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GOVERNMENT EXPENDITURES ON EDUCATION, RESEARCH AND DEVELOPMENT (R&D) AND THEIR IMPACTS ON THE INDONESIAN ECONOMY

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Abstract*: This paper is aimed at descriptively discussing the impact of government expenditures on education, Research and Development (R&D) on the national economy of Indonesia. In the analysis, the method used in this research is library research with an in-depth analysis and discussion on many related policies that effect technological change and economic growth in Indonesia. The findings show that Indonesian government has introduced a number of supporting policies related to education as well as R&D to promote economic growth of the country. These policies generally have started since New Order government in the late 1960s. However, New Order government has put the strong bases to encourage trade openness and investment especially foreign investment. On the meantime, the government had also involved in free trade cooperation such as Asia Pacific Economic Cooperation (APEC) which will be applied 2020 for the developing countries and 2010 for the developed countries. Even the government has generated numbers of favourable policies to attract foreign investment and fastening economic growth, the policies in generating public R&D has been not well developed. The government budget spends for public R&D is still low (around 2 percent every year). Based on the research findings, it is recommended for the government to increase the spending on education and R&D in order to increase economic growth.*

Keywords: government policies, education, technological change, R&D, economic growth.

INTRODUCTION

Economic growth is contributed by the factor of inputs such as capital, labour and technological change. This relationship is described in the Neo-classical growth model as well as Solow growth model. Solow growth model is widely accepted economic theory especially in growth theory. Production processes in the country are the units that contribute to economic growth. The processes work based on market mechanism in the real (outputs) and nominal (prices) flows. In this case, private and government sectors work together in contributing the outputs. The involvement of government in economic growth is not only

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from their production activities, but also from the policies, which are generated. Monetary, fiscal and trade policies are such kinds of policies that affect economic growth.

Government policies and regulations work both via domestic and international processes. The policies and regulations issued by the Indonesian government affect the economic activities and so the outputs. Investment laws, taxation, subsidies, permits, patent laws, anti monopoly regulations and others are part of those policies. On the other hand, trade policy as well as fiscal and monetary policies also have an impact on technology transfer and economic growth. Technology is brought from foreign into the domestic economy via foreign investment and trade (export and import). Foreign investment transfers the technology indirectly via “knowledge spillovers”. Meanwhile, trade activities (mainly import) bring the foreign technology via capital goods or services.

The successful growth of Indonesian economy has been facilitated well by the government policies and regulations. The role of government sector is bigger in the Indonesian economy. Government policies are due to not only one period policy but also the policies over time where in the Indonesian case over the government regimes since Old Order government up to Reformation government led by the former President Susilo Bambang Yudoyono in the current years. Nevertheless, the global economy also has its role in affecting Indonesian economic growth. This can be seen during the economic crisis in 1998 and afterward where *the contagion* effects troubled the Indonesian economy. However, we cannot totally blame the global economy as the initial factor of the economic crisis. The weakness in domestic economic structure in Indonesia was the other factors, which worsened the Indonesian economy during economic crisis.

The discussion of this paper will be focused on the Indonesian government policies including fiscal, monetary and trade together with government regulations toward facilitating technological and economic growth. The policies and regulations discussed started from the Old Order government up to the Reformation government.

LITERATURE REVIEW

In this part, the paper will discuss the government policies and regulations related either directly or indirectly to economic growth in Indonesia. The discussion also includes the impact of the policies on the economy. In discussing the economic growth, labour and capital variables are the main parts of the analysis. However, investment is an integrated part of capital (specifically, physical capital). Thus, in this part we can see a number of government policies and regulations that affect economic growth.

Successful economic growth in Indonesia over decades has been the results of economic policies during the past. Referring to the periods before the second economic crisis in 1998, Indonesia has shown a very amazing growth rate. Generally, there were two different policies between different government regimes in Indonesia before economic crisis. First, at the initial stage of independence, Indonesia had run by Old Order government led by President Sukarno. Political failures following by worse economic conditions caused Old Order government to step down in the mid 1960s. Then New Order government entered to the second stage of Indonesian government. A number of sound economic policies in the

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country have affected economic growth and development not only in the respective periods, but also until now. The successful sides of that regime such as they had put strong fundaments for the development of industrialization and strengthen agriculture development. The regime had also introduced open economic policies that were favourable to foreign investment and trade. Indeed, during New Order government, Indonesia had entered to Asia Pacific Economic Corporation (APEC) as part of free trade agreement. Nevertheless, some failures of New Order regime has been the heritages until current conditions, those are corruption, collusion and nepotism. Moreover, weak private sectors have been the products of the collusion.

Tambunan (2003) analyzed the different aspects of Old and New Order governments, those are:

- **Sukarno Era (1949-1966).** In this era, the Indonesian economy had been characterized by "inward looking" economic policies including the policies against foreign direct investment (FDI), specifically from western countries. This "close door" policy had accompanied by political chaos at that time that result in the fall down of the regime.
- **Soeharto Era (1968-1997).** Since the initial years of this government (beginning of 1970s), a series of donor-supported economic reform programs have been implemented which caused foreign direct investment (FDI) started to come to Indonesia. Moreover, the government had also gave more attentions on achieving economic stability and reconstruction where at the meantime put more strengthen on agriculture development.

RESEARCH METHOD

In analysis of this research, the data used is the data on R&D, education and economic growth from Old Order Era (1949) to Reformation Era (2006). The data is from the Indonesian Statistic Board (BPS), Indonesian Investment Coordination Board (BKPM), and other related institutions. The method used in the analysis is library research method with deep analysis and discussion on broad range of policies in education, R&D, and economic growth.

FINDINGS AND ANALYSIS

First, we will look at the investment environment in Indonesia overtime. Indonesian Investment Coordination Board (BKPM) (2005) stated that Indonesia offers several competitive advantages to the investors. Those advantages are:

- A vast, fertile country endowed with rich and diversified natural resources including agriculture, plantations, fisheries, and mining (oil and gas).
- A strategic location has become vital international sea transportation routes.
- A stable democratic country.
- An open market-oriented economy with flexible exchange rate system.

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Furthermore, BKPM (2005) also reported many aspects of investment environment in supporting foreign and domestic investment in Indonesia. Those aspects are:

1) **Legal aspect.** The key legal aspects that will be considered by the investors are:
    a. *Foreign Capital Investment Law No. 1 of 1967.* Foreign direct investment (FDI) referred to *Penanaman Modal Asing* (PMA) with the definition as a status of doing business and governed primarily by that investment law. So far, PMA companies are also automatically granted a period of 30 years for their operation. In addition, this period can be extended for another 30 years. According to this law, Indonesian government has been introducing a number of positive policies and measures in attracting FDI.
    b. *Domestic Capital Investment Law No.6 of 1968.* Domestic capital investment referred to *Penanaman Modal Dalam Negeri (*PMDN) with the definition as classification for doing the business for entirely domestically owned company between domestic companies or Indonesian individuals.
    c. *Corporate Law No. 1 of 1995.* In Indonesian case, the most common legal entity in doing business is an Incorporated Company or called *Perseroan Terbatas* (PT) for either foreign direct investments or domestic direct investments.
    d. *Tax Law No. 16, 17, 18, 19 and 20 of 2000.* The latest tax laws provide both domestic and foreign investors with certain tax allowances and procedures in doing the business in Indonesia.
    e. *Government Regulation No. 20 of 1994 on Share Ownership.* A PMA company is established as a joint venture between Indonesian and foreign partners. This partnership might involve legal entities such as corporations or individual persons. However, a PMA company might also be established as one hundred percent foreign owned entity. In doing so, there is a requirement that no later than 15 years after starting the operation, the company has to divest some of its shares to Indonesian individuals or business entity either directly via direct placement or indirectly via domestic stock exchange.
    f. *Law No.37 of 2000 on Free Trade Area and Free Port in Sabang.* This rule is generated so that import duty, value added tax, sales tax on luxurious goods and duty are not applicable in area of Sabang (an island in Aceh).
2) **Taxation.** Despite of legal aspects, taxation also affects the investment climate. The tax rules are arranged as follows.
    a. *Income Tax.* The income tax in Indonesia is progressive that applied to both individuals and enterprise. However, a self-assessment method is used in tax calculations.
    b. *Losses.* Indonesian government provides a loss carried forward facility for a period of five years.
    c. *Depreciation and Amortization Rates.* Depreciation cost of assets in Indonesia is deductible from the income before tax. In this case, investors can choose

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either the straight-line method for the period less than 20 years or the fast declining balance method.

d. *Value Added Tax and Sales tax on Luxury Goods.* Normally, the value added tax of 10 percent is imposed to imports, manufactured goods and most services. Furthermore, there is also sales tax on luxury goods from 10 to 75 percent depend on the article. Zero percent tax can be found on the export of Taxable goods.
e. *Withholding Tax.* This tax is an alternative method of paying tax beside of the self-assessment method. The tax rate may be vary depend on whether it is paid to a resident or non-resident.
f. *Stamp Duty.*[i] Stamp duty is normally created either 3000 or 6000 rupiah for specific legal documents.
g. *Land and Building Tax.* This tax can be paid annually for the land, buildings, and permanent structures. The effective rates are normally not more than one tenth of one percent per annum.

3) **Incentives.** Despite of taxation, Indonesian government also gives many incentives for the domestic or international investors. The incentives are as follows:
   a. *Import Duties.* The government grants PMA and PMDN projects that are approved by BKPM many facilities such as relief from import duty so that the final tariff becomes five percent.
   b. *Export Manufacturing.* There are also a number of incentives offered to exporting manufacture products.
   c. *Bonded Zones.* Industrial companies that are operated and locate in the bonded area are also provided with some incentives such as exemption from import duty, value added, and sales taxes.
   d. *Integrated Economic Development Zones (KAPETs), Certain Regions and Pioneer Industries.* The government has set up several integrated economic development zones in promoting development in some areas such as eastern part of Indonesia.

The investment policies run by the government has affected the Indonesian economy. For instance, Foreign Capital Investment Law No.1 in year 1967 was the effort of the government at that time to attract more Investment to Indonesia. Initially, the government granted 30 years ownership for foreign company. So far, the government also released tax rule and incentives to the investors. In terms of incentives discussed above, export on manufacturing product has favourable incentive from the government. This has been one way to promote export. However, those kinds of government policies have affected Indonesian economy. After releasing the Law No. 1, for instance, economic growth in 1968 was 5% per year. That was a good transition from lower growth to higher growth before the investment law released. Economic growth has been even higher for the years after 1968 with the rate more than 7% per year.

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Trade Policies

Soesastro and Basri (2005) found that the weakened of oil prices in the early 1980s caused the reduction in Indonesia's export earnings. By this condition, the government budget was affected as well. This was reasonable because Indonesia relied heavily on oil and gas export revenue in complementing national budget. Oil and gas earning was the dominant income for Indonesian government that time. In terms of trade, the sharp declining in oil prices during that time severely affected Indonesia's balance of payments especially on reducing the surplus. In responding to this problem, according to Soesastro and Basri (2005), the government introduced some adjustment programs. Those programs were aimed to increase economic efficiency and to restore the trade balance. The programs introduced such as altering Indonesian trade regime to be more open and outward looking and giving high priority for developing non-oil and gas exports. It was very reasonable policy as the solution for oil prices problem. Thus, from the period of 1983 until 1995 (period before economic crisis) Indonesian government has introduced around 24 packages of economic reforms especially in trade and investment. Indeed, the government has also changed the investment policy on the efforts to promote investment in Indonesia. These efforts of course have been successful in increasing export and supporting economic growth. Export exceeded import (which mean trade surplus) during the period of 1982-1985 and after. In addition, in the period of 1982-1985 there was also a movement in the export orientation from oil and gas to non-oil and gas.

Economic reform programs run by Indonesian government had been also induced by International Monetary Fund (IMF). In this case, Indonesia signed the agreement on trade reform as the part of financial aid commitments. On the structural adjustment program according to Soesastro and Basri (2005) Indonesia had to reduce gradually import tariff on numbers of products such as chemical, iron, steel, and fisheries to become 5-10%. Domestic trade in agriculture products were also deregulated according to structural adjustment program released at the beginning of 1998.

Employment Policies and Regulations

Labour is another factor in fostering economic growth. In Indonesian case, Department of Manpower and Transmigration is the main government agency that regulates employment (labour) issue. This department covers labour problems and transmigration of the people over the islands. In case of transmigration, the government transfers the people from populated Java Island to other islands such as Sumatera, Kalimantan, Sulawesi, and West Papua. This program initially started in New Order government led by President Soeharto and continues up to now. Related to the labour issue, Department of Manpower and Transmigration has the main responsibilities in reviewing the condition of employment, maintaining the harmony between employers and labour unions, and oversees the development of work force training and work safety programs.

According to BKPM (2005), there were at least four areas of policies and regulations done by the government related to the labour issue. Those were labour contract, working conditions, labour unions, and institutions for Human Resources Development (HRD).

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1) **Labour contract.** In Indonesian practice, labour unions and employers are free to negotiate on voluntary basis and enter into collective agreements on wages and employment conditions. Those agreements have to be approved by the government and only valid maximum for three years. The engagement of employees is possible based on three months trial period. In case of unsatisfactory during the period, employees may be dismissed.
2) **Working conditions.** There are six regulations related to working conditions, those are:
    a. *Fringe benefits.* This includes the payment of income tax, annual bonus, loans, medical expenses, travel allowances, and labour insurance.
    b. *Home leave and holidays.* According to the regulations, an employer is required to allow their workers to give annual leave of at least two weeks, sick leave for a period up to twelve months and maternity leave of three months.
    c. *Working hours.* Based on the government regulation, the basic weekly working hours is not more than 40 hours where it is normally eight hours per day.
    d. *Overtime.* The labour also has the right to get overtime payment based on government standard.
    e. *Social Security.*[ii] Nowadays, Indonesian government introduced Workers' Social Security (JAMSOSTEK) for the social security. It is recorded that in year 2003, the total member of JAMSOSTEK skim were 102,821 companies with 20,612,772 employers. The member of that social security has increased around 3.7 percent per year with the increase in employers around 4.3 percent per year.
3) **Labour Union.** Workers in every company are allowed to establish a labour union. In addition, labour strikes are not prohibited in Indonesian regulations.
4) **Institution for Human Resources Development.** This institution is such as Vocational Training Centres (VTCs) that available in most provinces in Indonesia. Generally, the government supports on human resources development can be also found in terms of education and research that mainly provided via state universities, research centre, and government institutions.

In additions to employment policies, one of the policies that also affect Indonesian employment is minimum wage policy that has been first released in 1970s. The government put more strengthens on minimum wage policy mainly in the early 2000 with higher level. This level has been varied over the regions. Local government has the power to make regulation on minimum wage especially after the implementation of the autonomy (decentralization) since the beginning of 2001. Previously, the minimum wage level had been set by Ministry of Manpower with regard to local governor recommendation. Wages as price measure of labour affect the number of labour demanded. With higher minimum wage setting, the labour demanded will be further affected. Nevertheless, the effects will depend on the labour elasticity. Suryahadi et al. (2001) found that the elasticity of total employment to

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the minimum wage was -0.112 for the period of study (1988-1999) with panel data for 26 provinces in Indonesia. It implies that every 10 percent increase in real minimum wages will result in 1.1 percent reduction in total employment. This finding shows quite inelastic labour supply with regard to wage level. The policies aimed to increase wage level do not have much impacts on labour supply. Moreover, the natural increase in labour significantly affects the availability of labour in the market.

We can see that the increase in wage level has not affected labour supply. Labour supply shows continuous increasing trend as the result of increasing population and increasing number in new labour force. There was also the evidence of increasing in unemployment rate from 1.0 million people in 1976 to 10.2 million people in 2004. Unemployment rate increased significantly in 1990 that was caused by the imbalances between the increase in labour force and job opportunities. Unemployment has been the important issue in Indonesian economic development.

Education and R&D Supporting Policies

Research and development (R&D) is one of the factors that affect economic growth beside technical change. R&D can be generated by government and private sector. It is commonly known that developed countries have bigger R&D in private sector. Nevertheless, R&D produced by the government is also not small. However, in Indonesian case, private sector does not much generate R&D; meanwhile government sector also does the same thing. In private sector, industrialization depends on imported capital and technology. This condition does not provide much incentive for the local firms to do the innovation process and generate R&D. On the other hand, the growth in public R&D mainly in the period of 1969-1994 was limited by the government budget. Government provides small amount of expenditures in generating public R&D. The smaller budget has been not only for public R&D, but also for education sector. The education budget is less than 20% of national output. It is very different compared to Malaysia and Singapore as the neighbouring countries. Furthermore, public research institutions also do not support well the technological innovation in Indonesia. Mostly, the universities have research centre inside, but the research activities are less developed compared to the teaching and learning activities.

Based on the data from Indonesian Statistic Board, public R&D expenditure for Indonesia generally is lower than 3 percent of total development expenditure, except for the year 1988 with the portion 5.89 of total development expenditure. The monetary amount of public R&D expenditure started with 121.91 billion rupiah in 1983, and then has continued to increase every year. In the year of 2003, the amount of public R&D expenditure was 1,112 billion rupiah, but the number had decreased again in the year after it.

However, Indonesian education expenditure ranged from 9 to 22 percent of total development expenditure. In the year 1983, the amount of education expenditure was 1,032.2 billion rupiah (10.43 percent of total development expenditure). The percentage of education expenditure over total development expenditure has varied narrowly between the periods of 1983-2000. After the year of 2001, education expenditure as percentage of total development expenditure has been more than 20 percent (see Table 1).

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Table 1. Indonesian R&D, Education, and Development Expenditure (1983-2004)

Year	R&D Expenditure (billion rupiah)	R&D Expenditure as Percentage of Development Expenditure	Education Expenditure (billion rupiah)	Education Expenditure as Percentage of Development Expenditure	Total Development Expenditure (billion rupiah)
1983	121.91	1.23	1,032.20	10.43	9,899.20
1984	190.00	1.91	1,202.00	12.08	9,952.00
1985	274.00	2.52	1,413.00	13.00	10,873.00
1986	181.00	2.17	1,185.00	14.22	8,332.00
1987	178.00	1.88	1,181.00	12.46	9,477.00
1988	721.00	5.89	1,606.00	13.11	12,251.00
1989	333.00	2.41	1,507.00	10.89	13,834.00
1990	333.00	2.05	2,065.00	12.73	16,225.00
1991	502.00	2.51	2,502.90	12.52	19,997.70
1992	567.00	2.47	3,002.00	13.10	22,912.00
1993	661.00	2.41	3,061.00	11.18	27,389.00
1994	530.00	1.93	3,061.00	11.17	27,398.00
1995	711.00	2.31	3,359.00	10.91	30,784.00
1996	806.00	2.34	3,970.00	11.51	34,502.00
1997	882.00	2.27	4,677.00	12.01	38,928.00
1998	1,144.00	1.23	8,368.00	9.03	92,683.00
1999	900.00	1.09	8,381.00	10.17	82,448.00
2000	648.30	1.56	5,396.80	12.97	41,605.70
2001	651.50	1.48	9,700.70	22.05	43,987.40
2002	713.00	1.36	11,307.00	21.62	52,290.00
2003	1,112.00	1.71	15,058.00	23.12	65,130.00
2004	983.00	1.39	15,339.00	21.64	70,871.00

Source: Indonesian Statistic Board (compiled from various years).

From Table 1, we can see that the government fiscal policy in terms of their budget has been conducive to the education development in Indonesia, but not so conducive to public R&D generating. There has been no significant increase in public R&D spending. Meanwhile, the increasing in education expenditure has been resulted from the society pressure in the efforts to get a better education. The society pressure becomes greater in the reformation era (the years after 1998). There is a public request that the government spends more on education in order to generate better human capital in Indonesia.

Analysis of Government Policies on Education and R&D and their Impacts on the Indonesian Economy

Previously, we have discussed a number of government policies and regulations in Indonesian economy. Those policies affect the investment climate, employment, and economic growth. In this part, we will analyze the effects of government policies on technical change and economic growth.

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Related to investment and trade policies released by the government, we can see many impacts on Indonesian economy. The issuing of Foreign Capital Investment Law No. 1 in 1967 had affected to a 5% economic growth in 1968. This was a transition period form Old Order to New Order government. New Order government had proved a good open policy at their initial stage. Economic growth was even higher in the period of 1969 to 1973 with rate 7% per year. Among other things, in the same period manufacturing sector had grown by 9.2% per year where the rate became higher (11.6%) in the period of 1984-1993 and after. That was the impact of investment policies on "incentives" as discussed previously. Incentives on export manufacturing and import duty relief to the rate 5% have fostering the growth of manufacturing sector Indonesia. Moreover, the policies have supported the structural transformation for Indonesian economy. In addition, trade and investment policies also caused manufacturing product export has continued to increase from 2.598 million US$ in 1981 to 48.677 million US$ in 2004.

Furthermore, trade and policies run by the government in the efforts to promote non-oil and gas export has been successful. By introducing 24 packages of economic reforms especially on trade and investment in 1983-1995, the economy has change from relying on oil and gas to non-oil and gas export in the period of 1982-1985 and after. The economic reforms also have been successful in maintaining higher economic growth (6% per year) in the period of 1984-1993. Economic growth was even higher (7.1%) in the period of 1994-1997.

Discussing further on investment policies especially the policies relate to investment laws and other facilities, we can find their impacts on foreign direct investment (FDI). The amount of FDI inflow had increased slowly up to1989 where in the period of 1991-1996 the rate of increase had become relatively higher. Starting from Indonesian economic crisis in 1997, until year 2000 FDI inflow had fallen sharply even became negative in some respective years. The economic recovery has pushed up FDI inflow in the years after 2000. As it was mentioned in earlier, the movement of FDI inflow in Indonesia is fluctuated. It has been caused not only by domestic government policies, but also from international economic conditions. Moreover, the political conditions in Indonesia also affect the amount of FDI inflow.

We could analyze also the impact of employment and education policies. They can be put together because of interconnection between education and employment. In Indonesia, majority of labour has primary education background. It is only small portion of labour that has university level of education. If we relate that reality to the government policies, we find a positive correlation between education budget and the level of education. In the past, Indonesian government had spent fewer portions of the budget for education. However, since 2000 to 2004, there was a significant increase in the education expenditure as the percentage of development expenditures. The increase was from 12.97 to 21.64%.

Based on the impact of government policies on Indonesian economic growth, the researcher has some policy recommendations. First, the government policies on investment and trade have been on the right track. However, the policies should be continued and strengthen in the efforts to develop manufacturing sector at the same time also develop agriculture sector. As it was discussed previously, manufacturing has mostly technological

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progress since 1992 (except for the economic crisis years). On the other hand, it is found that manufacturing has been less efficient with score less than one. Thus, the policies also should consider the efforts to increase efficiency in manufacturing sectors together with maintaining the efficient level of other sectors. Second, as it was found that FDI inflow has fluctuated more, there should be better investment and trade policies. The policies should be also aimed on liberalize the investment regulations. The restriction on foreign owned firms for 30 years, for instance, should be reformed. Finally, government also should spend more budgets on education and research and development (R&D) in the efforts to increase education level of the people as well as labour force. With this policy, Indonesia will have more educated labour (skill labour) in future. This will also benefit the labour in terms of higher wage.

CONCLUSION

Based on the earlier discussion, it can be concluded that the Indonesian government has introduced a number of supporting educational and R&D related policies to promote economic growth. These policies generally have started since New Order government in the late 1960s. However, New Order Government has put the strong bases to encourage trade openness and investment especially foreign investment. On the meantime, the government had also involved in free trade cooperation such as Asia Pacific Economic Cooperation (APEC), which, will be, applied 2020 for the developing countries and 2010 for the developed countries. This cooperation so far has been followed by tariff reduction and protection removing in some products. Fiscal policy has been encouraged favourable for trade openness. Domestically, there are also tax holiday and other kinds of incentives for the investors. Furthermore, the Reformation governments after 1998 have also continued the past policies in attracting foreign investment and fastening economic growth. In terms of fastening economic growth, the policies are both domestic and foreign policies.

Even the government has generated numbers of favourable policies to attract foreign investment and fastening economic growth, the policies in generating public R&D has been not well developed. The government budget spends for public R&D is still low (around 2 percent every year). Nevertheless, the budget for education sector has increased specifically after year 2000. With the new government led by the former President Susilo Bambang Yudoyono, the commitment to develop education sector has been continued. Better education development will produce better human capital in Indonesia, which in the long run will support well economic growth. A better quality of human capital also could well filter the technology transfer from foreign countries.

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[i] Stamp duty is part of non-tax revenue for the Indonesian government. However it's part of fiscal policy.

[ii] In this case, social security covers three aspects: retirement benefits, health insurance, and unemployment benefits. The social security is only applied for the employment case. It is not the benefits for the non-labor force.