 4 and 5). It seems that different sub sectors within the non oil and gas industry play different roles in influencing local economy. It may be also caused by the institutional and regulatory environment in Indonesian economy after financial crisis generate a dominating negative effect of non-oil and gas industry of FDI inflows on economic growth. This result is contradictory with previous study that have been conducted by Alfaro (2003) and Tam *et al.* (2006)

Furthermore, column (4) presents the regression result including both time- and sectoral-fixed effects. FDI level itself does not have a positive significant effect on economic growth, while the compositions of these FDI are found to be a negative effect and statistically significant. We find negative effects of forestry, mining and quarrying, and construction sectors on economic growth and become statistically significant at 5% level of confidence. The significant negative effect of these sectoral FDI on growth varies from -6.499638 to -4.827188. It means that these sectors have limited linkages to local development economy as they usually utilize few domestic intermediate goods in their activities. It may also be caused by a negative effect of extractive industries, e.g. forestry and mining, on domestic economy. According to Sachs and Warner (2001), the possible factor that extractive industries have a negative effect on economy is FDI inflows could create a crowding out effect on domestic firms. This crowding out changes the local market structures of industries and increase inefficiencies due to high concentration rates of ownership. The changing in local market structures could raise rent-seeking activity and deteriorate the institutions of local economy. Furthermore, the significant FDI

inflows in such natural resources related industries may change the real exchange rate and create negative incentives for production in the tradable good sectors (Sala-i-Martin and Subramian, 2003).

Finally, column (5) presents the results of estimation that include all of the variables – excluding FDI aggregate – time fixed effect, sectoral fixed effect, and FDI-sectoral dummies interaction terms. We find that forestry, mining and quarrying, and construction sectors are no longer significant at the 5% level of confidence. Furthermore, we find a negative correlation between FDI-dummies mining and quarrying and economic growth and statistically significant at 5% level of confidence. In contrast, an interaction of FDI with retail and wholesale sector and transportation and communication yield a positive effect on economic growth and significant result at 10% and 25% level of confidence but economically small.

6. Conclusion

This study has investigated the impact of FDI on economic growth in Indonesia in different economic sectors employing FDI inflows data for the period 1997-2006. Based on the literature review, in general inward FDI has positive effects on economic growth. In this study, we found that, at aggregate level, FDI has a positive effect on economic growth. However, at sectoral level, the effects of FDI on economic growth vary across sectors by testing the twelve sectors of economy; namely, farm food crops, livestock product, forestry, fishery, mining and quarrying, non-oil and gas industry, electricity, gas and water, construction, retail and wholesale trade, hotels and restaurant, transport and communications, and other private and services sectors.

Interestingly, FDI in the electric, gas, and water and private services have a positive correlation with economic growth. However, FDI in forestry and mining sectors has a negative effect on economic growth. The results seem to support the argument that extractive FDI might not enhance economic growth. Furthermore, the expectation that manufacturing sector has a positive effect on economic growth does not arise. Therefore, these empirical evidences suggest that Indonesia should not only focus on attracting on more foreign direct investment inflows but also investigate the policies that will maximize the benefits from FDI inflows through appropriate composition of FDI inflows.

References

Akinlo, A.E., 2004, "Foreign Direct Investment and Growth in Nigeria: An Empirical Investigation," *Journal of Policy Modeling* 26, 627-639.

Alfaro, L., 2003, "Foreign Direct Investment and Growth: Does the Sector Matter?" Harvard University, Harvard Business School, Working Paper.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and S. Sayek, 2004, "FDI and Economic Growth: The Role of Local Financial Markets," *Journal of International Economics* 64(1), 89-112.

Athukorala, P., 2003. "The Impacts of Foreign Direct Investment and Economic Growth: A Case Study in Sri Lanka" Achievements and Policy Option in W.D Lakshman (eds) Dilemmas of Development, 386-421.

Agosin, M. R. and R. Mayer, 2000, "Foreign investment in developing countries: Does it crowd in domestic investment?" UNCTAD Discussion Paper 146, Geneva.

Bachtiar, I., 2003, "Development Stages and Foreign Direct Investment: An Analysis of Indonesia's Recent Experinces," Department of Economics, CSU, *Dissertation*.

Balamurali, N., and C. Bogahawatte, 2004, "Foreign Direct Investment and Economic Growth in Sri Lanka," *Sri Lankan Journal of Agricultural Economic* 6 (1), 37-50.

Balasubramanyam, V., Salisu, M. and D. Sapsford, 1996, "FDI and Growth in EP and IS Countries," *The Economic Journal* 106(434), 92-105.

Baltagi, N., 1991. *Econometric Analysis of Panel Data*, NY: John Wiley & Sons.

Barrell, R., and Pain, N., 1997, "Foreign Direct Investment, Technological Change, and Economic Growth within Europe," *The Economic Journal* 107(445), 1770-1786.

Barro, Robert, 1990, "Government Spending in a Small Model of Endogenous Growth," *Journal of Political Economy* 98, 103-25.

Barro, R., and Sala-i-Martin, X., 1995, *Economic Growth.* MIT Press, Cambridge, MA.

Bende-Nabebde, A., 2001, "FDI, Regional Economic Integration and Endogenous Growth, Some evidence from Southeast Asia," *Pacific Economic Review* 6(3), 383-399.

Bende-Nabende, A., and Ford, J.L., 2003, "FDI, Policy Adjustment and Endogenous Growth: Multiplier Effect from a Small Dynamic Model for Taiwan, 1959-1998," *World Development* 26(7), 1315-1330.

Bengoa, M., and Sanchez-Robles, 2003, "FDI, Economic Freedom, and Growth: New Evidence from Latin America," *European Journal of Political Economy* 19, 529-545.

Borensztein, E., de Gregorio, J., and J-W Lee, 1998, "How does foreign direct investment affect economic growth?" *Journal of international Economics* 45, 115-135.

Carkovic, M. and Levine, R., 2002, "Does Foreign Direct Investment Accelerate Economic Growth?" University of Minnesota, Department of Finance, Working Paper.

Central Bureau Statistics (BPS), 1986-2006, *National Income of Indonesia*, www.bps.go.id.

Charaborty, C., and Basu, P., 2002, "Foreign Direct Investment and Growth in India," *Applied Economics* 34, 1061-1073.

Choe, J.I., 2003, Do Foreign Direct Investment and Gross Domestic promote Economic Growth?" *Review of Development Economics*, 7(1), 44-57.

Choong, C.K., Yusop, Z., and Soo, S.C., 2005, "Foreign Direct Investment and Economic Growth in Malaysia: the Role of Domestic Financial Sector," *The Singapore Economic Review* 50, 245-268.

Chowdhury, A., and Mavrotas, G., 2003, "FDI and Growth: What Cause What," The WIDER Conference on Sharing Global Prosperity, Helsinki, September 6-7.

Chen, C., Chang, L. and Y. Zhang, 1995. The Role of FDI in China's Post 1978 Economic Development. *World Development* 23(4), 691-703.

Damooei, J., and Tavakoli, A., 2006, "The Effects of Foreign Direct Investment and Imports on Economic Growth: A Comparative Analysis of Thailand and The Philippines (1970-1998)," *Journal of Developing Areas* 39(2), 79-100.

De Mello, Jr., L.R., 1997, "FDI in Developing Countries and Growth: A Selective Survey," *The Journal of Development Studies* 34, 1, 1-34.

Durham, B., 2004, "Absorptive capacity and the effects of FDI and equity foreign portfolio investment on economic growth," *European Economic Review* 48, 285-306.

Findlay, R., 1978, "Relative Backwardness, Direct Foreign Investment, and the Transfer of Technology: A Simple Dynamic Model," *The Quarterly Journal of Economics* 92(1), 1-16.

Feridhanusetyawan, T., and Pangestu, M., 2004, "Indonesia in Crisis: A Macroeconomic Perspectives," CSIS Working Paper Series No. 074.

Firebough, G., 1992, "Growth Effects of Foreign and Domestic Investment," *American Journal of Sociology* 98 (I), 105-130.

Grossman, G., and Helpman, E, 1991, *Innovation and Growth in the Global Economy*. MIT Press, MA.

Helpman, E., 2004, *The Mystery of Economic Growth*. Harvard University Press, MA.

Indonesian Investment Coordinating Board (BKPM), 2006, *Fact and Figures*, www.bkpm.go.id

Kennedy, P., 1998. *A Guide to Econometrics*, The MIT Press.

Knight, Frank H., 1944, "Diminishing Returns from Investment," *Journal of Political Economy* 52 (March), 26-47.

Kohpaiboon, A., 2003, "Foreign Trade Regimes and the FDI-Growth Nexus: A case Study of Thailand," *The Journal of Development Studies* 40(2), 55-69.

Levine, R. and Renelt, D., 1992, "A Sensitivity Analysis of Cross-growth Regressions," *American Economic Review* 82(4), 942-63.

Liu, X., Burridge, P., and Sinclair, P.J.N., (2002), "Relationship between Economic Growth, Foreign Direct Investment and Trade: Evidence from China," *Applied Economics* 34, 1433-1440.

Li, X., and Liu, X., 2005, "Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship," *World Development* 33(3), 393-407.

Lumbila, K.N., 2005, "What Makes FDI work? A Panel Analysis of the Growth Effect of FDI in Africa," Africa Region Working Paper Series No. 80.

Malthus, Thomas R., 1798. *An Essay on the Principle of Population*, London, W. Pickering, 1986.

Mankiw, G., Romer, D., and N. Weil, 1992, "A Contribution to the Empirics of Economic Growth," *Quarterly Journal of Economics* 107, 407-437.

Marwah, K., and Tavakoli, A., 2004, "The Effects of Foreign Capital and Imports on Economic Growth," *Journal of Asian Economics* 15, 399-413.

Nasution, A., (1998), "The Meltdown of the Indonesian Economy in 1997-1998: Causes and Responses", *Seoul Journal of Economics*, Vol.11, No.34.

Ricardo, D., 1817. *On the Principles of Political Economy and Taxation*, Cambridge, Cambridge University Press, 1951.

Romer, P.M., 1986, "Increasing Returns and Long Run Growth," *Journal of Political Economy* 94 (5), 1002-1037.

Romer, P.M., 1990, "Endogenous Technological Change," *Journal of Political Economy* 98, S71-S102.

Reis, A., 2001, "On the Welfare Effects of Foreign Investment," *Journal of International Economics* 54, 411-427.

Sachs, J.D., and Warner, A.M., (2001), "The Curse of Natural Resources," *European Economic Review* 45, 827-38.

Sala-i-Martin, X., and Subramian, A., 2003, "Addressing the Natural Resources Curse: An Illustration from Nigeria," NBER Working Paper 9808.

Schumpeter, Joseph A., 1934. *The Theory of Economic Development*, Cambridge MA, Harvard University Press.

Smith, A., 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations*, New York, Random House, 1937.

Solow, Robert M., 1957, "Technological Change and the Aggregate Production Function," *Review of Economics and Statistics* 39 (August), 312-320.

Temple, J., 1999, "The New Growth Evidence," *Journal of Economics Literature* 37, 112-156.

Vu, T.B., 2006, "Foreign Direct Investment and Endogenous Growth in Vietnam," *Applied Economics*, fortcoming.

Vu, T.B., Gangnes, B., and Noy, I., 2006, "Is Foreign Direct Investment Good for Growth? Answer Using Sectoral Data from China and Vietnam," Unpublished.

Wooldridge, J.M., 2003. *Econometric Analysis of Cross Section and Panel Data*. MIT Press.

Young, A., 1928, "Increasing Returns and Economics Progress," *Economic Journal* 38 (December), 527-542.

Zhang, K., 2001, "How Does FDI Affect Economic Growth in China?" *Economics of Transition* 9(3), 679-693.

Appendix I
Negative Investment List

NEGATIVE LIST BASED ON PRESIDENTIAL DECREE 96/2000 jo.118/2000

ATTACHMENT I :

LIST OF BUSINESS FIELDS ABSOLUTELY CLOSED FOR INVESTMENT

AGRICULTURAL SECTOR

1. Cultivation and processing of marijuana and the like

MARINE AND FISHERY SECTOR

2. Collection/utilization of sponge

INDUSTRIAL AND TRADING SECTOR

3. Industries producing chemicals harmful to the environment, such as penta chlorophenol, Dichloro Trichloro Ethane (DDT), dieldrin, chlordane, carbon tetra chloride, Chloro Flouro Carbon (CFC), methyl bromide, methyl chloroform, halon etc.
4. Industries producing chemicals stipulated in Schedule - 1 of the Chemical Weapon Convention (sarin, soman, tabun, mustard, levisite, ricine and saxitoxin)
5. Industries producing weapons and related components
6. Industries producing cyclamate and saccharine
7. Industries producing alcoholic drinks (liquor, wine and drinks containing malt)
8. Casino and gambling facilities

COMMUNICATIONS SECTOR

9. Air traffic system providers (ATS providers), ship certification and classification inspections
10. Management and operation of Radio Frequency Spectrum and Satellite Orbit

Monitoring Stations

MINING AND ENERGY SECTOR

11. Mining of radioactive minerals

ATTACHMENT II :

LIST OF BUSINESS FIELDS CLOSED TO INVESTMENT IN WHICH A PART OF THE SHARE ARE OWNED BY FOREIGN CITIZENS AND / OR FOREIGN BUSINESS ENTITIES

FORESTRY AND PLANTATION SECTOR

1. Germ plasma cultivation
2. Concession for natural forests
3. Contractors in the field of lumbering

COMMUNICATION SECTOR

4. Taxi/bus transportation services
5. Small-scale sailing

TRADING SECTOR

6. Trading and trading supporting services, except: Large-scale retailers (malls, supermarkets, department stores, shopping centers), wholesale trading (distributors/wholesalers, exporters and importers), exhibition/convention service providers, quality certification service providers, market research service providers, warehousing services outside seaports, and after-sale services.

INFORMATION SECTOR

7. Radio and television broadcasting services providers, radio and closed circuit television broadcasting services, and multimedia and printed media.
8. Motion picture production industry (film production, film technical services, export and import film business, film distributors and motion picture theatre operation).

ATTACHMENT III:

LIST OF BUSINESS FIELDS OPEN TO INVESTMENT UNDER CONDITION OF A JOINT VENTURE BETWEEN FOREIGN AND

DOMESTIC CAPITAL

1. Building and operation of seaports
2. Electricity production, transmission and distribution
3. Shipping
4. Processing and provision of potable water for public use
5. Atomic power plants
6. Medical services, including the building and operation of hospitals, medical checkups, clinical laboratories, mental rehabilitation service, public health maintenance security, rent of medical equipment, assistance services for health aid and evacuation of patients under emergency conditions, hospital management services and services for testing, maintenance and repair of medical equipment
7. Telecommunications
8. Regular/non-regular commercial airliners.

ATTACHMENT IV

LIST OF BUSINESS FIELDS OPEN TO INVESTMENT UNDER CERTAIN CONDITIONS

MARINE AND FISHERY SECTORS

a. Cultivation of fish in fresh waters
   a. Open to foreign investments for freshwater turtles, nila gift, sidat, kodok lembu, fresh water giant shrimps and thillapya sp;
   b. In cooperation with small-scale fishery business
b. Fishing of demersal fish (big fish, grouper and other sea fish)
   - except ZEEI areas of the Malacca Strait and Arafura sea

INDUSTRIAL SECTOR

3. Industries producing wood pulp
   a. raw material obtained from imported chips or guarantee of raw material supplied from industrial timber estates (HTI)
   b. other than sulfonating and/or chlorination (C 12)
4. Industries producing pulp made of other cellulose fibres or other materials
   - other that sulfonating and chlorination (C 12)
5. Industries producing chloro alkali
   - other that those using mercury
6. Processing of finished/semi-finished goods made from mangrove wood
   - raw material coming from mangrove cultivation
7. Money printing industry

- Operational licenses from BOTASUPAL -BAKIN and approval from Bank Indonesia required

8. Special printing industries (postal stamps, duty stamps, Bank Indonesia negotiable papers, passports and stamped postal matter)
   - Operational licenses from BOTASUPAL - BAKIN required
9. Milk processing industry (powder and sweetened condensed milk)
   - processing (not only repackaging)
10. Plywood and rotary veneer industries
    - only for The Irian Jaya Province (Papua)
11. Sawn timber industries
    a. only for the Irian Jaya province (Papua)
    b. outside the Irian Jaya province (Papua), only using logs from non natural forests
12. Ethyl alcohol industries
    - Technical grade, being only used as raw materials and auxiliary materials of other industries.
13. Industries producing raw materials for explosives (ammonium nitrate)
    - Only in cooperation with business entities which have secured a recommendation from the Ministry of Defense
14. Industries producing explosives and components for industrial (commercial) use
    a. Only in cooperation with business entities which have secured a recommendation from the Ministry of Defense.
    b. Only manufacturing activities, while storage and distribution are executed by companies appointed by the government.
15. Electricity planning and supervision consulting services
    Open to foreign investments with the provision that:
    a. PLTA (Hydro power plant) with a capacity above 50 MW,
    b. PLTU (steam power plat) with a capacity above 55 MW,
    c. PLTP (geothermal power plant) with a capacity above 55 MW,
    d. Main electrical relay station with a voltage above 500 KV,
    e. Transmission networks with a voltage above 500 KV
16. Electricity equipment construction, maintenance, installation services, development of technology supporting the supply of electricity and testing of electricity installations.
    Open to foreign investments with the provision that:
    a. Main electrical relay stations with a voltage above 500 KV,
    b. Transmissions networks with a voltage above 500 KV
17. Petroleum and natural gas drilling services
    Open to foreign investments with the provisions that:
    a. only for offshore drilling,
    b. especially for locations outside the Eastern Indonesia Region, must cooperate with national partners operating in a similar business field.
18. Power plant businesses

- Open to locations outside Java, Bali and Madura

TRADING SECTOR

19. Restaurants
    - Open to foreign investments with the special provision that they must be located in tourism areas/zones and/or integrated with hotels
20. Game services
    - Open to foreign investments with the special provision that they must be located in tourism areas/zones and/or integrated with hotels.

Source: http://www.bkpm.go.id/