

# **Foreign Direct Investment and Economic Growth: Empirical Evidence from Sectoral Data in Indonesia**

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## **Abstract**

The paper investigates the impact of foreign direct investment (FDI) on economic growth using detailed sectoral data for FDI inflows to Indonesia over the period 1997-2006. In the aggregate level, FDI is observed to have a positive effect on economic growth. However, when accounting for the different average growth performance across sectors, the beneficial impact of FDI is no longer apparent. When examining different impacts across sectors, estimation results show that the composition of FDI matters for its effect on economic growth with very few sectors showing positive impact of FDI and one sector even showing a robust negative impact of FDI inflows (mining and quarrying). The sectors examined are: 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.

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

**JEL codes:** F21, F23.

## 1. Introduction

During the past two decades, foreign direct investment (FDI) has become increasingly important in the developing world, with a growing number of developing countries succeeding in attracting substantial and rising amounts of inward FDI. Economic theory has identified a number of channels through which FDI inflows may be beneficial to the host economy. Yet, the empirical literature has lagged behind and has had more trouble identifying these advantages in practice. Most prominently, a large number of applied papers have looked at the FDI-GDP growth nexus, but their results have been far from conclusive.<sup>1</sup> Notwithstanding this absence of any robust conclusions, and somewhat surprisingly, most countries continue to vigorously pursue policies aimed at encouraging more FDI inflows.<sup>2</sup>

The Government of Indonesia started liberalizing its capital account regime in 1967, when it introduced the Foreign Investment Law No. 1/1967. The government later adopted a free-floating foreign exchange system in 1970 which was followed by further liberalization of the financial sector in 1980s. Indonesia has since been largely perceived as an attractive destination for foreign investment and this relatively long exposure to investment flows makes it an ideal candidate for empirical research on their efficacy in generating economic growth. Surprisingly, and in spite of the Indonesian government's

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<sup>1</sup> With the availability of better data, the last few years have seen an especially large number of empirical papers devoted to this question (e.g., Alfaro et al., 2004; Bengoa and Sanchez-Robles, 2003; Durham, 2004; Hsiao and Shen, 2003; Li and Liu, 2005, and Lipset, 2006).

<sup>2</sup> Lipset (2006) suggests that this anomaly arises because policymakers focus on the few clear success cases such as Ireland and China, in which rapid growth is clearly linked to massive foreign investment. For a critical look at domestic tax/subsidy policies aimed at encouraging inward FDI see Hanson (2001) and Mooij and Ederveen (2003).

long-term interest in generating foreign investment inflows, very little has been done to evaluate their impact in the last 20 years.

Moreover, almost all existing studies of the FDI-growth nexus have concentrated on the aggregate growth effects of FDI in spite of the theoretical nuances and ambiguities that have been developed over the recent decades. To the best of our knowledge, only three papers have looked at the sectoral differences in the impact of FDI, and neither of these has looked at the Indonesian case – these are discussed in more detail below.

Our paper contributes insights on the FDI-growth nexus in several ways. First, in contrast with much of the literature, we employ a case study (single-country) regression-based approach that enables us to disregard variables that measure the institutional, legal and cultural environment in which FDI projects are implemented and which may have an important impact on their growth consequences. The difficulty in accounting for these institutional characteristics hinders easy identification in cross-country approaches.<sup>3</sup>

Second, to the best of our knowledge, our paper is one of the first to use data from different sectors to examine the sectoral differences in the impact of FDI on economic growth.<sup>4</sup> Exceptions are Vu *et al.* (2006) on China and Vietnam, Chakraborty and Nunnenkamp (2006) on India, and Alfaro (2003) on a cross-country panel. The last two differentiate only between the primary, secondary and tertiary sectors, while the first includes a more detailed breakdown of data by production sectors similar to the one we pursue.

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<sup>3</sup> See Mukand and Rodrik (2005) for insights into this problem that are relevant to the policy-applicability of estimation results.

<sup>4</sup> This is potentially important since much of the recent theoretical and empirical micro-econometric literature concludes that FDI spillovers, if they exist, are found in intra-industry rather than in inter-industry settings (e.g. Javorcik, 2004). For a recent survey of the issue see Lipsey and Sjöholm (2005).

Yet this paper's country focus is different, and the unique nature of the transition economies and their recent reforms might suggest that whatever conclusions reached for China and Vietnam might not be relevant for countries with a much longer history of a market economy. Thus, barring very few exceptions, and while the theoretical literature has already been investigating the sectoral determinants of FDI effectiveness for some time, our empirical focus on sectoral impact is both novel and justified by this theoretical work.

Finally, we believe that the long experience of Indonesia to a liberalized regime may be indicative of the development path that may be taken in the future by a significant number of other countries, notwithstanding their numerous cultural, institutional, geographical and other differences.

Two important questions are ultimately posed here: Did FDI lead to economic growth in Indonesia? What were the differences across sectors of the impact of FDI on the Indonesian economy? A comprehensive review of the voluminous literature on FDI and growth is beyond the scope of this study, but in the next section we highlight some general findings of both the theoretical and empirical literatures. We then provide an overview of economic growth and FDI inflows in Indonesia (section 3). The fourth section contains details about the specification of the econometric model and the origins of the data used. The fifth section provides the empirical results while concluding remarks are gathered in the last section.

## **2. Theoretical Framework**

Solow's (1957) pioneering contribution to growth theory has generated the theoretical basis for growth accounting. In this neoclassical view, we can thus decompose the contribution to output growth of the growth rates 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:

$$Y = A\Phi(K, L, \Omega) \quad (1)$$

where  $Y$ ,  $K$ ,  $L$ , and  $A$  are output, capital, labor, and the efficiency of production, respectively; and  $\Omega$  is a vector of ancillary variables. Assuming, for example, a Cobb-Douglas form, and taking the logarithms and time derivatives of equation (1) yields:

$$g_Y = g_A + \alpha g_K + \beta g_L + \gamma g_\Omega \quad (2)$$

Where  $g_Y$  is the rate of growth of  $A, K, L, \Omega$  (the subscripts are defined in per capita terms), and  $\alpha, \beta, \gamma$  are, respectively, the elasticities of output with respect to physical capital, labor and the ancillary variables.

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

Mankiw, Romer, and Weil (1992) also modified Solow's model and argued that omitting human capital accumulation in Solow's model would cause biased estimation of the coefficient on saving and population growth. They argued that cross-country

variations in income-per-capita are a function of variations in the rate of saving, the rate of population growth, and the level of labor productivity.

The endogenous growth models that began with Romer's (1986) seminal work introduced a theory of technological change into a production process. Helpman (2004) argues that endogenous growth theory emphasized two critical channels for investment to 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.

Economic models of endogenous growth have been applied to examine the effect of FDI on economic growth through the diffusion of technology (Barro, 1990; Barrell and Pain, 1997). FDI can also promote economic growth through creation of dynamic comparative advantages that leads to technological progress (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. Romer (1990) argues that FDI accelerates economic growth through strengthening human capital, the most essential factor in R&D effort; while Grossman and Helpman (1991) emphasize that an increase in competition and innovation will result in technological progress and increase productivity and, thus, promote economic growth in long run.

In contrast to all these positive conclusions, Reis (2001) formulated a model that investigates the effects of FDI on economic growth when investment returns may be repatriated. She states that after the opening up to FDI, 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 the 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 additional reasons why FDI inflows may be less profitable than domestic investment and may even be detrimental. The country may gain less from FDI inflows than domestic investment, because of multinationals are less likely to contribute to government revenue; FDI is less likely to encourage local entrepreneurship; multinationals are less likely to reinvest profits; are less likely to develop linkages with domestic firms; and are more likely to use inappropriately capital-intensive techniques. FDI may be detrimental if it “crowds out” domestic businesses and stimulates inappropriate consumption pattern.

## **2.2. Empirical Studies on FDI-Growth Nexus**

In a widely cited work, Borensztein et al. (1998) examine the effect of FDI on economic growth in cross country regression framework, using data on FDI outflows from OECD countries to sixty-nine developing countries over the period 1970-1989. They find 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, 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 framework, Bulasubramanyam et al. (1996) examined the relationship between FDI and growth in the context of differing 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 find support for Bhagwati's hypothesis that FDI will increase growth in countries which adopt export promotion policy.

Li 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, but a negative effect of FDI on economic growth via its interaction with the technology gap. Bengoa et al. (2003) estimated 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, as in most other papers, Bengoa et al. (2003) find that the benefit to the host country requires adequate human capital, political and economic stability and liberalized market environment. Moreover, the volatility of FDI and the financial adjustment necessary because of this volatility has been observed by several economists (De Gregorio and Guidotti, 1995; Alfaro et al., 2004; and Durham 2004). These generally argue that countries with well-developed financial markets can not only attract higher

volumes of FDI inflows but also allow host countries to gain more extensively from them because of their ability to adjust to the volatility of capital inflows.

In contrast with these, Carkovic and Levine (2005) utilize General Method of Moment (GMM) to observe the relationship between FDI and economic growth. They use data for 1960-1995 for a large cross-country data set, and find that FDI inflows do not exert influence on economic growth directly nor through their effect on human capital. 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 evidence of Granger causality relationship between FDI and economic growth in either direction but with stronger effects visible from economic growth to FDI rather than the opposite.<sup>5</sup>

Bende et 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. They show that the impact of FDI on economic growth is positively signed and significant for Indonesia, Malaysia, and Philippines, while they identify a negative relationship for Singapore and Thailand. Similarly, Marwah and Tavakoli (2004) test the effect of FDI on economic growth in 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.<sup>6</sup>

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<sup>5</sup> Similar negative results are found in Agosin and Mayer (2000) and Stocker (2000).

<sup>6</sup> Damooei and Tavakoli (2006) and Chowdhury and Mavrotas (2003) find conflicting results for these South East Asian countries while Choong et al. (2005) find a qualified support for their positive hypothesis for Malaysia and Kohpaiboon (2003) for Thailand. Many papers analyze the Chinese experience with FDI (e.g., Berthelemy et al., 2000; Chen et al., 1995; Shan et al., 1997; Wen, 2003; and Zhang, 2001).

Most recent, and most similar to our own work, Vu et al. (2006) study sector-specific FDI inflows for both China over the period 1985-2002 and Vietnam over the period 1990-2002. Using an augmented production function specification and regression methodology, they conclude that FDI has positive and direct impact on economic growth as well as an indirect effect through its impact on labor productivity. In a similar sectoral investigation to ours, they find that the manufacturing sector appears to gain more than other sectors from sector-specific FDI.

No studies, of which we are aware of, except Bachtiar (2003), have examined the impact of FDI in Indonesia. Using annual time series data (1970-2000) and employing a simple single equation model, he identifies a positive sign for the coefficient on FDI inflows with GDP as the dependent variable.

### **3. Foreign Direct Investment and Economic Growth in Indonesia**

As early as 1967, the Government of Indonesia (GOI) started its liberalization program by enacting its Investment Law No. 1. In subsequent years, Indonesia has experienced rapid economic growth rate with amounted to around 7.3% over the period 1970-1996. Unfortunately, the 1997-8 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.

Indonesia was hit very hard by the East Asian financial crisis with GDP contracting by 13 percent in 1998. Many sub-sectors of economy had decreased dramatically from 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 2). The worst hit sectors were construction, transport, hotels & restaurants, services, and finance (particularly hard hit by the general banking collapse).

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 increased from an average of 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 banking and finance had all seen concurrent rapid growth and development.

FDI in Indonesia has a long and unique history. It began with the Dutch Colonial era from 1870s to 1941 and was followed by the Japanese Colonial era in the period 1942-1945. After the liberation from Japanese rule, these were followed by 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.

Under the “Old Order” regime, the government paid little attention to economic development. The government was grappling with the transition from colonialism to independence and also faced many domestic political and military challenges to its

authority, with no new inward foreign direct investment. Since the “New Order” regime, the government sharply changed to a much more market oriented economic policy. The government believed FDI flows represent an essential medium of transforming Indonesia’s abundant resources to boost economic development. FDI was seen to bring the capital, technological innovations, and skills needed. This policy has largely continued in the new “Reformation” era.<sup>7</sup>

All foreign investment projects in Indonesia come under the jurisdiction of the Indonesian Coordinating Board for Investment (*Badan Koordinasi Penanaman Modal*, hereafter referred to as BKPM).<sup>8</sup> The BKPM provides: (1) a guarantee for foreign companies to freely transfer profits and repatriate their capital after a certain period; (2) a basic tax holiday for foreign investors; (3) exemption from payment of import duties and sales taxes on machinery and equipment; and (4) licenses for foreign companies to operate for a period of 30 years after their legal formation.

To provide legal protection for foreign investors the GOI has concluded Investment Guarantee Agreement (IGA) with 61 countries.<sup>9</sup> Indonesia has also signed bilaterally the Investment Promotion and Protection Agreements with 55 countries and, to avoid incidental double taxation, tax treaties with 50 countries.<sup>10</sup> In addition, the GOI has participated in and signed an agreement on the Convention on the Settlement of Investment Disputes in 1970,<sup>11</sup> and joined the Multilateral Investment Guarantee Agency (MIGA) in 1986.<sup>12</sup>

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<sup>7</sup> This sequence of policies can be found in: 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.

<sup>8</sup> Established in 1973 (Presidential Decree No. 20/1973).

<sup>9</sup> <http://www.aseansec.org/IAP/Indonesia.pdf>. Updated most recently in 2005.

<sup>10</sup> [http://www.bkpm.go.id/en/info.php?mode=baca&cat=7&t=Investment&info\\_id=16](http://www.bkpm.go.id/en/info.php?mode=baca&cat=7&t=Investment&info_id=16)

<sup>11</sup> <http://www.worldbank.org/icsid/treaties/ii-country.pdf>

<sup>12</sup> <http://www.miga.org/sitelevel2/level2.cfm?id=1152>

Some business fields are restricted to both domestic and foreign investment with eight fields that are closed only to foreign investment. Those are: Germ plasma cultivation, concession for natural resources, contractors in the field of lumbering, taxi/bus transportation, small scale sailing, trading and trading supporting services, radio and television broadcasting services providers, and motion picture production industry.<sup>13</sup>

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 trillion in 15,395 projects. Approved FDI inflows have increased during the last three decades from US\$ 38.6 billion in 1967 to US\$ 119.3 billion in 1997. This trend has decreased to US\$ 53.9 billion in 1999, but gradually increased to US\$ 318.3 billion on July 2006. Table 2 provides data on approved foreign investments 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\$ 79.5 billion and US\$ 30.3 billion or 25 percent and 9.5 percent of total, respectively.

Of the approved FDI inflows in the secondary/manufacturing sector, the chemical and pharmaceutical, paper and printing, food, and metal, machinery & electronic industries received the largest approved FDI inflows. Over this period, the largest amount of approved FDI inflows was from Asia and Europe with total value US\$ 58.2 billion and US\$ 29.7 billion with the largest amounts coming from the United Kingdom (553 projects for US\$ 18.25 billion), Japan, Singapore, and Malaysia.

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<sup>13</sup> See Presidential Decree (*Keputusan Presiden*, KP) No. 96 of 2000.

The majority of approved FDI projects were never implemented however, so that data on realized FDI flows accounts for 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 realized investment with the amounting to 62.4 percent of total value approved FDI for leather goods and footwear industry, 46.2 percent of total value approved FDI for rubber and plastic industry, 44.1 percent of total value approved FDI for motor vehicles & other transport equipment industry, 40.6 percent, and 35.8 percent of total value approved FDI inflows for transport, storage & communication, and trade & repair sectors, respectively. Table 3 presents recent trends. The 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.

Of the twelve major industry groups in the manufacturing sector, four sectors – metal, machinery and electronics, chemical and pharmaceutical, food, and motor vehicles and other transport equipment industry – have received the largest volume of foreign investment. There have also been quite large FDI inflows into paper and printing, textile, and rubber and plastic industries.

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 more than doubled 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

The starting point of our empirical estimates is the augmented Cobb-Douglas production function framework, a modified form of equation (2), with FDI incorporated as one of the factor inputs:

$$g_{Y,it} = g_A + \alpha g_{F,it} + \beta g_{D,it} + \gamma g_{L,it} + \mu_i + \varepsilon_{it} \quad (3)$$

where we now separate capital into foreign direct investment (F) and domestic investment (D). The subscripts for sector  $i$  and time  $t$  are also included.  $\mu_i$  is as a set of unobserved sectoral effects (fixed effects) and  $\varepsilon_{it}$  is a time-varying idiosyncratic shock with the standard *iid* assumption.

We use annual data for 12 sectors from 1998 to 2006. All data are compiled from the Indonesian Government's Central Bureau Statistics (*Biro Pusat Statistik*, BPS) and Investment Coordinating Board (*Badan Koordinasi Penanaman Modal*, BKPM). The GDP data is compiled from the BPS, while the data on foreign direct investment, domestic investment, and labor are obtained from the BKPM.<sup>14</sup>

Following Alfaro (2003) and Vu et al. (2006), this study looks at the direct effects of FDI inflows on economic growth in different economic sectors utilizing a fixed effect

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<sup>14</sup> The twelve sectors for which data on direct investment is available are: 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.

estimation methodology. This method allows us to control for 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.<sup>15</sup>

Table 4 presents our results regarding the effects of FDI inflows, domestic investment, and labor employment on economic growth. We start, in column (1), by including only the three independent variables without any sector (fixed) effects. We find that while the investment variables (domestic and foreign) have the expected positive coefficient, neither of them is statistically different from zero. The coefficient on the variable measuring labor is negative but also insignificant.

In Column (2) we add time fixed-effects to control for the large fluctuations the Indonesian economy experienced in recent years. The effect of correlation of FDI with economic growth remains positive and now becomes statistically significant. The dramatic increase in the explanatory power of the specification in column 2 is due to the introduction of a time effect for 1998, a year in which the economy collapsed as did FDI inflows (the overthrow of Suharto occurred in May 1998). The 1998 time dummy is the only time effect that has a statistically significant coefficient.

Column (3)-(4) add to the benchmark specifications in (1)-(2) sectoral-fixed effects. These sectoral effects thus account for the differing growth performance of the various production sectors. As can be seen from column (4) that also includes the time-fixed effects, once we account for differences across sectors the correlation of FDI with economic growth loses its statistical significance. We can thus conclude that any correlation we found before between FDI and growth was due to the different average growth rates of different production sectors rather than through any times-series

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<sup>15</sup> Data availability is the only limiting constraint on our set.

correlation with FDI inflows; i.e., more FDI flows into sectors that grow more rapidly. This result largely explains the conflicting results found in cross-country growth regressions or in case studies that only analyze the aggregate country-specific time-series data.

For the average growth trends of different sectors: we find statistically distinguishable below average growth rates for forestry, mining and quarries, and construction. FDI inflows no longer seem to have any observable positive effect on economic growth in Indonesia over the 1998-2006 period.

Finally, column (5) presents the results of estimation that include all of the variables: time fixed-effects, sectoral fixed-effects, and FDI-sectoral dummy interaction terms. Here, we would like to examine whether FDI may have different impact on economic performance for different sectors. We do find a negative and statistically significant correlation between FDI and growth performance in the mining and quarrying sector – FDI seems to adversely impact this sector. In contrast, only the interaction of FDI with growth in the construction sector seems to lead to any output growth benefits (in that sector).

The negative effect of the extractive industries is interesting, though maybe not that surprising. Sachs and Warner (2001), for example, have argued that extractive industries may have a negative effect on economy. FDI in those industries will generate more input and therefore will harm the local economy (a variant of the ‘resource curse’). The changing in local market structures as a result of the incoming investment flows could raise rent-seeking activity and deteriorate the institutions of the local economy. Additional harmful affects can come from the impact on the real exchange rate and

changed incentives for production in the tradable good sectors (Sala-i-Martin and Subramanian, 2003).

## **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. The previous literature, in general, found a positive effect of inward FDI on economic growth but with a significant number of dissenting opinions. In this study, we found that, at aggregate level, FDI does indeed appear to have a positive effect on economic growth. However, at sectoral level, the effects of FDI on economic growth vary across sectors, and no aggregate affects are observed.

Interestingly, FDI in the mining sector has a negative effect on economic growth. The results seem to support the argument that extractive FDI might not enhance economic growth. Vu et al. (2006) reached similar conclusions casting doubt on the overall general benefit of FDI inflows. However, in their research, FDI into the manufacturing sector in China and Vietnam was observed to have a large positive effect on economic growth. Data for Indonesia does not include FDI for manufacturing and we are unable to test whether this positive result also applies to the Indonesian case.

The empirical evidence presented here suggests that Indonesia should consider more carefully whether a policy of subsidizing more foreign direct investment inflows in all sectors is indeed beneficial as a means to enhance growth prospects. More research may suggest that more attention should be paid to formulate policies that will maximize the benefits from FDI inflows through its appropriate sectoral composition and by

creating the conditions for a beneficial FDI in sectors in which no such benefit appears to exist within the current institutional framework.

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Table 1. World Distribution of FDI

	FDI net inflows (% of GDP)				FDI net inflows (% of Gross Fixed Capital Formation)			
	1980- 1989	1990- 1994	1995- 1999	2000- 2004	1980- 1989	1990- 1994	1995- 1999	2000- 2004
World	0.64	0.81	1.96	2.43	2.83	3.68	9.01	15.10
East Asia	0.76	3.03	3.78	2.61	2.81	9.58	11.96	8.14
South East Asia	0.05	0.08	0.04	0.07	0.23	0.37	0.18	0.58
Indonesia	0.37	1.18	1.49	-0.68	1.53	4.38	5.50	-3.45

Data from the World Bank's World Development Indicators CD-ROM 2006. FDI net inflows: FX.KLT.DINV.CD.WD.  
GDP: NY.GDP.MKTP.CD. And gross fixed capital formation: NE.GDI.FTOT.CD.

Table 2. Growth Rate of Gross Domestic Product by Industry at Constant 2000 Prices, 1984-2005  
(year-on-year 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

Table 3. Trend of Foreign Investment 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	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	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	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	3,651.4	1,217.1	761.9	190.5	409.5	136.5	4,822.8	482.3
13	Non-Metallic Mineral	12,787.4	4,262.5	876.0	219.0	1,171.8	390.6	14,835.2	1,483.5
14	Metal, Machinery & Electronics	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.	189.5	63.2	47.8	12.0	20.9	7.0	258.2	25.8
16	Motor Vehicles & Transport Equip.	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	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, 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

Notes:

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

No	Sector	1997-1999		2000-2003		2004-2006		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	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								
6	Food Industry	12,295.3	4,098.4	10,391.0	2,597.8	8,982.1	2,994.0	31,668.4	3,166.8
7	Textile Industry	899.3	299.8	1,074.8	268.7	1,361.6	453.9	3,335.7	333.6
8	Leather Goods	367.8	122.6	727.3	181.8	613.1	204.4	1,708.2	170.8
9	Wood Industry	203.7	67.9	120.5	30.1	112.8	37.6	437.0	43.7
10	Paper and Printing	61.4	20.5	351.6	87.9	122.4	40.8	535.4	53.5
11	Chemical and Pharmaceutical	316.7	105.6	874.6	218.7	863.5	287.8	2,054.8	205.5
12	Rubber and Plastic	3,241.4	1,080.5	2,877.0	719.3	1,868.6	622.9	7,987.0	798.7
13	Non-Metallic Mineral	982.8	327.6	670.5	167.6	572.5	190.8	2,225.8	222.6
14	Metal, Machinery & Electronics	330.4	110.1	220.4	55.1	264.6	88.2	815.4	81.5
15	Medical Preci. & Optical Instru.	4,836.4	1,612.1	2,289.3	572.3	1,652.1	550.7	8,777.8	877.8
16	Motor Vehicles & Transport Equip.	57.5	19.2	21.6	5.4	16.3	5.4	95.4	9.5
17	Other Industry	881.9	294.0	961.1	240.3	1,137.6	379.2	2,980.6	298.1
III	Tertiary Sector	116.0	38.7	202.3	50.6	397.0	132.3	715.3	71.5
18	Electricity, Gas & Water								
19	Construction	4,053.8	1,351.3	10,920.3	2,730.1	7,234.9	2,411.6	22,209.0	2,220.9
20	Trade & Repair	209.8	69.9	3,231.2	807.8	173.2	57.7	3,614.2	361.4
21	Hotel & Restaurant	442.9	147.6	554.9	138.7	1,355.2	451.7	2,353.0	235.3
22	Transport, Storage & Communication	89.5	29.8	775.5	193.9	1,359.1	453.0	2,224.1	222.4
23	Real Estate, Business Activities	895.5	298.5	584.5	146.1	346.5	115.5	1,826.5	182.7
24	Other Services	1,142.0	380.7	4,503.5	1,125.9	3,073.3	1,024.4	8,718.8	871.9
	Total	231,250.5	900.7	300.2	510.9	127.7	383.8	127.9	1,795.4

## Notes:

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 4 Aggregate, Sectoral and Time Effects of FDI in Indonesia

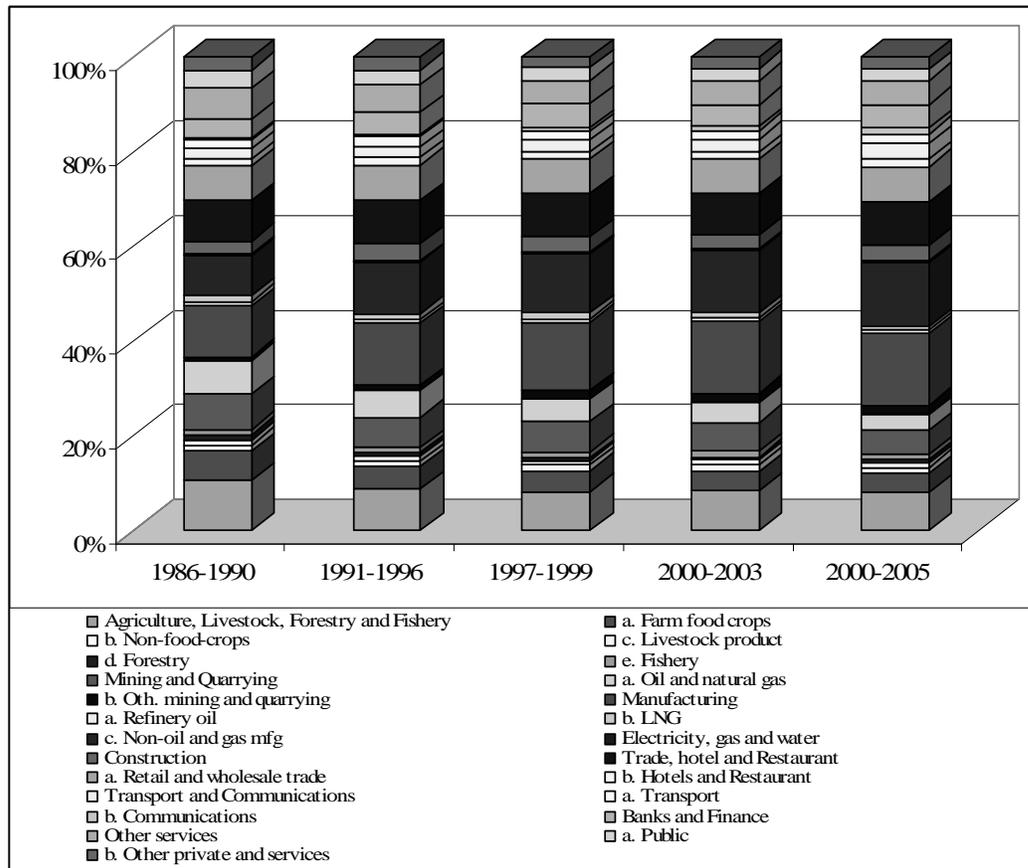
	(1)	(2)	(3)	(4)	(5)
FDI	0.0058177 (1.32)	0.0019138** (2.13)	0.0066765 (1.23)	0.0009805 (0.98)	
DOM	0.001658 (0.81)	0.0000771 (0.18)	0.0019036 (0.84)	-8.31e-06 (-0.02)	-0.0000706 (-0.16)
LAB	-0.0002284 (-1.32)	-0.0000412 (-1.16)	-0.0002358 (-0.67)	3.50e-06 (0.05)	0.0000526 (0.60)
DFFC			6.567644 (0.42)	-2.24934 (-0.79)	-1.65005 (-0.44)
DLP			3.660765 (0.27)	-2.304383 (-0.96)	-0.6640917 (-0.20)
DFtry			-0.550428 (-0.04)	-6.499638*** (-2.69)	-4.782858* (-1.74)
DFish			5.125106 (0.38)	-0.8169081 (-0.34)	-0.436855 (-0.11)
DMQ			1.026033 (0.08)	-4.827188** (-2.00)	0.4938888 (0.15)
DNOG			-2.458393 (-0.06)	-5.55117 (-0.75)	-4.865807 (-0.61)
DEGW			3.888237 (0.30)	0.9861025 (0.43)	2.709898 (0.97)
DConst			-1.027617 (-0.08)	-4.985861** (-2.13)	-6.246788** (-2.04)
DRW			3.472162 (0.25)	-3.276088 (-1.32)	-4.156869 (-1.22)
DHR			2.262471 (0.17)	-2.690811 (-1.13)	-1.567009 (-0.50)
DOPS			4.688946 (0.36)	0.1426545 (0.06)	0.8262029 (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 <sup>2</sup>	0.0254	0.9645	0.0341	0.9716	0.9754
Adj R <sup>2</sup>	-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 10%; \*\*significant at 5%;\*\*\*significant at 1%.

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.

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



Source: Annual Report BPS, 1986-2005