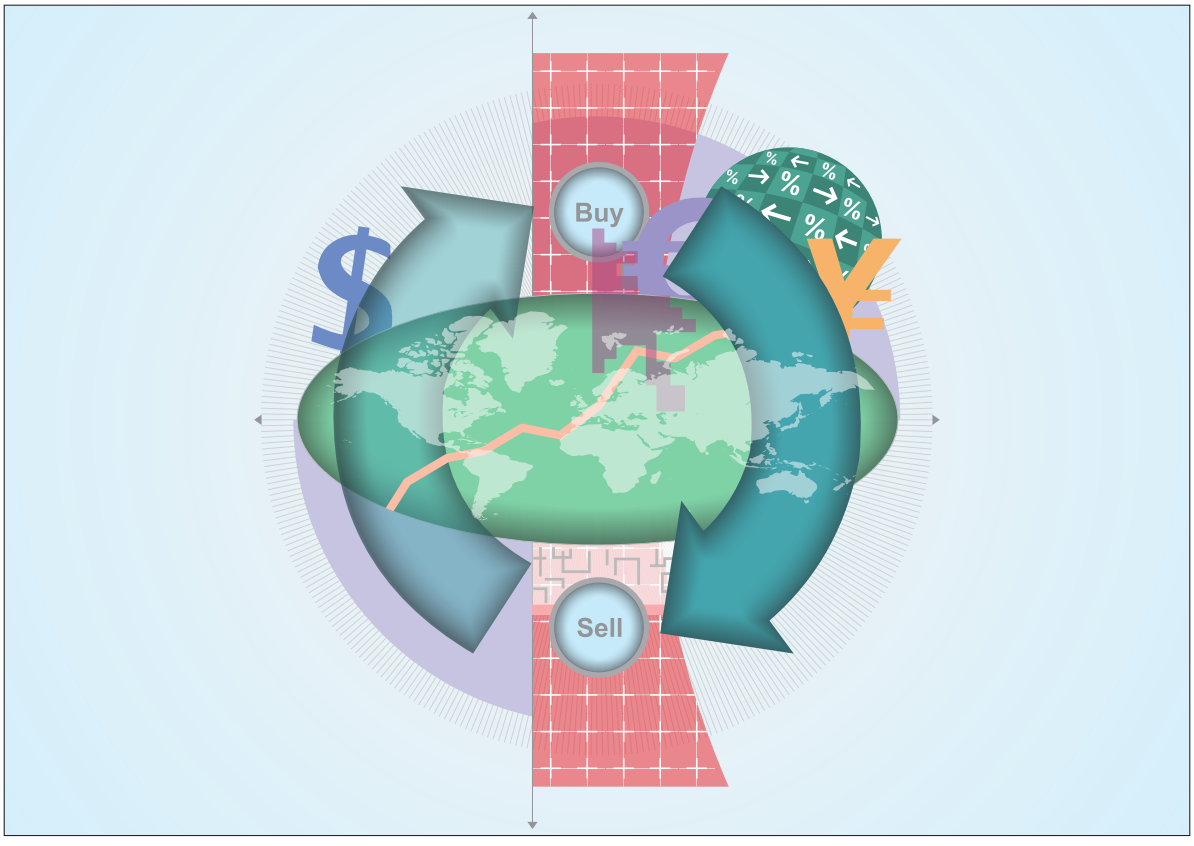

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Capital Inflows and Investment in Developing Countries: The Case of Indonesia

Yuniarto Hadiwibowo
Graduate School for International Development and Cooperation,
Hiroshima University, 1-5-1 Kagamiyama, Higashi-Hiroshima, 739-8529, Japan

Abstract: This study reviews the capital flows and investment in an open economy with the highest degree of capital account openness, managed exchange rate regime and high economic growth. We employ generalized error correction model to estimate the short-run and long-run relationships. The free capital mobility could be confirmed from the close relationship between domestic and benchmark interest rate. Interestingly, we find that investment moved one to one with saving. In this sense, the amount of capital inflows was not correlated with domestic investment. Net factor income from abroad offset capital inflows. Therefore, simplistic policy to attract capital inflows may not always be the optimal solutions for developing countries. The net resource flows should be taken into account. Not only interest payment for foreign debt, income payment for direct investment might also cause a high burden on the economy. Developing countries should design policies to improve domestic productivity.

Key words: Saving, interest, capital account, integration, resource, ECM

INTRODUCTION

Because of the limited amount of capital accumulation from domestic saving, developing countries rely on the foreign source of financing. Mody and Murshid (2005) explained the importance of financial integration and domestic policy to optimize the benefit of capital inflows in the form of foreign direct investment on the domestic investment. The potential benefit of capital inflows is indisputable, especially in the case of limited domestic capital accumulation. Countries that successfully attract foreign direct investment perform better than countries that deter foreign direct investment (Baharumshah and Thanoon, 2006). Therefore, the common policy recommendation is to attract capital inflows to augment capital accumulation for economic growth.

On the other hand, Calvo *et al*. (1996) point out several risk of the financial integration for developing countries, including volatility of commodity price and world interest rates. Because of its size, the small open economy may have limited influence on the international factors such as international interest rate and capital flows. Therefore, these factors may not be directly controllable by the domestic policies. The slow down or sudden stop of capital inflows may cause financial and balance of payment crisis (Calvo, 1998). Furthermore, Bosworth and Collins (1999) argue that capital inflows may not be fully employed for investment. Some portion might be used for current consumption. In addition, capital inflows may not be fully transformed into resource flows because some parts might be offset by capital outflows, reserve accumulation, or errors and omissions.

Furthermore, capital inflows may affect developing countries in a different way from developed country. Capital inflows can be used to finance current account deficits in

developed countries, but may cause current account imbalance in developing countries (Yan, 2007). The incorrect structure of the capital inflows may create detrimental effect for economic growth and financial stability (Van Zyl, 2002). Instead of raising investment, substantial increase of external debt might have negative effects on investment (Javed and Sahinoz, 2005).

This study contributes to the analysis of capital flows from the perspective of developing countries. Literatures on the impact of capital flows on the economy differ in their methodology and approach. However, the ultimate goal is identical, i.e., to achieve high economic growth. One strand of literature estimates economic growth directly from capital flows data (Gruben and McLeod, 1998; Baharumshah and Thanoon, 2006). Other strand estimates the impact indirectly through investment because investment would induce capital accumulation needed to accelerate economic growth (Bosworth and Collins, 1999; Mileva, 2008). The last strand relates the capital flows with current accounts and financial integration (Blanchard and Giavazzi, 2002).

Similar with this last strand of literature, this study assesses the impact of capital flows through saving and investment relationship by reviewing the contribution of capital accumulation on economic growth, confirming the capital market openness and estimating the relationship between saving and investment. We analyzed the period of 1984-1995 in Indonesian economy as a representative of developing countries because of the typical characteristics of a developing country with open capital account. Several common characteristics are large capital inflows, managed exchange rate regime, large investment and high economic growth. Other reasons to focus on this period are the interest rate liberalization in the mid 1983 and the fact that capital account openness in Indonesia was at the highest level during this period.

MATERIALS AND METHODS

Economic Growth and Investment

First, we review the importance of investment or capital accumulation for economic growth. The average GDP growth during the period 1984-1995 was 6.4%. Collins and Bosworth (1996) assert that from 3.7% average growth of output per worker over the period 1984-1994 in Indonesia, physical capital accumulation contribution was 2.3%, while human capital and total factor productivity contributed for 0.5 and 0.9%, respectively. At this period, the capital account openness in Indonesia was at the highest level according to KAOPEN index of Chinn and Ito (2008). Ito (2000) assesses that capital flows to Asia before Asian crisis contributed to high economic growth which in turn attracted more capital flows into that region. Indonesia was one of the country receiving large capital inflows during this period.

Before this period, Indonesian economy relied on the abundance of the commodity and high international price of oil and gas. With declining oil price, the contribution of crude petroleum and its products to exports was decreasing (Fig. 1). Crude petroleum and its products comprised more than 60% of Indonesian export before 1984, but decreasing until it only had less than 20% share of the total export in the 1990s. High economic growth until early 1980 was mostly attributed to the oil revenue. Therefore, we exclude the period of high oil price to emphasis the role of the capital inflows on investment and economic growth.

To maintain export competitiveness and exchange rate stability, managed exchange rate regime was adopted. The domestic currency was stabilized based on US dollar. The development of nominal and real exchange rate is presented in Fig. 2. Nominal exchange rate

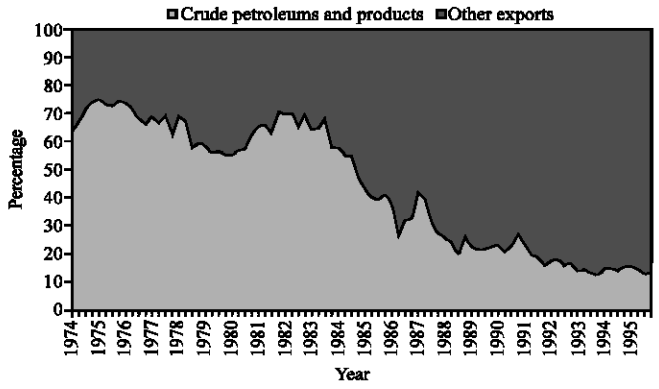

Fig. 1: Export composition. Source: Author's calculation

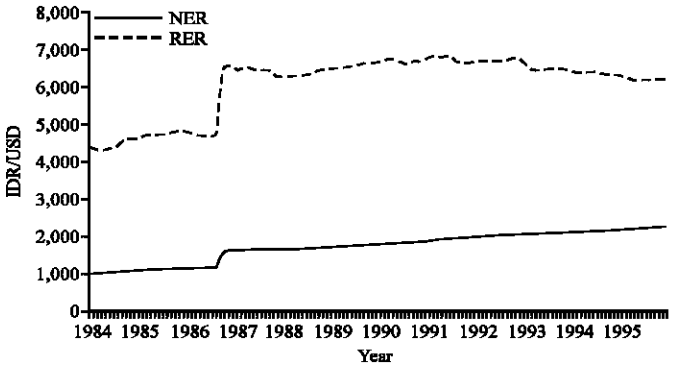

Fig. 2: Nominal and real exchange rate. Source: Author's calculation

was stable and gradually depreciated over the period of analysis, with a sudden depreciation in 1986. It is apparent that exchange rate was managed to maintain purchasing power parity and to sustain export competitiveness.

Figure 3 shows three items of the balance of payment. We can see that capital inflows were always positive with the average value of 3.7% of GDP. At the same time, current accounts were always negative. Another typical characteristic of the developing countries is the negative net factor income from abroad. Because foreign assets in domestic economy are larger than domestic assets abroad, developing countries usually have to pay for the factor income.

Data Source and Empirical Framework

The data are mainly from the International Financial Statistics (IFS) 2009 CD-ROM of the International Monetary Fund (IMF). Quarterly GDP data for the period 1984-1989 are taken from Statistic Indonesia because quarterly GDP data from IFS start from 1990. Interest rates are also from IMF, except for domestic interest rate of several months in 1984 and 1986 which are taken from Bank Indonesia. Figures for these months are missing in IFS. We use money market rate to represent domestic interest rate and U.S. LIBOR dollar rate as the benchmark rate. Estimations on interest rates are conducted on a monthly basis, while estimations on saving and investment are on a quarterly basis.

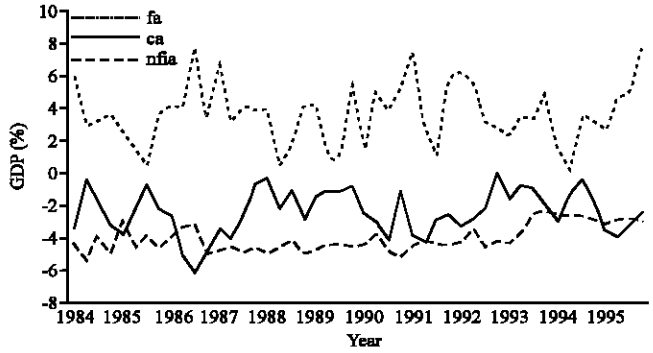

Fig. 3: Balance of payment analysis. Source: Author's calculation

The period of analysis is 1984-1995. The analysis is conducted in two main parts. The first part reviews the capital flows in the context of free capital mobility. We employ Mundell-Fleming framework (Fleming, 1962; Mundell, 1963) to get evidence of the capital account openness. The second part elaborates the relationship between saving and investment. We estimate the saving-investment relationship using Feldstein and Horioka (1980) framework.

In the Mundell-Fleming framework (Fleming, 1962; Mundell, 1963), if the exchange rate is fixed (or managed), free capital mobility implies zero monetary policy independence. To assess the monetary independence, we estimate the relationship between domestic and benchmark interest rate. In addition to OLS estimation on the level and first differences of the variables, we also employ the generalized error correction model (Davidson and MacKinnon, 1993). This dynamic approach is suggested by Obstfeld *et al.* (2005) and Shambaugh (2004). The specifications of the model are as follows:

$$\Delta rd_t = \alpha + \beta \cdot \Delta rb_t + u_t \quad (1)$$

$$rd_t = \alpha + \beta \cdot rb_t + u_t \quad (2)$$

$$\Delta rd_t = \alpha + \beta \cdot \Delta rb_t + \theta \cdot (rd_{t-1} - \gamma \cdot rb_{t-1}) + u_t \quad (3)$$

where, rd is domestic interest rate and rb is benchmark interest rate.

The short-run relation can be seen from β in Eq. 1 and 3, while the long-run relation from β in Eq. 2 and γ in Eq. 3. The coefficient θ represents the speed of adjustment toward the long-run equilibrium. With apparent control on exchange rate during the period of analysis (Fig. 1), we may use monetary independence as evidence of free capital mobility. The null hypothesis of the free capital mobility condition or zero monetary independence is $\beta = 1$ or $\gamma = 1$.

In the saving and investment analysis, we define gross domestic product (GDP) as the sum of goods produced domestically together with imports (M) produced abroad, are consumed by private sector (C) and government (G), used as investment (I), or sent as exports (X).

$$GDP + M = C + I + G + X \quad (4)$$

Domestic saving is GDP less private and government consumption. Net export (NX) is the gap between domestic saving (S_d) and domestic investment (I_d).

$$GDP - C - G - I = X - M \tag{5}$$

$$S_d - I_d = NX \tag{6}$$

Net factor income from abroad (NFIA) is the income from international capital flows, usually in the form of interest or dividend. National saving (S_n) consists of domestic saving and net factor income from abroad. Net export and net factor income from abroad comprise Current Account (CA) which also represent Net Foreign Investment (NFI). National saving may be invested domestically or abroad as NFI. In the end, national saving equals to national investment.

$$NFIA + S_d - I_d = NX + NFIA = CA = NFI \tag{7}$$

$$NFIA + S_d = I_d + NFI \tag{8}$$

$$S_n = I_d + NFI = I_n \tag{9}$$

Equation 8 and 9 imply that investment is financed by saving. In a closed economy, all domestic investment comes from domestic saving. The benefit of the open capital market for developing countries is the ability to attract international capital that could enhance their capital accumulation in addition to the domestic saving. However, there might be possibilities that the capital inflows are used to raise consumption instead of investment (Bosworth and Collins, 1999). As a result, saving would be reduced. Capital inflows would increase investment, decrease saving or both. Consequently, saving and investment would move independently with the existence of the capital inflows. The relationship can be described as follows:

$$\frac{I_t}{Y_t} = \alpha + \beta \cdot \frac{S_t}{Y_{t\,t}} \tag{10}$$

Subtracting saving from both side and multiplying with minus one would result the relation between saving and current accounts or net foreign investment.

$$\frac{S_t}{Y_t} - \frac{I_t}{Y_t} = -\alpha + (1-\beta) \cdot \frac{S_t}{Y_t} \tag{11}$$

$$\frac{NFI_t}{Y_t} = -\alpha + (1-\beta) \cdot \frac{S_t}{Y_t} \tag{12}$$

In an open economy, any increase in saving will cause an increase in investment in all countries. The smaller the country, the smaller proportion of domestic saving would be retained domestically. There would be no correlation between saving and investment ($\beta = 0$) in an open economy. On the contrary, increased domestic saving is retained entirely and transformed into domestic investment in a closed economy. There would be one to one saving and investment relationship ($\beta = 1$). For this reason, Feldstein and Horioka (1980) argue that domestic saving and investment relation implies the degree of capital mobility.

Many literatures employ time series approach for individual country analysis, such as Jansen and Schulze (1996), Sarno and Taylor (1998) and Taylor (2002). As in the interest rate

estimation, we employ regression in levels, differences and also generalized error correction model. The specifications to estimate Eq. 10 are as follows:

$$\Delta i_t = \alpha + \beta \cdot \Delta s_t + u_t \quad (13)$$

$$i_t = \alpha + \beta \cdot s_t + u_t \quad (14)$$

$$\Delta i_t = \alpha + \beta \cdot \Delta s_t + \theta \cdot (i_{t-1} - \gamma \cdot s_{t-1}) + u_t \quad (15)$$

The small characters mean that the variables are stated as a ratio to income. This study employs both definition of income (GDP and GNP). Both domestic saving and national saving are regressed on domestic investment.

RESULTS AND DISCUSSION

First, we test the assumption of free capital mobility to confirm the capital account openness. Table 1 shows the estimates of domestic interest rate responsiveness to the benchmark rate. The null hypothesis of unity of the short-run coefficients in the first model (β in Eq. 1) and third model (β in Eq. 3) could not be rejected. However, the short-run coefficients are not statistically significant due to large standard deviation. The long-run coefficients from the second model (β in Eq. 2) and third model (γ in Eq. 3) are highly significant and are statistically not different from unity. Moreover, domestic interest rate seems to adjust rapidly, with adjustment coefficient of 0.5, indicating half life of one month. Therefore, we may conclude that domestic interest rate followed the movement of the benchmark rate. Monetary policy was not independent. It also implies that capital was freely mobile during the period 1984-1995.

The lack of independence of the monetary policy in this period is in support of Shambaugh (2004) results that countries with pegged exchange rate would have no monetary independence. Interest rate follows the benchmark rate if capital is freely mobile. This result also confirms Chinn and Ito (2008) assessment of the capital mobility in Indonesia with the highest value of KAOPEN index in this period.

According to Feldstein-Horioka criterion, if capital is freely mobile and the economy is small, saving coefficient would be zero. On contrary, coefficient of one in saving and investment relation would mean closed economy or zero capital mobility because all incremental saving is used to finance domestic investment. The null hypothesis of a closed economy is $\beta = 1$ and $\gamma = 1$. Because Table 1 implies free capital mobility, we should be able to reject the null hypothesis of the closed economy. We estimate domestic investment relation using two definitions of saving.

Table 1: Domestic interest rate responsiveness to benchmark rate

	α	β	θ	γ	R^2	DW	$\beta = 1$	$\gamma = 1$
Δrd	0.0005	1.9618			0.0282	2.5536	0.5369	
	(0.0019)	(1.5538)						
rd	0.1827	0.8894***			0.2008	1.0197	0.6699	
	(0.2741)	(0.2590)						
Δrd	0.0676	1.0857	-0.5118***	0.9371***	0.2605	2.0055	0.9003	0.8553
	(0.1868)	(0.6834)	(0.1719)	(0.3445)				

*,** and *** represent 10, 5 and 1% levels of significance, respectively. Standard errors reported in parentheses are robust to heteroskedasticity and autocorrelation. The unit-root hypothesis is rejected for the residuals from all models. The benchmark rate is U.S. LIBOR dollar rate

Table 2: Domestic saving and domestic investment

	α	β	θ	γ	R^2	DW	β = 1	γ = 1
Δi	0.0005	1.0655***			0.8927	2.4491	0.2913	
	(0.0021)	(0.0614)						
i	-0.0108	0.9723***			0.7854	0.9271	0.7359	
	(0.0281)	(0.0816)						
Δi	0.0052	1.0299***	-0.4460***	0.9045***	0.9127	2.0347	0.6410	0.5808
	(0.0258)	(0.0637)	(0.1091)	(0.1717)				

*,** and *** represent 10%, 5% and 1% levels of significance, respectively. Standard errors reported in parentheses are robust to heteroskedasticity and autocorrelation. The unit-root hypothesis is rejected for the residuals from all models

Table 3: National saving and domestic investment

	α	β	θ	γ	R^2	DW	β = 1	γ = 1
Δi	0.0001	1.0787***			0.9097	2.5970	0.1331	
	(0.0020)	(0.0515)						
i	0.0175	1.0160***			0.8411	1.0293	0.8174	
	(0.0216)	(0.0688)						
Δi	0.0270	1.0410***	-0.5118***	0.8950***	0.9312	2.0990	0.4847	0.4731
	(0.0237)	(0.0581)	(0.0988)	(0.1451)				

*,** and *** represent 10%, 5% and 1% levels of significance, respectively. Standard errors reported in parentheses are robust to heteroskedasticity and autocorrelation. The unit-root hypothesis is rejected for the residuals from all models

Table 2 shows the results using domestic saving. Short-run and long-run coefficients in all models are highly significant and statistically not different from unity. Adjustment speed is high with half life of one month. Moreover, adjusted R^2 values are very high, more than 90%. Domestic investment moved one to one with domestic saving.

Table 3 shows the results of estimations using national saving. The use of national saving does not change the result. The short-run and long-rung coefficients are highly significant and also not different from unity. National saving contributed for more than 90% of the variation in investment. In other words, domestic investment followed the movement of national saving almost perfectly.

The results indicate one to one relationship between saving and investment in the short-run and long-run. This implies that domestic investment was financed by domestic or national saving, not capital inflows. This fact is against our intuition, considering the fact of large capital inflows. This condition is known as the Feldstein-Horioka puzzle. Sinha and Sinha (2004) and Kaya-Bahce and Ozmen (2008) also found a high correlation between saving and investment in Indonesia. However, the interpretation is different, because they conclude that capital mobility was low in Indonesia. We believe that high correlation between saving and investment coexists with free capital mobility in Indonesia.

As a robustness check, we estimate the relation between national saving and current accounts (ca), which also represents net foreign investment as in Eq. 12. After finding close relationship between saving and investment, we expect that saving would not be correlated with net foreign investment. There would be no correlation between saving and current account. Saving coefficients would be zero in the short-run and long-run. Therefore, the null hypotheses are $\beta = 0$ and $\gamma = 0$. Table 4 shows the results. The null hypothesis could not be rejected. The saving coefficients in the short-run and long-run from all models are zero. In this sense, saving did not have any relationship with net foreign investment. Excess saving was invested domestically, while lack of saving did not attract foreign investment.

The results indicate that domestic investment was only influenced by saving. All domestic investment was financed by domestic saving. Therefore, the relation between capital inflows and domestic investment may not be as strong as we expected. Considering the amount only, it may imply that capital inflows were used to pay for the net factor income.

Table 4: National saving and current account

	α	β	θ	γ	R^2	DW	β = 0	γ = 0
Δca	0.0006	-0.0390			-0.0035	2.1629	0.3435	
	(0.0019)	(0.0407)						
ca	-0.0347	0.0349			-0.0122	1.1123	0.6072	
	(0.0209)	(0.0675)						
Δca	-0.0305	0.0009	-0.5501***	0.1075	0.2680	1.8360	0.9864	0.3956
	(0.0194)	(0.0506)	(0.0932)	(0.1253)				

*,** and *** represent 10%, 5% and 1% levels of significance, respectively. Standard errors reported in parentheses are robust to heteroskedasticity and autocorrelation. The unit-root hypothesis is rejected for the residuals from all models

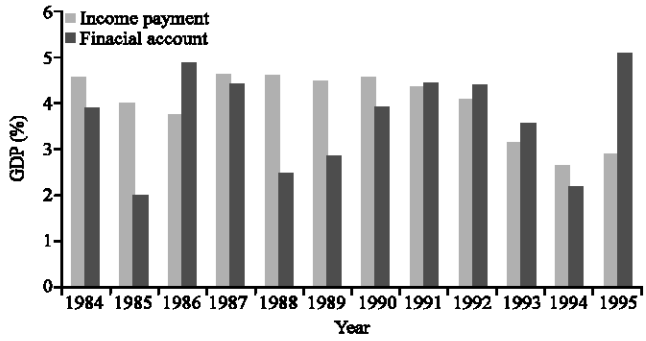

Fig. 4: Investment income payment to abroad and financial account. Source: Author's calculation

Alternatively, it may indicate that domestic saving was high because of high burden to pay for the factor income abroad and capital inflows were used to finance domestic investment. Figure 4 compares the annual figures of net investment income payment to abroad with the financial accounts which represents the capital inflows during the periods.

Income payments were larger than financial account in many cases. There was a large burden to service foreign investment. In other words, resource was transferred out of Indonesia. Net resource outflows happened at the same time with capital inflows. The results in this study provide evidence for Bosworth and Collins (1999) remarks that capital inflows are not always equal to resource transfer. In Indonesian case, capital inflows have been offset by payments of the net factor income to abroad. This fact is interesting because economists believe that physical capital was the main source of economic growth at that time. In this sense, capital inflows played a crucial role. Naturally, we expect that capital inflows would mean net resource inflows and thus higher investment.

Further analysis on the composition of the income payment is presented in Fig. 5. We can see that direct investment comprised a significant portion of the income payment until the end of 1980s. This fact creates another interesting issue because the amount of direct investment until this period was not as large as other investment.

The implication of the results is that simplistic approach to attract capital inflows might not be an optimal solution for developing countries. Development the domestic infrastructure and capability is necessary to attain the highest benefit from international capital. Therefore, domestic productivity may improve in parallel with the increase of foreign capital. The importance of total factor productivity increase and spillovers are also suggested by Haskel *et al.* (2007). The increased domestic productivity is crucial to service debt and other factor payment to abroad.

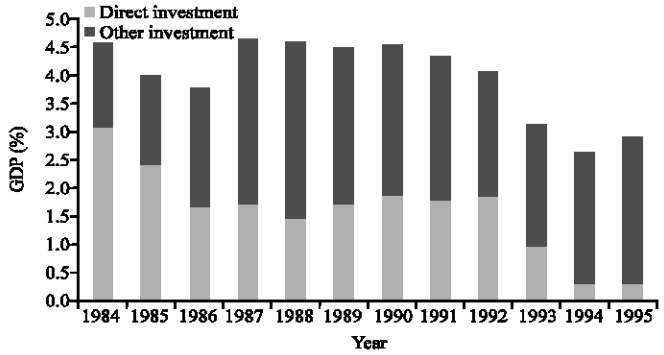

Fig. 5: Composition of investment income payment to abroad. Source: Author's calculation

CONCLUSIONS

The potential benefit of foreign capital inflows to developing countries is indisputable. Capital inflows raise economic growth by accelerating capital accumulation. However, there might be risks of the capital inflows and financial integration. The most apparent risk would be the slow down and sudden stop of the capital inflows which may cause crisis in developing countries. The impact on resource transfers may also need attention because capital inflows may not automatically mean resource inflows.

In Indonesian case, domestic investment moved one to one with saving. This is inconsistent with the fact of open capital market. Analysis on the balance of payment showed that the amount of capital inflows was smaller than net factor income payment to abroad. Resource outflows happened at the same time with capital inflows.

In short, policies directed toward absorbing foreign capital inflows and discouraging capital outflows might not be sufficient. Domestic policies should be directed towards optimal utilization of the foreign capital inflows to improve domestic productivity.

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