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The economic growth increased during quarter three in 2015 with a well maintained macroeconomic stability. The growth recorded 4.73 percent (yoy), which is higher than the previous quarter of 4.67 percent (yoy), supported by stronger government spending both on consumption and investment. This is inline with the significant realization of the infrastructure project. On the other hand, the macroeconomic stability is evident with the lower inflation rate and an improvement of the current account deficit. The financial stability is also solid; supported by the viable banking system and the moderate financial sector performance. We expect to see an increase of the economic growth on quarter four 2015, and also inflation within its target range of 4 + 1 percent. However, we emphasize the necessity to continuously observe some economic risks derived from external and domestic.

Keywords: macroeconomy, monetary, economic outlook.

JEL Classification: C53, E66, F01, F41
I. GLOBAL DEVELOPMENT

While the global economic recovery has not been achieved yet, the pressure from the global financial market needs to be anticipated. Economic growth of the United States has been moderate as indicated by weak export and manufacture expansions. Nevertheless labor sector has performed some improvement, reflected from the decrease in unemployment along with the increase in income growth and non-farm payroll. The development drove higher expectations on the increase in Fed Fund Rate on December 2015. Meanwhile economic recovery in Europe and Japan remained vulnerable leading to the ongoing monetary easing. China’s economic performance has been slowing down as indicated by contraction of PMI (Purchasing Manager Index) of manufacture along with the decrease in demand of export which eventually drove monetary easing. The Chinese government also took several steps of reformation on financial market and Renmimbi internationalization.

Economic growth of the United States has been moderate. It is indicated from weak export and manufacture expansion. The stagnant manufacture sector performance has been driven by the weakening global economy and trend of US Dollar appreciation, leading to export contraction since early 2015. Nevertheless labor sector of the United States has performed improvement as indicated by decreasing trend of unemployment, accompanied by the increasing trend of wages and non-farm payroll data. The improvement of wages growth would drive higher consumption and inflation towards the target. The development drives higher expectations on the increase in Fed Fund Rate on December 2015. Along with the improvement of labor sector, the increase in FFR rate was expected to occur when FOMC was conducted on December 2015. Market expectation on the increase in FFR rate of December 2015 has been intensifying reflected from implied profitability of FFR rate and Bloomberg survey.

Meanwhile European economic recovery remained vulnerable. Economic recovery of Europe was sustained by the increase in domestic demand reflected from the increase in retail sales and new car registrations. Besides that manufacturing sector expanded massively along with domestic demand and export recoveries. Nevertheless domestic demand recovery has not been able to drive higher inflation to meet the target of European Central Bank (a bit less than 2%)

Economic recovery of Japan has also been vulnerable. Economic recovery of Japan indicated from the increase in Japanese production activities. It is reflected from expansive manufacturing sectors, driven by the increase in domestic new orders. Nevertheless domestic consumption of Japan has been lower as well, indicated by the decrease in retail sales trend. It is in line with condition of labor sector that remained unrecovered along with declining trend in wage growth into negative zone. Along with the development, consumer expectancy rate was also weak accompanied by deflation risk.

China’s economy has also been growing slowly. It is mainly indicated by contraction of manufacture PMI accompanied by the decrease in export (Figure 1). China’s export growth performed negatively due to slowing down global economic growth, even slightly recovered
due to Yuan devaluation. Import growth has been negative as well due to higher price of import as the consequences of Yuan devaluation and decreasing trend in domestic demand. Slowing down economic growing drove the Chinese Central Bank to run monetary easing policy by lowering credit and deposits rate by respectively 25 bps to 4.35% and 1.5%. Besides that Chinese Central Bank lowered the Required Reserve Ratio of large banks by 50 bps to 17.5% and small bank to 15.5%. The Chinese government had taken several reformation steps on its financial market and Renmimbi internationalization.

India’s economy has been growing rapidly even though export was relatively weak. Domestic demand increased reflected from positive business sentiments and sales of automotive sector (cars). Strong domestic demand has been supporting manufacture PMI of India to keep steady to expand. Nevertheles, India’s export was relatively weak along with slowing down economic growth of China (Figure 2).

Limited global economic recovery affected declining world commodity prices. The declining prices was mainly driven by lower global demand in line with the fact that the economy has been depending on domestic consumption. Declining trend of prices is predicted to occur on overall primary commodities in which the largest decline occurs on coal, nickel, tin, and copper. The declining trend of commodity prices was driven by lower expectation on global demand, mainly from China.
II. DYNAMICS OF INDONESIA’S MACROECONOMY

2.1. Economic Growth

Indonesia’s economy has been positively growing in quarter III 2015 and was expected to keep positively growing in quarter IV 2015. The economic growth in quarter III 2015 was 4.73% (yoy), much higher than the previous period by 4.67% (yoy) (Table 1). The positive growth was mainly driven by stronger role of the government both on consumption and government investment. It is in line with the progress of infrastructure projects of the government that increased by 38.8% until October 2015. Household consumption remained strong as indicated by the increase in purchasing power. From the external side, lower commodity prices and slowing-down economic growth of trading partners i.e. the United States, China, and Singapore drove larger export contraction.

### Table 1

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<td>5.09</td>
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<td>5.28</td>
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<tr>
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<td>4.86</td>
<td>-4.53</td>
<td>1.02</td>
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<tr>
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<td>0.41</td>
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<td>3.22</td>
<td>2.19</td>
<td>-2.38</td>
<td>-6.98</td>
</tr>
<tr>
<td>GDP</td>
<td>5.14</td>
<td>5.03</td>
<td>4.92</td>
<td>5.01</td>
<td>5.02</td>
<td>4.72</td>
<td>4.67</td>
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Source: BPS

Household consumption was relatively stronger in quarter III 2015. The household consumption grew from 4.68% (yoy) in quarter II 2015 to 4.99% (yoy) in quarter III 2015. The increase in household consumption driven by the positive contribution of consumption of Household Non-Profit Institution (Lembaga Non-Profit Rumah Tangga-LNPRT) was related to expenditure activities towards regional election in December 2015. Besides that, the increase in household consumption was driven by the improvement of public purchasing power as exhibited by income expectation and Farmers Price Index (Nilai Tukar Petani-NTP) that increased in quarter III 2015.

The government consumption significantly increased in quarter III 2015. The government consumption grew by 6.56% (yoy), higher than the previous quarter II 2015 by 2.13% (yoy). The source of the government consumption growth was the increase in goods expenditure driven by the increase of government’s budget absorption.

Investment growth that increased in quarter III 2015 was mainly driven by the increase in investment in building. Investment performance increased from 3.69% (yoy) in quarter II 2015
to 4.62% (yoy) in quarter III 2015. The growth of investment was mainly driven by investment growth in building by 6.25% (yoy), higher than the growth in quarter II 2015 by 4.82% (yoy). The increase in investment in building was indicated from cement sales that increased significantly in quarter III 2015 (Figure 3). This development is in line with the progress of the government’s infrastructure projects while the private sectors remained “wait and see”. Meanwhile non-building investment (Gross Domestic Fixed Investment Formation or Pembentukan Modal Tetap Domestik Bruto/PMTDB) grew by 0.04% (yoy), relatively lower than the previous quarter by 0.62% (yoy). The slowing down was reflected from the continuous contraction of sales of heavy equipment. The slowing-down performance of non-building investment was driven by contraction on Cultivated Biological Resources (CBR) and intellectual property.

From the external side, low commodity prices and weak performance of trading partners’ economic growth drove larger contraction of export. Moreover export in quarter III 2015 was 0.69% (yoy), larger compared to the previos quarter by -0.09% (yoy). Non-oil and gas contraction was driven by slowing down growth of export of mining products (Figure 4) mainly coal. Meanwhile export of manufacture sector slightly decreased due to decrease in CPO export. The ongoing contraction of export performance was in line with low commodity prices and weak economic performance of trading partners such as the United States, China, and Singapore.

Import performance in quarter III 2015 has improved along with the improvement of domestic demand. Import experienced contraction by 6.11% (yoy), lower than the previous quarter by 6.98% (yoy). The improvement of import performance was in line with the improvement of domestic demand driven by infrastructure expenditure in quarter III 2015 while export performed negatively.
From the industry level, the increase in economic growth in the quarter III 2015 was driven by non-tradable sectors along with the increase in domestic demand. The rapid growth can be seen from construction, transportation, communication, financial sector, and water provision sectors. Performance of construction sector is driven by the rapid growth of government investment realization while the private sectors remained “wait and see”. Besides that, transportation sector was driven by the increase in sales of motorcycles and air vehicles. Communication sector also increased as indicated by the increase in sales of telecommunication sector issuers accompanied by the increase in demand due as public had shifted from 2G to 3G, and 3G to LTE (Long-Term Evolution). Meanwhile, financial sector also significantly increased five times from the previous period. It was driven by banking activities in foreign currency transaction. In the other hand, some tradable sectors grew moderately due to slowing down economic recovery. Mining sector remained contracted mainly due to declining production of coal and copper. The growth of manufacturing sector was stagnant as response to weak export amidst the increase in domestic demand.

Spatially economic recovery occurred in Java while economic recovery in Sumatera’s economy recovered moderately (Picture 1). The increase in economic growth in many regions in Jawa was mainly driven by the increase in investment along with the acceleration of large scale infrastructure projects such as Trans Jawa Highway, Mas Rapid Transit (MRT), ports, and airports. Meanwhile the large scale infrastructure projects such as Trans Sumatera and other construction projects for Asian Games had contributed to economic recovery in Sumatera. Nevertheless the economic recovery in Sumatera was hampered by slowing down export growth due to lower global demand and lower commodity prices. Moreover Riau and Aceh perceived economic growth contraction due to negative performance of mining sectors mainly oil and gas even it was not in the previous periods. In the other hand Easter Indonesia’s economy grew relatively slow as it was driven by the negative performance of agriculture as the impact of drought in some regions along with the decrease in low commodity prices. Moreover Kalimantan recorded negative growth for the first time since last 10 years. Economic performance of East Kalimantan was more contracted compared to the previous periods which was driven by declining production of coal, negative performance of export, and declining production (lifting) of gas. The province of Papua also experienced negative growth after growing rapidly in the previous quarters. Nevertheless slowing down of economic growth was hampered by the acceleration of large scale infrastructure projects such as ports and airports.
2.2. Indonesia’s Balance of Payments

The improvement of current account transaction massively run sustained by balance of trade of non-oil and gas. Deficit or current account transaction in Indonesia Balance of Payment (Neraca Pembayaran Indonesia – NPI) of the quarter III was recorded to reach USD 4.0 billion (1.86% to GDP), slightly better compared to deficit in quarter III 2014 by USD 7.0 billion (3.02% to GDP). The improvement of current account transaction was sustained by the improvement of balance of trade of non-oil and gas due to sharp declining import (18.2% yoy) midst low domestic demand. In the other hand, non-oil and gas export slightly declined (11.0% yoy) which was mainly driven by declining commodity prices, even though it was recorded an increase by 4.5% (yoy). Meanwhile balance of trade of oil and gas recorded deficit similar with the previous quarter as the decline in surplus of balance of trade was compensated by the declining deficit of balance of trade of oil.

The improvement of current account transaction performance was also supported by declining deficit of balance of service. Deficit of balance of service in quarter III 2015 reached USD 2 billion, slightly better than deficit of the previous quarter by USD 2.7 billion. It was driven by the declining import of freight service along with the declining import of goods and by the increase in surplus of travel services due to the increase in foreign tourists visit to Indonesia.

The balance of primary income recorded deficit, while the balance of secondary income recorded surplus. The balance of primary income in quarter III 2015 recorded deficit by USD 7.4 billion, higher than USD 7.1 billion in the previous quarter. The increase in deficit of balance...
of income was mainly driven by the increase in the revenue payment of direct investment and revenue payment of investment portfolio of public sector which was in line with its cycle pattern. Meanwhile the balance of secondary income recorded surplus by USD 1.2 billion which was mainly driven by positive margin of personal transfer income. In quarter III 2015, it was recorded to reach USD 1.6 billion which was relatively similar to the previous quarter.

Meanwhile midst the increase in uncertainty of global financial market, performance of capital and financial transactions still recorded surplus. The capital and financial transactions in quarter III 2015 recorded surplus by USD 1.2 billion which was relatively lower than quarter II 2015 by USD 2.2 billion and quarter III 2014 by USD 14.7 billion. The declining surplus was mainly driven by deficit of portfolio investment and the declining surplus of direct investment. The deficit of portfolio investment was mainly driven by net sales of government bonds and domestic stock by foreign investors. In the other hand the increase in government foreign debt and the decrease in private sector’s foreign debt drove other investment to turn back from deficit to surplus which was eventually able to hold further decrease in surplus of capital and financial transactions.

The declining surplus of capital and financial transactions could not fully afford to compensate current account deficit so that overall balance of payment of Indonesia (NPI) in quarter III 2015 fell into deficit by USD 4.6 billion (Figure 5). Deficit of Indonesia Balance of Payment in quarter III 2015 was much larger than the previous quarter by USD 2.9 billion. In regards with the facts, foreign exchange reserve position at the end of September 2015 was recorded to reach USD 101.7 billion (Figure 6). The foreign exchange reserve was sufficient to cover the required import payment and government foreign debt payment of 6.8 months and was above the international adequacy standard.
2.3. Rupiah Exchange Rate

Rupiah depreciated in quarter III 2015 compared to the previous quarter. During quarter III 2015, Rupiah depreciated by averagely 5.35% (qtq) to the level of IDR 13,873 per USD (Figure 7). The pressure on Rupiah was affected by the external factors of the anticipation towards normalization of the Fed Policy and Yuan devaluation. Moreover from domestic points of view, the pressure on Rupiah was mainly driven by the prospect of slowing down domestic economic growth. Those following factors eventually corrected foreign investor ownership on Rupiah asset. Based on monthly periods depreciation occurred along the quarters with the increasing pressure on August and September. It was mainly driven Yuan depreciation and the increase in uncertainty of the increase in The Fed rate. Midst the pressure on Rupiah, the Rupiah’s volatility was relatively maintained compared to other foreign currencies within the region in quarter III 2015. Nevertheless Rupiah volatility increased to the level of 11.5% compared to quarter II 2015 by 5.75% (Figure 8).

![Figure 7. Rupiah Exchange Rate](image1)

![Figure 8. Rupiah Volatility (Quarterly)](image2)

2.4. Inflation

Inflation in quarter III 2015 was relatively stable by 4.1%, meeting the inflation target of 2015. During quarter III 2015, CPI is recorded by 1.27% (qtq) or 6.83% (yoy) lower than the previous quarter by 1.40% (qtq) or 7.26% (yoy) (Figure 9). The lower inflation was mainly driven by the correction of food prices of volatile food group and correction on various tariff of transportation post-lebaran in the group of administered prices. Meanwhile core inflation increased compared to the previous quarters, driven by cyclical factors such as Ramadhan, Lebaran, and new academic year. Nevertheless the pressure from the core group was not as high as its historical value for the last four years along with the slowing down domestic economy and the controllable expected inflation.
Inflation of volatile food in the quarter III 2015 is lower than the previous quarter. It was driven by correction of food materials prices. Inflation of volatile food was recorded to reach 1.82% (qtq) or 8.52% (yoy), lower than 2.35% (qtq) and 8.83% (yoy) of the previous quarter. It was driven by correction of prices of red union and various chili following harvest and deep correction on the prices of chicken meat and beef midst Idul Adha. In the other hand, the pressure from volatile food group was driven by the increase in price of rice led by limited quantity and quality of harvest due to drought.

During quarter III 2015 inflation of the administered price was lower than the previous quarter. It was driven by the correction of transportation tariffs post-lebaran. The group of administered prices was recorded to reach 0.80% (qtq) or 11.26% (yoy), lower than 2.53% (qtq) and 13.14% (qtq) of the previous quarter. Low inflation of this group was driven by the correction on various transportation tariff post-lebaran, correction on LPG 12 kg price by IDR 6,000 per gas cylinder, and correction of non-subsidized fuel price.

The core inflation was driven by the slowing-down domestic economy and stable expected inflation in the quarter III 2015. The core inflation was recorded to reach 1.30% (qtq) or 5.07% (yoy) higher than the 0.73% (qtq) or 5.04% (yoy) of the previous quarter. The cyclical factor of Ramadhan, Lebaran, and new academic year also contributed upon the pressure on the core inflation. Meanwhile depreciation of Rupiah that occurred during quarter III 2015 was suspected not fully transmitted to selling prices by the entrepreneurs due to slowing-down domestic economy.

The core inflation of the quarter III 2015 was driven by controllable expected inflation. The expected inflation of the next 3 months, both on consumers and retailers levels, would
experience downturn along with the trend of Rupiah appreciation and correction on energy prices. The correction of energy prices was actually the decrease in diesel fuel, LPG 12 kg, and electricity tariff prices. Moreover the expected inflation of the next three months, both on consumer and retailer levels would, decrease following the harvest. Meanwhile the pressure of inflation in Eastern Indonesia and Kalimantan was driven by the increase in prices of various food categories.

III. DEVELOPMENT OF MONETARY, BANKING, AND PAYMENT SYSTEM

3.1. Monetary

Liquidity of Inter-Bank Financial Market (Pasar Uang Antar Bank- PUAB) was relatively stable. The average of PUAB O/N quarter III 2015 experienced slightly positive growth by 5.75%, higher than the quarter II 2015 by 5.66% (Figure 10). The increase in interest rate of PUAB O/N could not be separated from the strategy of tightening liquidity strategy of Rupiah in the short-term through OPT and FX Swap. The average of DF Rate in the quarter III 2015 decreased from IDR 105.26 trillion to IDR 102.57 trillion. Meanwhile the average of interest rate spread max-min of PUAB was higher compared to the previous quarter from 101 bps to 200 bps. It was an indication as the impact of tightening liquidity strategy of Rupiah in the short-term through OPT and FX Swap. In nominal the average volume of total PUAB in the quarter III 2015 decreased from IDR 12.19 trillion to IDR 10.85 trillion. The decrease in total PUAB volume was likely to be contributed by the decrease in PUAB volume O/N from IDR 6.97 trillion to IDR 6.03 trillion.
Moreover deposits rate decreased again in the quarter III 2015 while credit rate remained stagnant. The weighted average (Rata-rata Tertimbang – RRT) of deposits rate in the quarter III 2015 kept decreasing since the last quarters. Liquidity easing that reduced the competition in third party funds withdrawal drove banks to implement efficiency by reducing its deposits rate gradually. The weighted average of deposits interest rate decreased from 8.16% to 7.94% and it occurred in all BUKU categories of bank in the quarter III 2015. The rapid decrease occurred in deposits with 3 months maturity. Meanwhile the RRT rate in the quarter III 2015 was relatively stagnant due to the increase in credit risk factors. The RRT rate was stagnant at the level of 12.91%, slightly lower compared to the previous quarter by 12.97% (Figure 11). The declining weighted average (RRT) of credit rate was mainly driven by the decrease in working capital...
rate and investment credit rate by respectively -11 bps and -10 bps to respectively 12.59% and 12.19%. Meanwhile the weighted average of consumption credit increased by 4 bps to 13.86%. With the development spread between credit rate and deposits rate increased from 481 bps to 497 bps in the quarter III 2015 (Figure 12).

Liquidity of the economy (M2) grew slowly in the quarter III 2015 due to declining fiat money. The growth of M2 decreased from 12.75% (yoy) to 12.41% (yoy) during the quarter III 2015. Regarding the components the decrease in M2 was mainly driven by the decrease in fiat money from 13.90% (yoy) in the quarter II 2015 to 12.51% (yoy) in the quarter III 2015. Meanwhile the M1 growth increased from 9.92% (yoy) in the quarter II 2015 to 12.00% (yoy) in the quarter III 2015. The increase in M1 was mainly driven by the increase in demand deposits of Rupiah and fiat money. The growth of fiat money performed the increasing trend along with the positive economic growth. It indicated that the economy started to recover.

Based on the influencing factors the slowing-down growth of M2 was driven from the intervention of foreign currency from Bank Indonesia in maintaining exchange rate stability. It drove lower growth of NFA. Meanwhile the contribution of NDA was not much to change on the growth of M2 due to relatively stable credit growth. The growth of credit2 slightly increased from 10.2% (yoy) in the quarter II 2015 to 10.9% (yoy) in the quarter III 2015.

3.2. Banking Industry

Stability of banking industry that remained solid was sustained by the sustainability of banking system with relatively stable financial market performance. The sustainability of banking industry remained strong with the following credit risks, liquidity, stable market, and sufficient capital support.

The growth of credit in the quarter III 2015 performed some improvements even though it was still vulnerable slowing-down economic growth and the increase in exchange rate risk. Credit growth3 in the quarter III 2015 was 11.1% (yoy) which increased from 10.4% (yoy) in the quarter II 2015 (Figure 13). The increase in credit growth of quarter III 2015 was mainly driven by investment credit and consumption credit that respectively grew by 13.0% (yoy) and 10.1% (yoy) from respectively 10.1% (yoy) and 9.9% (yoy) in the quarter II 2015. Meanwhile the growth of working capital credit was slowing-down from 10.8% (yoy) in the quarter II 2015 to 10.7% (yoy) in the quarter III 2015. From sector-based perspectives, the increase in

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2 The monetary concept was used to calculate credit distribution growth by 10.9% (yoy) in quarter III 2015. The monetary concept consists of Rupiah and Foreign Exchange loans distributed from Commercial Banks and Rural banks (excluding branch offices operating overseas) to public (excluding the central government). Meanwhile credit growth using banking concept was 11.1% (yoy) in the quarter III 2015. According to banking concept the Rupiah and the Foreign Exchange Loans are distributed from Commercial Banks (including branch offices operating overseas) to the public (including central government) and non-citizen.

3 Banking-based concept of credit
credit growth was mainly driven by manufacture, trade, agriculture, services, electricity, water, and gas sectors.

The growth of third party fund (Dana Pihak Ketiga – DPK) slightly decreased in the quarter III 2015 which was mainly driven by the decrease in deposits. The growth of DPK\(^4\) was 11.7\% (yoy) in the quarter III 2015 which was lower than the previous quarter by 12.7\% (yoy) (Figure 14). The decrease in DPK was mainly driven by slowing-down deposits growth from 16.4\% (yoy) in the quarter II 2015 (June 2015) to 11.2\% (yoy) in quarter III 2015 (September 2015). The decrease in deposits occurred in both Rupiah and foreign currency. Meanwhile the trend of slowing-down deposits growth had occurred since early 2015 and had entered negative phase since July 2015. In the other hand the growth of demand deposits and savings was higher from respectively 15.9\% (yoy) and 4.5\% (yoy) in the quarter II 2015 to respectively 19.9\% (yoy) and 6.4\% (yoy) in the quarter III 2015.

Banking industry of Indonesia remained stable midst the increase in credit growth. During the quarter III 2015, capital sustainability was still sufficient with \textit{capital adequacy ratio} (CAR) by 20.4\%. It is higher than the minimum requirement by 8\% (Table 2). Meanwhile the \textit{non-performing loan} remained low and stable at 2.7\% (gross) or 1.3\% (net).

\textsuperscript{4} The calculation of third party fund (DPK) by 11.7\% (yoy) used banking-based concept. According to banking-based concept, DPK is deposits of the third party in both Rupiah and Foreign Exchange on Commercial Banks (including branch offices operating overseas) in the form of savings, demand deposits, and time deposits. According to the banking-based concept, DPK also includes central government savings and non-citizen savings. Meanwhile according to the monetary concept DPK was 11.5\% (yoy) in the quarter III 2015 which was lower than the previous quarter by 13.2\% (yoy). According to the monetary concept DPK is deposits of the third party both in Rupiah and Foreign Exchange in Commercial Banks and Rural Banks (excluding branch offices operating overseas) in the form of savings, demand deposits, and time deposits. According to the monetary concept DPK excludes Central Government savings and non-citizen savings.
3.3. Capital Market and Government Bond Market

Development of domestic capital market in the quarter III 2015 performed diminishing performance which was mainly driven by external sentiments. IHSG declined by 14.0% (qtq) to 4,223.91 in the quarter III 2015 (30 September 2015). It was driven by selling actions from foreign investors. Diminishing performance of the capital market was affected by external sentiment mainly related to the uncertainty of The Fed normalization policy and the increase in the anticipation of global economic downturn. From domestic side the positive sentiment beyond expectation as that it could not hold the capital flow. Correction of stock price was also perceived by some other stock exchanges in other countries such as Chinese stock exchange that experienced lower growth by 28.6% (qtq) (Figure 15).

Performance of SBN slightly decreased in the quarter III 2015 as reflected by the increase in yield SBN for all maturity periods. Along with the capital market, diminishing performance of SBN was also driven by external sentiment. Diminishing performance of SBN was affected by global sentiment of The Fed normalization policy and higher anticipation of global economic downturn. Overall yield of SBN increased by 133 bps from 8.22% to 9.55%. Short-term, middle-term, and long-term yields respectively increased by 136 bps, 128 bps, and 139 bps to respectively 9.20%, 9.59%, and 9.93%. Meanwhile yield benchmark of 10 years maturity increased by 127 bps from 8.33% to 9.60% (Figure 16). During quarter III 2015 foreign investors recorded net sales by IDR 14.16 trillion so that foreign ownership in the quarter III 2015 decreased from 38.62% to 36.60%.
3.4. Non-Bank Funding

Non-bank economic funding during quarter III 2015 was lower compared to the previous period due to stagnant economic growth. Total funding during quarter III 2015 through initial public offering, right issue, corporate bonds, medium term notes (MTN), promissory notes, and other financial institutions reached IDR 13.3 trillion which was lower than the quarter II 2015 by IDR 47.6 trillion. The composition of funding coming from issuing obligation reached 65.7% of the total funding. Based on the composition, the largest decrease was driven by the decrease in funding through bonds issuance that only reached IDR 9.5 trillion, or decreased 63.6% compared to the quarter II 2015. Funding through stock, MTN, and NCD (negotiable certificate of deposits) issuances was also lower compared to the previous quarter by respectively IDR 0.9 trillion and IDR 2.8 trillion. Nevertheless total funding of the quarter III 2015 was higher compared to the same period of the previous year by IDR 8.2 trillion.

3.5. Development of Payment System

In general development of payment system of cash group was in line with development of domestic econom, primarily household consumption. Position of circulating fiat money (Uang Yang Diedarkan – UYD) in the quarter III 2015 was IDR 518.3 trillion, or grew by 9.4% (yoy) higher than the previous period of previous year (IDR 474.0 trillion or grew by 9.0% yoy). In the last working day of Ramadhan 2015, UYD was recorded to reach IDR 604.2 trillion, which was the highest position during quarter III 2015. It was in line with the increase in cash demand from household consumption sector during Ramadhan. Subsequently there was reverse flow of banking capital to Bank Indonesia post-Idul Fitri 2015.
Midst trend of UYD affected by the cyclical factor, Bank Indonesia kept attempting to improve the quality of money supply. During quarter III 2015 there was 1.5 billion sheets of money that were not feasible to be supplied by IDR 41.9 trillion. They had been exterminated and replaced by the feasible ones. The number of sheets exterminated was higher than the quarter II 2015 by 1.2 billion or was equal to IDR 33.4 trillion. High extermination during the quarterly report took place was maunly driven by the increase in capital inflow from banking industry to Bank Indonesia in which the sheets were not feasible. Besides that during the early period of the report took place Bank Indonesia also enhanced the standard of money supply (fitness level).

Payment system transaction run steadily during quarter III 2015. During the quarter III 2015 the non-cash payment system transaction increased, both in terms of value and volume. The increase in the transaction value was IDR 538.9 trillion or was 1.4% (qtq) (Table 3). Meanwhile the increase in transaction volume was 50.7 million transactions or increased by 3.7% (qtq). In general the increase in transaction volume was mainly driven by the increase in transaction value of Bank Indonesia-Scripless Securitie Settlement System (BI-SSSS) and the increase in payment tools transaction using cards (Alat Pembayaran Menggunakan Kartu - APMK). The value of BI-SSSS transaction increased by 3.1% (qtq) to IDR 39.5 trillion. Meanwhile the largest increase in transaction volume was electronic money that grew by 29.6 million transactions or was equal to 20.7% (qtq) higher from the previous quarter. Meanwhile the transaction of APMK increased by 1.8% (qtq) or was equal to 21.1 million transactions dominated by ATM-Debt transactions. The increase in PMK and Electronic Money transactions reflected the increasing and the expanding utilization of non-cash payment instruments of the public.

<table>
<thead>
<tr>
<th>Table 3. Development of Non-Cash Payment System Transaction Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Cash Payment System Transaction</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>BI-RTGS</td>
</tr>
<tr>
<td>BI-SSSS</td>
</tr>
<tr>
<td>Clearance</td>
</tr>
<tr>
<td>Debt</td>
</tr>
<tr>
<td>Credit</td>
</tr>
<tr>
<td>APMK</td>
</tr>
<tr>
<td>Credit Card</td>
</tr>
<tr>
<td>ATM_CARD</td>
</tr>
<tr>
<td>Electronic_Money</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
**IV. PROSPECT OF ECONOMY**

Bank Indonesia predicted that domestic economic growth would be higher in quarter IV 2015. Economic growth in quarter IV 2015 was expected to be higher compared to the quarter III 2015 by 4.73% (yoy). The higher economic growth was driven by the increasing domestic demand and lower export contraction. The increase in domestic demand was in line with the pattern of government budget absorption that rapidly increased in quarter IV 2015. Household consumption (including LNPRT) also grew rapidly following regional election in December 2015. From the external side the economic recovery was driven by export performance that had been recovering along the global economic recovery. In responding the increase in domestic economy and export improvement, import was expected to grow steadily. Overall 2015 the economic growth was expected reach 4.7% to 5.1%.

Inflation of the quarter IV 2015 was expected to be lower than the previous projection. The expectation on lower inflation was driven by core group and *volatile food* (VF) group. In the quarter IV 2015, core inflation was expected to be lower than the previous projection along with the realization of core inflation of October which was lower than the prediction. The impact of exchange rate was also expected to be relatively small along with diminishing domestic demand. Meanwhile during quarter IV 2015 the VF group was also expected to experience lower inflation compared to the previous projection mainly after deep deflation in October 2015. The impact of El-Nino on food prices that was not as strong as the projection also supported the expectation of lower inflation on VF group. In the other hand, the group of *administered price* (AP) was expected to experience higher deflation compared to the previous projection. It was mainly driven by the realization of AP higher inflation on October 2015 compared to the projection and the increase in tariff of highway by averagely 15%. In overall periods, Bank Indonesia believed that inflation of 2015 would be stable under the target by 4±1%.

Bank Indonesia will keep focusing on observing several economic risks driven by domestic and external factors. From the global side, the uncertainty of the increase in *The Fed Fund Rate* and slowing-down economy of China provided risks of generating pressure on Rupiah exchange rate, inflation, and economic growth. Other global risk source is declining commodity prices in international market. From domestic side the pressure of higher inflation should be anticipated mainly those coming from the increase in price of *administered prices* group. Risk related to effectiveness of fiscal stimulus should become an important concern as it serves as the key factor for the future economic growth.
THE DETERMINANTS OF BANK’S EFFICIENCY IN INDONESIA

Astoeti Wahjoe Widiarti1
Hermanto Siregar2
Trias Andati

Abstract

This paper measures the efficiency of the banks using the intermediation approach and the Data Envelopment Analysis (DEA) on quarterly data of 108 conventional banks in Indonesia during the period of 2012Q1 to 2014Q4. The results shows that the Indonesian banking industry is inefficient in its intermediation function, which is in line with their financial indicators namely the total increasing asset, stable ROA of around 2-3%, and their Operating to Income Cost ratio of about 66-83%. Furthermore, we apply data panel estimation to estimate the determinant of this efficiency; the result shows the bank’s type, the Non-Performing Loan (NPL), the Loan to Deposit Ratio (LDR), the size of the bank, the Cost Efficiency Ratio (CER), and the Capital Adequacy Ratio (CAR); significantly affect the bank’s efficiency in Indonesia

Keywords: Banking, efficiency, panel estimation, Indonesia.
JEL Classification: G21, C23, D24

1 Astoeti Wahjoe Widiarti (corresponding author, astoetiw@gmail.com) is a researcher on Bank Indonesia; currently is assigned in OJK, and also graduate from Program Pascasarjana Manajemen dan Bisnis Institut Pertanian Bogor. The views on this paper are solely of the authors, and do not necessarily represent the views of Bank Indonesia or OJK.
2 Hermanto Siregar (hermansiregar@yahoo.com) and Trias Andati (trias_andati@yahoo.com) are lecturers at Program Pascasarjana Manajemen dan Bisnis IPB.
I. INTRODUCTION

Financial service sector is a sub-system of the whole economic system in Indonesia. According to data released by Financial Service Authority (OJK), financial service sector consists of bank financial institution and non-bank financial institution (insurance, pension fund, financing services, securities, and pawnshop). Bank’s performance and health that dominate financial sector in Indonesia requires serious concern in order to achieve efficient and healthy banking systems to drive sustainable and inclusive economic growth through safe, secure, and affordable financing to achieve prosperity and public welfare. The total asset of banking industry is 79% of the total asset of financial institution as exhibited in Table 1.

<table>
<thead>
<tr>
<th>Financial Service Institution</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset</td>
<td>% Total FS</td>
<td>Asset</td>
<td>% Total FS</td>
</tr>
<tr>
<td>1. Bank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Conventional</td>
<td>4,418.59</td>
<td>78.79</td>
<td>5,196.47</td>
</tr>
<tr>
<td>b. Syariah</td>
<td>156.00</td>
<td>4,954.47</td>
<td>242.00</td>
</tr>
<tr>
<td>2. Non-Bank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Insurance</td>
<td>569.32</td>
<td>652.90</td>
<td>777.8</td>
</tr>
<tr>
<td>b. Pension</td>
<td>158.37</td>
<td>162.06</td>
<td>187.52</td>
</tr>
<tr>
<td>c. Financing</td>
<td>341.76</td>
<td>420.14</td>
<td>443.73</td>
</tr>
<tr>
<td>d. Others</td>
<td>119.83</td>
<td>100.35</td>
<td>121.7</td>
</tr>
<tr>
<td>Total FS</td>
<td>5,607.87</td>
<td>100.00</td>
<td>6,531.92</td>
</tr>
</tbody>
</table>

Source: Indonesia Banking Statistics, December 2014 and 4th Quarter Report 2014, Financial Service Authority (OJK), processed (http://www.ojk.go.id)

An interesting phenomenon has come up regarding dynamics of banking sector in Indonesia, reflecting performance of banking profitability and operational efficiency which are not healthy and not sustainable. It is driven by poor structure of banking’s productive asset, banking income mostly generated from traditional fluctuated asset, and lower asset to customer ratio leading to relatively higher operational cost of Indonesia’s banking sector compared to other countries. Most of banks, primarily domestic ones, did not optimize their fee base income yet (Subandi and Ghozali, 2013). According to data released by Indonesia Banking Statistics (Statistika Perbankan Indonesia-SPI) of OJK in the period of December 2014, operating income is mostly dominated by interest income by 90%, while non-interest operating income such as fee-based income is not optimized yet.

According to SPI of 2012, 2013 and 2014, several financial ratios and specific financial accounts of bank internal factors serve as independent variable in this research that perform significant impact on banking profitability in Indonesia measured by Return on Asset (ROA). Those
independent variables are Total Asset (Size), credit risk represented by Non-Performing Loan (NPL), required reserve represented by Capital Adequacy Ratio (CAR), liquidity represented by Loan to Deposit Ratio (LDR), income represented by Net Interest Margin (NIM), and operational cost to operational income ratio (BOPO). Composition of deposits or third party’s fund (Dana Pihak Ketiga-DEP) is exhibited in the following Table 2.

<table>
<thead>
<tr>
<th>ROA and Profitability Independent Variables</th>
<th>State-owned Banks</th>
<th>Foreign Exchange Private Bank</th>
<th>Non-Foreign Exchange Private Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Asset (Rp. Billion)</td>
<td>1,535,343</td>
<td>1,758,873</td>
<td>2,076,518</td>
</tr>
<tr>
<td>Non-Performing Loan (NPL)</td>
<td>2.22%</td>
<td>1.90%</td>
<td>1.94%</td>
</tr>
<tr>
<td>Capital Adequacy Ratio (CAR)</td>
<td>16.17%</td>
<td>15.91%</td>
<td>17.08%</td>
</tr>
<tr>
<td>Loan to Deposit Ratio (LDR)</td>
<td>79.84%</td>
<td>86.70%</td>
<td>83.73%</td>
</tr>
<tr>
<td>Net Interest Margin (NIM)</td>
<td>5.95%</td>
<td>5.60%</td>
<td>5.11%</td>
</tr>
<tr>
<td>Operating Income to Operating Cost (BOPO)</td>
<td>70.53%</td>
<td>66.16%</td>
<td>69.57%</td>
</tr>
<tr>
<td>Ratio of Deposits to Third Party’s Fund</td>
<td>37.14%</td>
<td>37.25%</td>
<td>41.86%</td>
</tr>
<tr>
<td>Total Banks</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROA and Profitability Independent Variables</th>
<th>Local Development Bank</th>
<th>Mixed bank</th>
<th>Foreign Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Asset (Rp. Billion)</td>
<td>366,684</td>
<td>389,964</td>
<td>440,691</td>
</tr>
<tr>
<td>Non-Performing Loan (NPL)</td>
<td>2.30%</td>
<td>2.81%</td>
<td>3.45%</td>
</tr>
<tr>
<td>Capital Adequacy Ratio (CAR)</td>
<td>18.02%</td>
<td>17.58%</td>
<td>17.79%</td>
</tr>
<tr>
<td>Loan to Deposit Ratio (LDR)</td>
<td>78.57%</td>
<td>92.34%</td>
<td>89.73%</td>
</tr>
<tr>
<td>Net Interest Margin (NIM)</td>
<td>6.70%</td>
<td>7.04%</td>
<td>6.65%</td>
</tr>
<tr>
<td>Operating Income to Operating Cost (BOPO)</td>
<td>75.29%</td>
<td>73.49%</td>
<td>78.08%</td>
</tr>
<tr>
<td>Ratio of Deposits to Third Party’s Fund</td>
<td>30.74%</td>
<td>29.48%</td>
<td>33.97%</td>
</tr>
<tr>
<td>Total Banks</td>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
</tbody>
</table>

Source: Indonesia Banking Statistics, December 2014, processed (http://www.ojk.go.id)

As exhibited in the above Table 2, it is seen that during the period of 2012 – 2014 State-owned Banks with the above 5% NIM, the above Rp. 1,500 trillion total asset, and BOPO by 70% have generated ROA by average 3.8%, while Foreign Banks with the only 3% NIM, total asset by Rp. 300 trillion, and BOPO by 80% have generated ROA by 3%. It indicates that Foreign Banks, with lower NIM and total asset compared to State-owned Banks, are able to generate almost the same level of ROA by 3%, compared to State-owned Banks by 3.8%. Indonesia’s banking NIM is relatively higher by 5.43% compared to other countries such as Philippines by 3.3%, Thailand by 2.6%, and Malaysia by 2.3%, and Singapore by 1.5%.
The largest banking financing source comes from third party's fund (Dana Pihak Ketiga - DPK) besides long-term financing source through the issuance of bonds and Medium Term Note (MTN), supports in terms of capital (investment) from parent companies or foreign loan, and subordination loan mainly for foreign banks branch offices and mixed-banks (foreign and domestic private). The portion of deposits in DPK is the largest as interest rate offered is relatively higher than savings and time deposit. Deposits structure with the higher cost of interest significantly affects banking rentability (Banking Industry Profile Report Quarter II/2014, OJK).

Some of banks financial performance ratios shown in Table 2 are just part of financial performance assessment to support the analysis of the Bank’s Health Level (Tingkat Kesehatan Bank – TKS). Bank’s TKS has to be well-maintained or even to be continuously improved in order to keep public confidence on banks. Besides, Bank’s TKS is used as one of evaluation tools to overcome weaknesses and obstacles faced by banks, both in the form of corrective actions by banks and supervisory actions by financial service authority (OJK). TKS is the output evaluation on banking risks and performance. Banks are mandated to maintain and/or improve the TKS by implementing the principle of prudent banking and risk management in running business activities. The coverage of TKS assessment includes risk profile factor (risk profile); Good Corporate Governance (GCG); rentability (earnings); and capital. Banks with Composite Level 1 (Peringkat Komposit 1 – PK-1) reflects healthy banking condition in general so that they are considered to be able to face any negative and significant impacts from business dynamics and other external factors. Meanwhile banks with Composite Level 5 (PK-5) reflects banks’ condition which is considered not healthy so that they are assumed incapable of encountering negative impacts from changes of business dynamics and other external factors (Bank Indonesia Regulation No.13/1/PBI/2011 dated 5 January 2011 on Conventional Bank Health Assessment).

Efficiency is one of the important indicators to analyze a bank’s performance and also serves as the tool to improve the effectiveness of monetary policy. The ability to generate optimal output from the existing input is actually the expected performance from bank’s operation. When it is conducted efficiency measurement, bank is challenged to maximize output using the existing input, or to gain minimum input from certain level of output. By identifying input and output allocation, it can be further analyzed the trigger of inefficiency (Mansyur, 2012). Technical measurement of efficiency is limited to the technical and operational relationship during the process of converting input to be output. Berger and Humphrey (1997) argued that intermediation approach is the most appropriate one to evaluate performance of financial institutions in general since their characteristics as financial intermediation.

A number of prior researches about determinant of efficiency and its impact on profitability of banking industry have been conducted in several countries. A research about banking industry in Tunisia employing factors of overhead cost to total asset ratio, capital to total asset ratio, banks loan to total asset ratio, idle asset to total asset ratio (size), and macroeconomic factors such as inflation, interest rate, and GDP per capita argued that banks
with higher capital and NIM had positive and significant impact on profitability while macro indicators such as inflation and FDP per capita growth did not have significant impact on interest rate margin and profitability (Naceur, 2003).

Research about banking industry in Malaysia of Omar et al. (2006) observed productivity of Syari'ah banking industry using non-parametric Data Envelopment Analysis (DEA). The research does not matter in improving bank’s efficiency. Nevertheless improvement from the technical aspects through technology utilization supported by employees’ knowledge and skills, it will drive more rapid growth of productivity. Syari’ah banks are considered to be less-efficient compared to commercial conventional banks. Furthermore Muda et al. (2013) observed determinants of profitability between domestic Syari’ah banks and foreign banks using DEA approach. It is concluded that determinants of domestic bank profitability are different from foreign banks. Significant factors for domestic banks are not relevant to foreign banks (they may be insignificant to foreign banks). Overhead cost ratio, loan ratio, technical efficiency, GDP growth rate, and bank’s size have significant effect on determining the level of domestic bank’s profitability while these factors are not significant on foreign banks. Sok-Gee (2011) argued that his research on banking industry in China using DEA approach concluded that foreign commercial banks are relatively more efficient followed by state-owned banks (BUMN) and private domestic banks.

Research on efficiency determinants and the impact on profitability were also conducted in Indonesia. Independent variables that had significant impact on profitability (represented by ROA) are bank size, bank type, NPL, CAR, LDR, Operating Cost, and NIM (Subandi and Ghozali, 2013), and they were subsequently added with variables of BOPO, growth of operating income (PLO), and credit growth (PK) by Suyono (2005). The research discussed about the comparison of financial performance among domestic banks, foreign banks, and mixed-banks using financial ratio proxies. Performance of foreign banks based on financial radio proxies does not always outperform mixed banks and domestic banks, vice versa. It indicates that each of public banks has the equal opportunity to outperform other public banks disregarding those banks are domestic banks, foreign banks, or mixed banks (Handayani, 2005). Compared to the group of Syari’ah banks of BUS and UUS, it is seen that BUS with higher total asset has higher efficiency than UUS whose lower total asset. Meanwhile, the second stage of the test using Tobit approach showed that total asset, type of banks of BUS and UUS, net operating income, the quality of loan had positive impact nevertheless it was not significant while capital adequacy ratio had negative but insignificant impact (Abidin and Endri, 2010).

Permatasari and Novitasari (2014) observed the impact of good corporate governance (GCG) on capital and bank’s performance in Indonesia. The result suggested that the implementation of GCG (indicated by self-assessment) could reduce the possibility of bank’s credit default as risk management becomes one of assessment points on self-assessment sheet, thus if the implementation of GCG runs accordingly, it will improve risk management as well.
Besides, high commitment from top management and all staffs on the implementation of GCG can minimize the risk of negative impact of credit distribution. GCG composite index did not have significant impact on financial performance due to management action regarding credit distribution to the public. The management of bank applies prudent bank principles in leading to declining credit distribution. As the result, banks also suffer from the decline of profit.

Referring to the above research introduction, it is necessary to re-examine the impact of internal factors on efficiency and profitability of conventional banks within the last three years. The research is aimed to estimate the impact of internal factors on efficiency and profitability of banks (ROA). Banks operating more efficiently will be able to achieve healthy and sustainable profitability performance. Internal factors used as independent variable is also used to measure the level of bank’s health. Those variables are represented by bank size, bank type, credit risk represented by Non-Performing Loan (NPL), capital represented by Capital Adequacy Ratio (CAR), liquidity represented by Loans to Deposit Ratio, operating cost to operating income ratio (BOPO), net margin represented by Net Interest margin (NIM), composition of deposits to total third party’s fund ratio (DEP), and corporate governance represented by Good Corporate Governance (GCG). Research problem in this research is to measure the impact of internal factors on efficiency of banking industry in Indonesia. Besides this research will try to analyze whether efficiency level using non-parametric approach measured by DEA score and bank internal factor have significant impact on profitability of Indonesia’s banking industry measured by ROA.

The output of this research is expected to provide theoretical implication in improving efficiency theory and financial performance for banking industry; to provide managerial implication regarding management policy in driving up higher efficiency and profitability performance mainly for domestic banks; to be useful for regulators to formulate policies to improve efficiency, bank’s profitability, interest rate for third party’s fund and credit, and to prepare bank institutions in Indonesia to compete in MEA. Moreover, the research is also useful for public to decide which bank they consider proper to save their excess fund and to be source of financing.

II. THEORY

Bank is a business entity that collects surplus funds from public in the form of savings and distributes it to public who are deficit in the form of credit and other forms to improve living standard of the public (UU RI No. 10/1998 on Banking). Banking is all aspects regarding bank including institution, business activities, and process in doing all its business activities. Banking industry in Indonesia run its operation based democratic economy using prudent principles that aim to elevate national development in order to improve equality, economic growth, and national stability to achieve prosperity for the public. Bank is a business entity that collects surplus funds from public in the form of savings and distributes it to public who are deficit in the form of credit and other forms to improve living standard of the public.
According to Indonesia’s Banking Statistics Quarter IV 2014, the classification of commercial banks of 119 banks is divided into 4 State-Owned Banks, 38 Domestic Private Foreign Exchange Banks, 29 Domestic Private Non-Foreign Exchange Banks, 26 Local Banks, 12 Mixed Banks, and 10 Foreign Banks. Out of 119 banks there are 108 conventional banks. Based on the ownership, banks are divided into 3 groups which are national banks, foreign banks, and mixed banks. The national banks consist of State-Owned Banks, Domestic Private Foreign Exchange Banks, Domestic Private Non-Foreign Exchange Banks, Local Banks, while foreign banks are Foreign Banks Office Branch (Kantor Cabang Bank Asing – KCBA).

Definition of foreign bank branch office from SK DIR No.32/37/KEP/DIR on The Requirements and Procedures of Opening Branch Office, Supporting Branch Office, and Bank’s Representative Overseas is branch office of a bank located overseas established and subject to foreign constitution in which the head office is located overseas that is directly and indirectly responsible to the head office and is located in Indonesia.

According to PBI No.14/26/PBI/2012 on Business Activities and Office Network Based On Bank’s Core Capital and the Letter of BI No. 15/6/DPNP 8 March 2013 on Business Activities of Commercial Banks Based On Core Capital, Classification of Commercial Banks based on the Business Activities is classified into 4 (four) BOOKS. The higher the core capital of the banks, the higher the BOOK of the bank and the broader the coverage of business activities that bank can precede. BOOK 1 is the bank with core capital by equal to or less than Rp. 1.000.000.000.000.00 (one trillion Rupiah); BOOK 2 is the bank with core capital by at least Rp. 1.000.000.000.000.00 (one trillion Rupiah) to Rp. 5.000.000.000.000.00 (five trillion Rupiah); BOOK 3 is the bank with core capital by at least Rp. 5.000.000.000.000.00 (five trillion Rupiah) to Rp. 30.000.000.000.000.00 (thirty trillion Rupiah); and Book 4 is the bank with core capital by at least Rp. 30.000.000.000.000.00 (thirty trillion Rupiah).

According to the expert of management and economics i.e. Hasibuan (1994) defined that efficiency is the best comparison between input and output, cost and benefit, between implementation output and resources. The point is to gain optimum output with the limited resources. According to Supriyono (2007), efficiency is when a unit works properly so that the goal will be achieved. Based on the economic theory, there are two definitions of efficiency (Ascarya and Yumanita, 2005). Economic efficiency has a macroeconomic perspective while technical efficiency has a microeconomic perspective. Measurement of technical efficiency is limited to technical relationships and operations during the process of converting input to output. Meanwhile in economic efficiency, price is not considered as given since it may be affected by macro policy (Sarjana, 1999).

Haddad et al. (2003) stated that determinations of input and output from a bank used asset approach (deposits as input). It is considered that it would ease next researches on banking efficiencies, as well as comparing the result of this research to other prior researches. Besides, banks also serve to be financial institution that collect funds from surplus unit and convert it
to credit distributed to deficit unit. In other words, it is said as bank serves to run intermediaries function. If deposits is measured as output, the deposits services will be imposed to bank’s customer in the form paying interest rate below market rate (Certificate of Bank Indonesia, SBI) rather than setting it with certain price as fee and services.

According to Kurnia (2004), measurement of banking efficiency consists of two approaches which are production and intermediation. In production approach, bank is considered as unit of economic activities that operates business to produce output of savings service to saving customers or to produce lending service to lending customers using all input the banks possessed. Meanwhile according to intermediation approach, bank is considered as unit of economic activities that transform all kinds of collected funds into loans. The consequence of these two approaches is the way the banks treat savings. In production approach, savings is considered as output since savings is service produced through banking activities. While in the intermediation approach, savings is considered as input since banks will transfer savings into any productive assets mainly loans. According to Kwan (2002) intermediation approach is frequently used in the research of bank’s efficiency as it includes interest expenditure by half or two third of bank’s total cost. Siamat (2005) mentioned that bank’s profitability is measured by ROA and ROE. Stanton et al (2000) argued that determinants of profitability can be divided into internal determinants which are factors controlled by banks management, and the second one is external determinants which are macroeconomic and bank-specific industry.

Measurement of banking efficiency can be done using various methods. It can be grouped into two main factors which are parametric and non-parametric methods. Both of these methods are aimed to estimate frontiers representing best practices from a system. The frontiers estimated are used as benchmark to compare a company to others. In parametric approach, measurement is conducted using stochastic econometric modelling and to try to omit any effect of inefficiency. There are three econometric parametric approaches which are (1) Stochastic Frontier Approach (SFA); 2) Thick Frontier Approach (TFA); and 3) Distribution-Free Approach (DFA). Meanwhile non-parametric approach with Nonparametric Linear Programming Approach conducts non-parametric using no stochastic approach and tends to “combine” disturbance and inefficiency. This argument is constructed based on findings and observations from population and evaluated relative efficiency on the observed units. This approach is known as Data Envelopment Analysis (DEA).

The benefit of using DEA approach is that the approach does not meet explicit specification from a form of function and just requires little structures to construct the efficient frontiers. According to Rusydiana and Devi (2013), a weakness that might come up is “self-identifier” and “near self-identifier”.

Subandi and Ghozali (2013) argued that the difference between these two approaches is that parametric approach used to identify relationship between input and output requires accurate information on input price and sufficient simple as well as requiring proper form of
function of the frontier and structure from an on sided error (if needed). Meanwhile non-parametric approach does not require too much information as well as the assumption and required samples. Other main differences are that the parametric approach includes random error on the frontier while DEA does not require so.

According to Ascarya and Yumanita (2005), substantial differences among the three approaches in measuring efficiency performance is in terms of assumptions that shapes curve or the efficient frontier, treatment on random error, and inefficiency distribution of random error. Other substantial differences are that parametric approach includes random error on the frontier; meanwhile DEA approach does not include random error. As the consequence, DEA approach is not able to measure factors of price differences among regions, regulation differences, behavior of data, extreme observations, and other inefficiency factors. As the result, non-parametric approach can be used to measure efficiency more generally. The weakness of DEA approach is that one outlier can significantly affect measurement of efficiency of each company (Haddad et al., 2003).

According to Abidin and Endri (2010), DEA method is a non-parametric frontier using linear program model to measure the comparison of output and input ratio of all units in a population. The goal of DEA method is to measure efficiency level of Decision Making Unit (DMU i.e. bank) relative to the similar banks when all these units are on or below its efficient frontier curve. Thus the method is used to evaluate efficiency relative to several objects (performance benchmarking).

Berger and Young (1997) measured the relationship between quality of credit, cost efficiency, and bank’s capital in the United States. The result showed that credit default led to an increase in operating cost or a decline in cost efficiency as bank spent cost of monitoring and billing upon NPL. Banks with low quality of credit are required to provide reserve leading to decline in capital. This research also measured determining factors of low quality of credit leading to NPL that are external factors of economic policy, while internal factors are lack of credit distribution, inefficient portfolio management, credit analysis, collateral valuation, and moral hazard.

Naceur (2003) examined determining factors of profitability on banking industry in Tunisia. It is divided into two substantial categories which are internal determinants (liquidity, capital adequacy, and management cost) and external determinants (ownership, firm size, and economic condition). Findings of the research expressed that efficient management of cost is one of the most significant determinants of banks in obtaining high profitability. Economic condition such as inflation would have positive impact on profitability. The higher the interest rate, the lower the bank’s profitability is.

Profitability of foreign banks is much better than domestic ones. Several factors that drive this performance are (a) capital from foreign investors reduces fiscal cost of bank restructuring (Tang et al., 2000); (b) foreign banks have higher experience in managing risk and better
corporate governance that make foreign banks more efficient (Bonin et al., 2005); (c) the
presence of foreign banks increases competition that drive banks to reduce cost and improve
efficiency (Claessens et al., 2001). Moreover, domestic banks gain technology transfer developed
by foreign banks.

Prasnanugraha (2007) argued that based on the result of t test, it is seen that NPL, NIM,
and BOPO have partial impact n ROA while CAR and LDR do not have partial effect. ROA was
quite high even though NPL was relatively high as we in that year. The average NPL was still
below maximum level set by regulator by 4.14% thus ROA was considered to remain high.

Research on the impact of financial ratio on financial performance was also conducted
by Prananugraha (2007). Statistical analysis in the research is multiple linear regressions that
measure the effect of independent variables (CAR, NPL, LDR, BOPO, and NIM) on dependent
variables (ROA). The effect magnitude of independent variables (CAR, NPL, LDR, BOPO, and
NIM) on dependent variables (dividend payout ratio) can be simultaneously calculated through
multiple regression equation using SPSS program. Variables of CAR, NPL, LDR, BOPO, and NIM
have simultaneous effect on ROA. Meanwhile CAR and LDR do not have partial effect on ROA
while NPL, BOPO, and NIM have partial impact n ROA.

Warganegara (2011) conducted analysis on efficiency determinant of NIM in banking
industry during the period of 2006 – 2009. According to the analysis, banking industry in
Indonesia is considered inefficient compared to other banking industries in South East Asia.
Relatively high NIM becomes burden for the economy with the high intermediation cost. NIM
is affected by market power, bank’s quality management, bank’s size, and NPL policy.

Suyono (2005) conducted analysis of the impact of determinant of financial ratios of CAR,
BOPO, NIM, LDR, operating income growth (PLO), and credit growth (PK) on ROA. It is seen
that CAR, BOPO, NIM, LDR, NPL, PLO, and PK have significant impact on ROA. CAR and LDR
respectively have positive and significant impact on ROA while BOPO has negative and significant
impact on ROA. Furthermore NIM, NPL, PLO, and PK do not have significant impact on ROA.

III. METHODOLOGY
Population of this research is conventional banks in Indonesia during the period of 2012 to
2014, consisting of 108 banks. Those banks are respectively grouped into 4 State-owned
Banks, 39 Foreign Exchange Domestic Banks, 23 Non-Foreign Exchange Domestic Banks, 26
BPD, 6 mixed banks, and 10 KCBA (branch offices of foreign banks). Period of observation
is data of quarter 3 (Q1.2012 – Q4. 2014). The research employs secondary data of bank’s
financial data accessed from Indonesia Banking Statistics and Publication Report of period 2012,
2013, and 2014. The research consists of 2 stages which are 1) efficiency measurement using
intermediation approach; and 2) estimation of factor model that has significant impact which
are internal factors of bank on efficiency as exhibited below
Determinants of internal factor include size, type, NPL, CAR, LDR, BOPO, NIM, DEP, and GCG. They are explained as follow:

1. According PBI No. 14/15/PBI/2012 dated 24 October 2012 on Asset Assessment of Commercial Banks, it is mentioned that asset consists of productive asset and non-productive asset. Productive asset is funds allocation of banks to gain return in the form of credit and other securities, inter-bank placements of acceptance claim, securities claim that is purchased and commitment of reselling the securities, derivative claim, inclusion, transaction of administrative account, and provision of other funds similar to quoted earlier. Meanwhile non-productive asset are those that have potential lost in the form of taken over collateral, abandoned property, inter-office account, and suspense account.

2. Classification of commercial banks based on Indonesia Banking Statistics published by OJK consists of 4 State-owned Banks, 38 Foreign Exchange Banks, 29 Non-Foreign Exchange
Banks, 26 Local Banks (BPD), 12 Mixed Banks, and 10 Foreign Banks. Based on the ownership, bank is classified into three groups which are State-owned Banks, Foreign Exchange Banks, Non-Foreign Exchange Banks, Local Banks (BPD), while foreign banks consists of Branch Office of Foreign Banks (KCBA). In this research, type of banks is divided into 6 groups which are (1) State-owned Banks; (2) Mixed Banks; (3) Foreign Exchange Banks; (4) Non-Foreign Exchange Banks; (5) Local Banks (BPD); and (6) Branch Office of Foreign Banks (KCBA).

3. NPL or credit default, which is the ratio that shows quality of commercial bank’s asset, is measured using NPL Gross and NPL Netto. According to PBI No.14/15/PBI/2012 dated 24 October 2012 on the Asset Assessment of Commercial Banks is provision of funds or claims similar to it agreed upon the deal of borrowings between banks and other parties that requires debtor to settle the debt at maturity date with imposing interest rate including: (1) overdraft; a negative balance on time deposit account of customers failed to be settled at maturity; (2) taking over claim within the period of factoring activities; and (3) taking over or purchasing credit from other parties.

4. According to PBI No.15/12/PBI/2013 dated 12 December 2013 CAR is the Minimum Required Capital of Commercial Banks. In order to create health banking system and be able to develop as well as competing both domestically and internationally, banks need to improve the ability to mitigate risks caused by crisis and/or high growth of banking’s credit. In order to improve the ability to mitigate risks, it is needed improvement on quality and quantity of bank’s capital based on international standard mentioning that improvement of capital quality is conducted through some adjustments on components requirements and bank’s capital instrument, as well as adjustments on capital ratios. In order to enhance quantity of capital, banks need to provide additional capital above the minimum required capital adjusted to risk profile that serve as buffer when economic and financial crisis occurs which negatively affects financial system stability.

5. Loan to Deposit Ratio, abbreviated as LDR, is credit ratio distributed to the third party in Rupiah and foreign exchange which does not include credit to other banks, to third party’s fund including time deposit, savings, and deposits in Rupiah and foreign exchange which does not include inter-bank funds. Liquid asset management has to consider trade-off between liquidity and profitability (liquidity vs earning trade-off). According to SE BI No.13/30/DPNP dated 16 December 2011 on the third revision of SE BI No.3/30/DPNP dated 14 Decembers 2001 on Monthly Financial Report of Commercial Bank and Specific Report delivered to Bank Indonesia, it is mentioned that LDR is the comparison between credit to third party’s fund.

6. BOPO of operational efficiency ratio is the ratio that expresses comparison between operating cost and operating income (Riyadi, 2004). According to SE BI No.15/7/DPNP dated 8 March 2013, it is decided that benchmark of BOPO for commercial banks classified into BOOK 1 is up to 85%, BOOK II is 78 – 80%, BOOK III is 70 – 75%, and BOOK IV is 60 – 65%.
7. **Cost efficiency ratio** (CER) is the ratio used to measure how much non-interest rate cost spent by a bank to generate net interest income and other non-interest income (Timothy and Scott, 2000). **Non-interest expense** or frequently called as overhead cost consists of allowance for losses upon productive and non-productive assets, labor cost, employee allowance, as well as administration and general costs (electricity, telephone, building rents, transportation, maintenance, etc.). Meanwhile non-interest income consists of commission income and non-credit provisions, transfer income, check disapproval and intercity, gains from foreign exchange transaction, and other non-credit bank’s service income. Non-interest income is frequently called as *fee-based income*.

8. Third party’s fund consists of time deposit, Savings, and Deposits. Definition of each of them is mentioned in SE BI No.2/19/DSM dated 3 October 2000 on Monthly Report of Commercial Banks.

9. According to SE BI No.6/23/DPNP dated 31 Mei 2004 on Assessment System of Bank’s Health, it is mentioned that NIM (*Net Interest Margin*) is the comparison between net interest income and the average of productive assets.

10. The implementation of GCG in banking industry must always refer to the 5 basic principles which are (1) transparency which is the openness of relevant and material information access as well as the openness during the process of decision making; (2) accountability which is the clarity of functions and responsibility of bank’s organizations so that the implementation of GCG will run effectively; (3) responsibility which is the conformity between management of banks and laws; (4) independency which is professional banking management without any interference of other parties; and (5) *fairness* which is the equality in fulfilling rights of stakeholders that emerge upon agreement and laws.

    The first stage of this research is to measure efficiency using DEA method which is to compare input and output variables using intermediation approach considering that banking is intermediation institution that distributes funds from surplus units to deficit units in the form of credit to drive domestic economic growth. DEA consists of 1 output (O) and 1 input (I), which is respectively the total of the following accounts:
In assessing efficiency in the above Table 3, definition of output and input variables are defined based on PBI No.2/21/PBI/2000 dated 19 September 2000 on Monthly Report of Commercial Banks as follow:

1. Credit is distribution of funds or claims similar to it, agreed upon the deal of borrowings between banks and other parties that requires debtor settle the debt at maturity with interest rate imposed.

2. Operating interest income is defined as interest income in Rupiah and foreign exchange from investment of a bank upon citizen non-citizen.

3. Non-interest income is all income in Rupiah and foreign exchange obtained from non-interest operational activities for instance the increase in fair value of credit and securities, gains from sales of securities, and gains from derivative transactions.

4. Fixed Asset is an asset of a bank that is used to support bank’s operating activities including from *finance lease*.

5. Labor cost includes wages, salaries, and other allowances paid to management and employee (both permanent and non-permanent) of bank before being subtracted from income tax and other cost cuts; payment to commissioner/supervisory council of bank and all labor costs excluding wages, salaries, and allowances such as over-time wage and health insurance.

6. Third party’s fund that consists of time deposit, savings, and deposits is collected funds from public.

Technical efficiency of banking is measured using ratio between output and input of banking. DEA calculates banks that use input $n$ to generate different output $m$ (Miller and Noulas, 1996 in Etty Puji Lestari, 2001). Bank’s efficiency is measured using the following formula (Lestari, 2001):

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Input-Output Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td><strong>Source</strong></td>
</tr>
<tr>
<td>O: Total of:</td>
<td></td>
</tr>
<tr>
<td>Credit</td>
<td>Balance Sheet</td>
</tr>
<tr>
<td>Interest Income</td>
<td>Income Statement</td>
</tr>
<tr>
<td>Non-Interest Income</td>
<td>Income Statement</td>
</tr>
<tr>
<td>I: Total of:</td>
<td></td>
</tr>
<tr>
<td>Fixed Asset</td>
<td>Balance Sheet</td>
</tr>
<tr>
<td>Labor Expenditure</td>
<td>Income Statement</td>
</tr>
<tr>
<td>Third Party's Fund</td>
<td>Balance Sheet</td>
</tr>
</tbody>
</table>
where $h_t$ is the bank’s technical efficiency; $m$ is bank’s output (O1, O2, O3); $n$ is bank’s input (I1, I2, I3); $y_{rk}$ is the number of output $r$ produced by banks; $x_{ri}$ the number of input $r$ used by banks; $\mu_{rk}$ is the weight of input $r$ of bank $k$; and $r$ is calculated from 1 to $m$ while $i$ is calculated from 1 to $n$.

The second stage is to estimate the impact of bank’s internal factors that serve as independent variables to dependent variable of efficiency (the result of DEA measurement) using data panel regression. The third stage is to estimate the impact of bank’s internal factors and DEA efficiency result as independent variable on ROA as dependent variable. In general, using data panel, it will create different intercept and coefficient slope on each bank and on each period. As the result, estimation of regression equation will strongly depend on assumptions constructed about the intercept, slope coefficient, and disturbing variables. In order to estimate model parameter using data panel, there are several alternative technique which is fixed coefficient time series and individual (Common Effect): Ordinary Least Square. This technique is similar to run regression using cross-section or time series data. Before running the regression, it is needed to combine cross-section with time series (pool data). Furthermore the data is treated as unity of observation to estimate model using OLS method. This method is well-known as Common Effect. Nevertheless the difference will not appear across individuals and across period by combining the data. In other words, this approach does not consider individual and time dimensions. It is assumed that data across firm is the same across periods of observations.

Assumption that $\alpha$ and $\beta$ will be equal (constant) for each time series and cross-section data, then $\alpha$ and $\beta$ are estimated using the following model.

$$
EFF_{it} = \alpha_1 + \beta_1 SIZE_{it} + \beta_2 TYPE_{it} + \beta_3 NPL_{it} + \beta_4 1CARI_{it} + \beta_5 LDR_{it} + \beta_6 BOPO_{it} + \beta_7 DEP_{it} + \beta_8 NIM_{it} + \beta_9 GCG_{it} + \epsilon_{it}; i = 1,2,\ldots,N; t = 1,2,\ldots,
$$

Dependent variable is efficiency ($EFF_{it}$); meanwhile independent variables include Total Asset (Size), Type of Banks (Type), Non-Performing Loans (NPL), Capital Adequacy Ratio (CAR), Loans to Deposit Ratio (LDR), Ratio of Operating Cost to Operating Income (BOPO), composition of Deposits to Third Party’s Fund (DEP), Net Interest Margin (NIM) and Good Corporate Governance (GCG).
IV. RESULT AND ANALYSIS

Efficiency score using DEA method is ranging between 0 and 1. Efficiency with score of 1 showed that the bank is the most efficient among the samples within certain periods, while efficiency score of other banks is relative to the more efficient bank. Bank with efficiency score closed to 0 reflects that the bank is inefficient (Mansyur, 2012).

In the Q4 2012, there is only 1 bank with efficiency score by 1 (Domestic Foreign Exchange Bank) and there are 6 banks that have efficiency score by 0.76 – 0.99 while other 101 banks have efficiency score lower than 0.75. In Q4 2013, there is 1 state-owned bank that has efficiency score by 1 and there are 2 foreign exchange banks with efficiency score by 0.76 – 0.99, while the other 105 banks have efficiency score below 0.75. In Q4.2014 there is no banks that have efficiency score by 1, and there are only 6 banks that have efficiency score by 0.76 – 0.99 while the other 102 banks have efficiency score below 0.75. The result of efficiency measurement for the overall 108 banks is exhibited in Table 4.

Based on the result of efficiency measurement, it is seen that banking in Indonesia is considered inefficient within 3 years of research periods which is in accordance with bank’s internal factors such as financial indicators that bank’s asset in 2014 (Rp. 7,303.82 trillion) has

<table>
<thead>
<tr>
<th>Years</th>
<th>Type</th>
<th>The Number of Banks based on the range of efficiency value</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0-0.50</td>
<td>0.51-0.75</td>
</tr>
<tr>
<td>2012</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>38</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>34</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>2014</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>34</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Efficiency Score using DEA method per individual bank
increased higher compared to 2013 (Rp. 6,531.92 trillion) and 2012 (Rp. 5,607.87 trillion). Nevertheless ROA tends to be stable by 2% to 3%’ NIM of banking in Indonesia is relatively higher by 5.49% (2012), 4.88% (2013), and 4.23% (2014) compared to other countries such as Philippines by 3.3%, Thailand by 2.6%, Malaysia by 2.3%, and Singapore by 1.5%, while BOPO of banking industry in Indonesia is approximately 66% to 83%.

**Estimation Result of the Impact of Factors on Efficiency**

Based the estimation of internal factors model, determinant of efficiency is exhibited as follow:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-0.011056</td>
<td>0.111028</td>
<td>-0.099579</td>
<td>0.9207</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.032349</td>
<td>0.003269</td>
<td>9.895937</td>
<td>0.0000</td>
</tr>
<tr>
<td>TYPE</td>
<td>-0.030435</td>
<td>0.004369</td>
<td>-6.965801</td>
<td>0.0000</td>
</tr>
<tr>
<td>NPL</td>
<td>-0.008610</td>
<td>0.003480</td>
<td>-2.474221</td>
<td>0.0135</td>
</tr>
<tr>
<td>KPM</td>
<td>0.002136</td>
<td>0.000413</td>
<td>5.173256</td>
<td>0.0000</td>
</tr>
<tr>
<td>LDR</td>
<td>-0.000270</td>
<td>0.000133</td>
<td>-2.024566</td>
<td>0.0431</td>
</tr>
<tr>
<td>BOPO</td>
<td>-0.000496</td>
<td>0.000592</td>
<td>-0.838013</td>
<td>0.4022</td>
</tr>
<tr>
<td>DEP</td>
<td>-0.008728</td>
<td>0.022775</td>
<td>-0.383245</td>
<td>0.7016</td>
</tr>
<tr>
<td>NIM</td>
<td>0.000347</td>
<td>0.002190</td>
<td>0.158610</td>
<td>0.8740</td>
</tr>
<tr>
<td>GCG</td>
<td>-0.009772</td>
<td>0.010166</td>
<td>-0.961284</td>
<td>0.3366</td>
</tr>
<tr>
<td>CER</td>
<td>-0.001177</td>
<td>0.000308</td>
<td>-3.828072</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

According to the above estimation in Table 5, it can be interpreted that the regression output generates lower R-squared by 0.147780. It shows that independent variables can only explain efficiency by 14.77% while the rest 85.23% bank’s efficiency is explained by other factors that are not observe in this research.

The impact of bank size proxied by total asset on technical efficiency is shown by $\beta_1 = 0.032349$ which means bank size has positive impact with probability below 0.05%. It shows that bank size has significant impact on technical efficiency of domestic banks. Furthermore
banks with larger asset have infrastructure in the form resource, information technology; sufficient organizational structure that supports bank’s operating activities. The banks are also supported by office network laid in all areas, various and complex banking products so that the banks will be more efficient with specific input to generate output in the form of transaction service to the public, credit distribution and placements of productive assets to generate profit. Large banks tend to have comprehensive internal policy so that all operating activities of bank runs optimally and well-structured based on the respective authority. It is confirmed by the result of research that banks that have efficiency score closed to 1 are state-owned banks which are BRI and Bank Mandiri compared to other banks in Q4. 2014 by respectively Rp. 778.08 trillion and Rp. 757.04 trillion. In line with other previous studies, it is confirmed that banks with larger total asset tend to have higher efficiency compared to banks with relatively lower total asset. Boahene et al (2012) argued that large scale banks are better than small scale banks since banks with larger assets are able to manage the operations timely and it works on better economies of scale. Other researches expressed that bank size does not really matter to improve banking efficiency. Nevertheless, the improvement of technical aspects through high technology utilization equipped with knowledge and skills will generate higher productivity (Omar et al, 2006); factors of bank size, types of bank, capital adequacy ratio, loan to deposits ratio, operating cost, and net interest margin have significant impact on technical efficiency (Subandi and Ghozali, 2013). Nevertheless, there are several researches that contradict with the result of this research. Ataullah et al (2004) argued that efficiency tends to decline in the large banks group, public banks, as the bank’s organization tends to be complicated and political compared to smaller foreign private banks.

The impact of bank’s type, that consists of 6 groups of bank, on technical efficiency is shown by the coefficient $\beta_2 = -0.030435$ with probability 0.0000. It means that bank’s type has significant impact on technical efficiency of domestic banking. Bank’s type consists of 6 categories which are (1) State-owned Banks, (2) Mixed Banks, (3) Foreign Exchange Domestic Banks, (4) Non-Foreign Exchange Domestic Banks, (5) BPD, and (6) Branch Offices of Foreign Banks (KCBA). The score is to attribute characteristics of the respective group of banks and cannot be interpreted as performance measurement. Coefficient of the impact of bank’s type on efficiency is -0.030435. It can be concluded that banks with the score closed to 1 is considered efficient. It is in line with the result of efficiency measurement using DEA expressing that banks with efficiency score closed to 1 are state-owned banks which are BRI and Bank Mandiri. The result confirms study of Handayani (2005) who argued that foreign banks performance regarding financial ratios proxy are not always superior compared to mixed banks and other domestic banks, vice versa. Each of public banks has the same opportunity to be superior compared to other public banks disregarding whether the bank is domestic ones, foreign ones, or mixed. Nevertheless, it contradicts with the prior researches of Kurnia (2004), Haddad et al. (2003), and Astiyah and Hausman (2006) expressing that foreign banks are more efficient.
The impact of gross NPL of banks on technical efficiency is shown by $\beta_3 = -0.008610$ and probability by 0.0135. It means that gross NPL has significant and negative impact technical efficiency of domestic banks. Banks with high NPL will generate higher cost of reserve establishment of credit allowance. It will affect income and bank’s capital. Besides establishing reserve, banks also need more human capital on recovery and collection units that are responsible to manage credit so that NPL is expected to decline. If banks manage NPL below 5% following the regulation, then those banks are expected to be more efficient as collection and recovery costs and the establishment of minimum required reserve are minimized to achieve higher efficiency. According to Berger and Mester (1997) and Kwan and Eisenbeis (1995), banks with higher efficiency tend to have lower NPL.

The impact of CAR on technical efficiency is explained by $\beta_4 = 0.002136$ with profitability 0.0000. It shows that CAR has positive and significant on technical efficiency of domestic banks. CAR is the comparison between capital and Risk-Weighted Asset. It measures the extent to which bank’s capital to mitigate potential lost that might emerge from credit risk, interest rate risk, and liquidity risk. If the capital is assumed to be fixed and Risk-Weighted Asset increases, then it will decrease CAR. The increase in Risk-Weighted Asset has potential impact on the increase in credit while capital must be able to mitigate the risk that may emerge from them. The result of this research shows that CAR has positive and significant impact on bank’s efficiency which means the ability of bank’s capital to absorb the risks indicates that the banks are efficient. Prior research of Suyono (2005) argued that CAR has partial impact on ROA of commercial banks in Indonesia during the period of 2001 – 2003 with the level of significance by 5%. The same result is also suggested by Ghozali (2013) that factors of capital adequacy ratio significantly affect the technical efficiencies.

The impact of LDR on technical efficiency is explained by $\beta_5 = -0.000270$ with probability by 0.0431. It shows that LDR has significant and negative impact on technical efficiency of domestic banks. LDR is one way to measure the extent to which a firm can generate liquidity. LDR is used to measure banking intermediation performance and serves as indicator of bank’s liquidity. The higher funds that serve as liquidity buffer and the higher the buffer compared to the required liquidity, the higher the probability of funds to be unproductive. It eventually leads to inefficiency. Besides serving as liquidity, LDR is also used to measure the role of bank as intermediation institution. The higher the LDR, the higher the quality of bank’s intermediation role. It is indicated by LDR ranging from 79% to 92%. Ongore and Kusa (2013) argued that capital adequacy, asset quality, and management efficiency have significant impact on financial performance of commercial banks in Kenya. Nevertheless it does not happen on liquidity. LDR has partial and significant impact n ROA of commercial banks in Indonesia during the period of 2001 – 2003 with level of significance of less than 5% (Suyono, 2005).

The impact of BOPO on bank’s technical efficiency is shown by $\beta_6 = -0.000496$ with probability of 0.4022. It indicates that BOPO has negative but insignificant impact on technical
efficiency of domestic banks. BOPO is actually the ratio of all operating costs to operating revenue while efficiency is measured from the comparison between output (credit, interest income, and non-interest income) and input (fixed asset, inventories, labor cost, and third party’s fund). In BOPO ratio, operating costs serve as numerator while in measuring efficiency, operating costs serve as denominator. It eventually affects probability value of regression of BOPO on efficiency. The result contradicts with research of Berger and Mester (1997) expressing that the higher the cost, the lower the efficiency. Furthermore, research from Subandi and Ghozali (2013) showed that operating cost factors and net interest margin have significant impact on technical efficiency. Moreover, the result also contradicts with the theory that expresses the higher the BOPO, the higher the inefficiency of the bank. In order to solve the problem, it is conducted other analysis of efficiency ratio which is Cost Efficiency Ratio (CER). It is the ratio between overhead cost and income interest and fee-based income. Based the regression output regarding the impact of CER on efficiency, it is found that CER has significant impact on technical efficiency which is explained by $\beta = -0.001177$ with probability of 0.0001. This finding is in line with theory and prior researches expressing that the lower the expenses, the higher the efficiency bank could create.

The impact of DEP, representing composition of deposits on third party’s fund, on technical efficiency is explained by $\beta7 = -0.008728$ with probability of 0.7016 (higher than alpha 5%). It shows that the composition of deposits on third party’s fund has negative but insignificant impact on technical efficiency. The effect is insignificant as interest rate imposed applied for credit is market rate and banks do not impose special rate above deposits rate. Besides the insignificant impact is also caused by behavior of customer which is not sensitive on fluctuations of interest rate. The other reason is that public literacy on financial institution and financial products as well as the regulation set by OJK on October 2014 that interest rate is adjusted (restricted) based on types of BOOK the banks are grouped into. Prior researches on the impact of third party’s fund (Subandi and Ghozali, 2013) argued that ratio of deposits on loan has significant impact on technical efficiency.

The impact of NIM on technical efficiency is explained by $\beta8 = 0.000347$ with probability 0.8740 (higher than 5%). It shows that NIM has positive but insignificant impact on technical efficiency of domestic banking. NIM theoretically has negative impact on efficiency, which means the higher the NIM, the lower the efficiency. The insignificant impact occurred as NIM in Indonesia is relatively high thus the competition is not tight to determine NIM in banking industry. Prior researches (Aberu and Mendes, 2001) argued that NIM positively reacted to operating cost, but insignificant on earnings before tax.

The impact of GCG on technical efficiency is explained by $\beta9 = -0.009772$ with probability of 0.3366 (higher than 5%). It means that GCG has negative but insignificant impact on technical efficiency of domestic banking. The insignificant impact occurred as GCG score is made using self-assessment, thus it does not reflect the real GCG implemented by banks. The score of GCG
that reflects objective performance is conducted by financial service authority. The constraint of this research is that the GCG data from financial service authority cannot be published and cannot be used for this research. Prior researches by (Ongore and Kusa, 2013) concluded that management efficiency has significant impact on commercial bank in Kenya.

Of the nine independent variables, it can be concluded that the most dominant variable is bank size with regression coefficient by 0.032349 while the least dominant variable is LDR with regression coefficient by -0.000270.

V. CONCLUSION

According to the above findings, it can be concluded that:

1. Commercial banks are not fully efficient during the period of observation. In Q4.2012, banks with efficiency score of 1 consist of 1 Foreign Exchange Banks and there are only 6 banks that have efficiency score ranging from 0.76 to 0.99 while the other 101 banks have efficiency score by less than 0.75.

2. In Q4. 2013 banks that have efficiency score by 1 is 1 state owned-banks while there are 2 Foreign Exchange Banks that have efficiency score ranging from 0.76 – 0.99. Meanwhile, there are 105 banks that have efficiency score by less than 0.75.

3. In Q4. 2014, there are no banks that have efficiency score by 1 while there are 6 banks that have efficiency score ranging from 0.76 to 0.99. Meanwhile, there are 102 banks that have efficiency score by less than 0.75.

4. Internal factors, measured by DEA, that have negative and significant impact on technical efficiency are NPL, LDR, CER, and composition of deposits on third party’s fund (DPK). Meanwhile, the ones that have positive impact are CAR and NIM. Internal factors that do not have impact on technical efficiency are GCG.

According to the above findings, then banks need to concern more on their internal factors that have significant impact on efficiency. Those variables are bank size, bank’s type, NPL, CAR, and LDR. Banks can use the following strategies to:

1. Well-managing credit to maintain 5% of NPL by distributing credit using the principles of prudent-banking, preparing qualified human capital in charged to manage credit, restructuring credit that potential lost, not to distribute credit on any economic sectors that do not have positive prospect in the future, implementing risk tolerance and risk appetite to mitigate the risk of managing credit.

2. Improving capital capacity to drive bank’s operations efficiency. Banks that have met the requirements of BOOKS (BUKU) are expected to run their business activities efficiently. Complexity of banking business activities should be supported by minimum required capital as regulated in the classification of BOOKS (BUKU)
3. Optimizing source of fund from third party’s fund to distribute in the form of credit by applying the principle of prudent-banking by emphasizing on the importance of human capital efficiency along with supporting infrastructure to achieve bank’s efficiency.

Moreover the research also provides policy implication such as OJK that serves as supervisory authority of banking industry can use the result of this research to formulate policies regarding supervisory actions. Policy series of OJK to implement restriction on interest rate based on BOOKS (BUKU) is considered appropriate to drive higher profitability and efficiency of banking industry. It is needed commitment from banking industry to comply and to publish the score of GCG based on facts to reflect objective performance as GCG does not have significant impact on efficiency.

By considering that efficiency measurement just uses intermediation approach and independent variables consist of bank’s internal factor, then there will be recommendations and suggestions for further research:

1. Adding macroeconomic factors in the analysis of efficiency level and its impact on profitability. Those variables are credit interest rate, inflation, economic growth, and foreign Exchange.

2. Analysis on the comparison between the efficiency of banking in Indonesia and South East Asia regions as well as conducting analysis on the comparison of Syari’ah banking and conventional banking.

3. Efficiency assessment can be completed by measuring efficiency using parametric methods. Besides it can be also conducted analysis on the comparison of result of efficiency assessment using parametric and non-parametric approach.
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INTRA ASEAN-5 CAPITAL FLOWS: DO THEY REPRESENT NEOCLASSICAL BELIEF OR LUCAS PARADOX?

Nurul Qolbi¹
Akhmad Syakir Kurnia²

Abstract

The neoclassical belief the capital flows downhill from rich to poor countries as a consequence of capital endowment variation. In contrast to the neoclassical belief, Lucas found evidence that capital tends to flow uphill. This paper investigates the intra ASEAN-5 capital flows. Using panel estimation, we found that both neoclassical variables and Lucas variables appear as determinants for the capital flow from Indonesia, Malaysia, Philippines, and Thailand to Singapore as a host country. On the contrary, the capital flow from Singapore to other ASEAN countries as host countries is encouraged only by Lucas variables. Furthermore, the downhill capital flow from rich country to ASEAN countries including Indonesia is influenced by the quality of institutions, human capital as well as per capita GDP that is an evidence for Lucas Paradox rather than neo-classical variables.

Keywords: capital flow, neoclassical belief, lucas paradox, panel data model

JEL Classification: F21, O16

¹ Department of Economics and Development Studies, Faculty of Economics and Business, Diponegoro University (uul.qolbi@gmail.com).
² Department of Economics and Development Studies, Faculty of Economics and Business and Center of Development Research Diponegoro University (akhmadkurnia@undip.ac.id)
I. INTRODUCTION

Massive capital mobility across countries is the opportunity of capital inflow that may drive economic growth. The flow of capital may drive capital accumulation in host country and may help diversify risks. It can also imply the capital allocation efficiency to drive higher economic performance (Okada, 2013).

The elimination of barriers of capital mobility will also attract investors to invest in a country. It will drive higher balance of payment, lower cost of debt, and eventually drive economic growth (Djaafara et al, 2012). Meanwhile indirect impact shows that capital inflow will contribute to promote higher growth of productivity through technology transfer (Okada, 2013). Besides that, international capital mobility facilitates distribution of global financial resources for production activities (Alfaro, Kalemli-Ozcan, and Volosovych, 2007).

The neoclassic theory argues that downhill capital flows from rich countries (capital abundant) to poor ones (capital scarce). When all countries have the same opportunity to access the same technology and produce the same products while gap of income per capita reflects gap of returns, then new investment will be conducted in poor countries. In the other hand, Heckscher-Ohlin model explicitly predicts that capital will flow from countries with lower interest rates to countries with higher interest rates (Pogoda, 2012).

Nevertheless, Robert E. Lucas, Jr (1990) in his article titled “Why doesn’t capital flow from rich to poor countries?” questioned the assumptions validity mentioned in neoclassic model. Lucas found empirical evidence that capital flows “uphill” from poor countries to rich countries. This phenomenon is subsequently known as “Lucas Paradox.” According to him, if neoclassic model is proven and the international capital market becomes free (competition) and perfect, countries will experience gap of investment and capital return.

Theoretical explanation about Lucas Paradox is divided into two aspects (Alfaro, 2008). First, it includes fundamental difference that affects production structure in an economy such as technological gap, omitted factors in production function, government policy, and institutional structure. Alfaro (2008) concluded that the increase in international capital flow, as the impact of financial openness, is in line with the increase in institutional quality.

Second, imperfect capital market due to asymmetric information and sovereign risk. Empirical study of Herrmann and Kleinert (2014) on member of European Monetary Union countries shows that imperfect market will slow down capital allocation efficiency. As the consequence, capital flow to poor countries and-in dynamic perspective; Allocation Puzzle1 - to fast-growing economies that grows slower than neoclassic model predictions.

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1 Gourinchas and Jeanne (2007) found that capital flow to emerging economies is not only based in size but is also allocated to countries with economic growth lower than other emerging economies.
South East Asian countries has achieved the stage of liberalization of capital mobility of Foreign Direct Investment (FDI), especially inward investment and liquidity. Nevertheless there is upper limit of outward investment in Malaysia, Philippines, and Thailand. Since 2010, the barriers has been removed gradually.

<table>
<thead>
<tr>
<th>HOST</th>
<th>Brunei Darussalam</th>
<th>Cambodia</th>
<th>Indonesia</th>
<th>Lao PDR</th>
<th>Malaysia</th>
<th>Myanmar</th>
<th>Philippines</th>
<th>Singapore</th>
<th>Thailand</th>
<th>Vietnam</th>
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<td>-</td>
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<td>0.00</td>
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<td>79.80</td>
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<td>14.84</td>
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</tr>
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<td>(0.06)</td>
<td>-</td>
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<td>0.48</td>
<td>0.38</td>
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<td>71.33</td>
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<td>0.30</td>
<td>-</td>
<td>1.10</td>
<td>32.62</td>
<td>1863.20</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
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<td>23.70</td>
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<td>-</td>
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<td>48.97</td>
<td>79.96</td>
<td>-</td>
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<td>80.10</td>
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<td>(74.10)</td>
<td>2386.20</td>
<td>(50.66)</td>
<td>1517.34</td>
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</table>

Source: ASEAN Secretariat - ASEAN FDI Database, 31 December 2014

In 2011, capital inflow of FDI in ASEAN reached USD 97,538.12 million with the following details. It is about USD 15,228.44 million of intra-ASEAN and about USD 83,564.36 million beyond ASEAN. FDI flow of intra-ASEAN of 2011 is exhibited in Table 1. FDI flow is mostly concentrated in ASEAN-5 and it was just small capital flow to other ASEAN countries (Brunei Darussalam, Cambodia, Laos, Myanmar, and Vietnam – BCMLV). It seems negated that the largest capital flow in ASEAN actually flows to ASEAN 5. Of the total FDI coming to ASEAN 5 in that period, Indonesia becomes the largest intra-ASEAN FDI destination by USD 8,334.45 million with Singapore as the largest source country by USD 8,514.13 million. Thus referring to FDI that flows from the same region countries, it is seen that the largest flow goes to Indonesia – a country with low per capita income – is in line with the theory of neoclassic model. Nevertheless, it does not happen in Philippines, a country with low per capita income as well.

A theory expressing capital flow that is line with the neoclassic model is acceptable considering the explaining factors. Nevertheless, what would happen to the capital flow of ASEAN 5 if it is assumed that the countries within the region closed to capital inflow from non-

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4 14th Meeting of the ASEAN Working Committee on Capital Account Liberalization, Kuala Lumpur, July 2009. see Djafaara et. al. (2012).
ASEAN countries? Does Lucas Paradox occur in this region? These urgent questions underlie the purpose of this research.

The next session of this research elaborates related theory and literatures. The third part provides data and estimation technique. The fourth session will deeply explain the estimation result and the analysis, while the fifth part will provide conclusion and recommendation.

II. THEORY

Several researches about international capital flow is conducted by Lucas (1990). According to Lucas (1990), Marginal Product of Capital India is 58 times larger than the United States in 1988. Nevertheless after including the stocks of human capital, the result estimated that productivity of each of labor in rich country (United States) is equal to five people in poor country (India). If the gap of human capital across countries is included, then capital flow to poor countries will be less than prediction of neoclassic model. Instead, stock of human capital in rich countries will drive higher capital flow to countries that have abundant capital.

Alfaro, Kalemli-ozcan, and Volosovych (2007) (AKV) conducted a research on the capital flow across countries and volatility of its determining factors across 1970 – 2000. Theoretically, quality of institution is the most important determining factor of capital flow. Meanwhile it is empirically proven that quality of institution is strongly related stock of human capital and sovereign risk. Lack of capital flow from rich countries to poor countries motivated AKV (2007) to conduct next research in 2008. The research is intended to test phenomenon of Lucas Paradox. The result suggested that quality of institution is a causal variable in Lucas Paradox explanation. There is gap of quality of institution between rich countries and poor countries. Policies to strengthen property rights, to reduce corruption, and to uphold orders must be implemented by government of poor countries in order to increase the capital inflow. Besides, foreign investment moderated with high quality of institution will drive higher development in the future.

Okada (2013) also conducted analysis on Lucas Paradox expressing focusing on two factors that explained capital flow. The impact of financial sector globalization on international capital flow depended on the quality of a country’s financial institution. Meanwhile financial openness and the quality of institution do not have significant impact on the individual international capital flow. Nevertheless interactions between the two variables have significant impact. Besides that, institutional factors, quality of bureaucracy, law, and orders have important role on determining FDI. Financial openness and improvement of financial institution quality leads to international capital to drive higher economic performance.

Herrmann and Kleinert (2014) conducted empirical study on Lucas paradox in other countries (in other regions). The research focuses on observing country member of European Monetary Union (EMU) to identify whether there is gap in capital flow in the region using Lucas
Paradox or Allocation Puzzle Hypotheses. The result is that there was no empirical evidence expressing that Lucas Paradox for international capital flow. After evaluating the Lucas Paradox in emerging markets, it is found that empirical evidence expressing that Lucas Paradox applies in countries that are trying to be grow faster and among that, net capital flows to rich countries. Meanwhile, after observing the trend of gross capital flow, it shows that international capital flow (gross) is in line with Lucas Paradox. In the other hand, imperfect market will hamper efficiency of capital allocation. As the consequence, the flow of capital to poor countries and – in dynamic perspective; Allocation Puzzle – to fast-growing economies are relatively lower than the estimation of neoclassic model.

In order to obtain comprehensive description on how the empirical model works, thus it describes basic theories on capital flow and its determining factors.

2.1. Neoclassic Investment Theory

Investment is one aggregate expenditure variables in national income components (Gross Domestic Product/GDP) even though it is less than consumption expenditure (Mankiw, 2013). Investment is divided into three aspects investment in fixed asset (machinery and equipment), residential investment (construction), and inventory investment purchased by private sectors. Fixed asset investment model – neoclassic investment theory – examined cost and benefit to invest in capital goods. This theory assumes that there two types of firms. First, production firms that generate goods and service using rented capital. Second, leasing companies (called as the owner) that purchase capital and rent it to production firms.

Firms lease capital in the rent level (R) and sell output on price level (P). Meanwhile, production firms cover real expenses by (R/P) for each capital unit. Therefore the increase in real benefit obtained for each of capital unit is called marginal product of capital (MPK). MPK is basically the return from capital investment and rent. If leasing firms want to maximize the benefit, thus capital should be rented until MPK is equal to the real price of rent.

In order to explain leasing price equilibrium and its determining variables, it is used the following Cobb-Douglass production function:

\[ Y = AK^\alpha L^{1-\alpha} \]  

(1)

where (Y) is output, (K) is capital, (L) is labor, A is technology, and \( \alpha \) is parameter between zero and one that measures capital on output. Meanwhile, MPK (\( r \)) for Cobb-Douglass production function is:

\[ r = \alpha A (L/K)^{1-\alpha} \]  

(2)
As the real price of rent is equal to MPK in the equilibrium, thus

\[ \frac{R}{P} = \alpha A \left( \frac{L}{K} \right)^{1-\alpha} \]  \hspace{1cm} (3)

The explanation of equation (3) shows that the lower the capital reserve, the higher the labor employed, the better the technology, the higher the real price of leasing and capital.

In the other hand, revenue from capital leasing firms is benefit of capital ownership. Capital leasing firms receive real leasing price from capital \( \left( \frac{R}{P} \right) \) for each capital that the firm has and lease. Nevertheless, leasing firm also covers the cost of its capital ownership, which is credit interest rate \( (i) \), cost of lost and profit of leasing firm \( (-\Delta P_K) \), and depreciation \( (\delta) \), thus:

\[ R_K = iP_K - \Delta P_K + \delta P_K \]

\[ R_K = P_K(i - \Delta P_K/P + \delta) \]  \hspace{1cm} (4)

If it is assumed that the price of capital goods increase along with the increase of other goods, where \( \Delta P_K/P \) is equal to overall inflation \( \tau \), thus cost of capital will depend on capital price, real interest rate, depreciation, thus:

\[ R_K = P_K(i + \delta) \]  \hspace{1cm} (5)

Meanwhile real cost of capital\(^5\) is expressed as follow:

\[ R_{K_{\text{real}}} = \left( \frac{P_K}{P} \right) (i + \delta) \]  \hspace{1cm} (6)

It expresses that real cost of capital highly depends on relative price to capital goods, interest rate, and depreciation rate.

Leasing firms will receive real income \( (R/P) \) and will cover real cost \( (P_K/P) (i+\delta) \) for the respective capital unit that is being leased. Thus, real profit per capital goods can be expressed as follow:

\[ \pi = \left( \frac{R}{P} \right) - \left( \frac{P_K}{P} \right) (i + \delta) \]  \hspace{1cm} (7)

As real price of lease is in equilibrium condition of MPK, then profit per capital unit can be expressed as follow:

\[ \pi = r - \left( \frac{P_K}{P} \right) (i + \delta) \]  \hspace{1cm} (8)

---

\(^5\) Real cost of capital is a cost to purchase and lease capital unit measured in unit of economic output.
According to equation 8, a firm would gain a profit when MPK is larger than cost of capital. Instead, the firm would suffer from lost if MPK is lower than cost of capital.

Investment decision of leasing firm to either increase capital reserve or to let the existing capital depreciated actually depends on the potential profit. Meanwhile, changes in capital reserve or net investment highly depends on MPK and cost of capital. A firm will gain a profit if it increase capital reserves, exactly when MPK is larger than cost of capital. Nevertheless, if MPK is lower than the cost of capital, the leasing firm will let the capital reserve remain lower.

A firm that optimizes its capital for production will enjoy additional benefit per capital unit (MPK) and will cover cost of capital. Meanwhile a firm that leases its capital to a manufacturing firm will increase its capital reserve if the MPK is larger than the cost of capital. Thus, additional capital reserve can be expressed as follow:

$$\Delta K = I_n \left[ r - \left( \frac{P_K}{P} \right) (i + \delta) \right]$$  \hspace{1cm} (9)

where $I_n ()$ is the function that expresses respond of investment incentive towards net investment. Thus investment function can be derived from total expenditure on fixed investment of business. Consequently fixed investment of business depends on MPK, cost of capital, and depreciation:

$$I = I_n \left[ r - \left( \frac{P_K}{P} \right) (i + \delta) \right] + \delta K$$  \hspace{1cm} (10)

The neoclassic investment model expressed in equation 10 expresses that investment decision is determined interest rate. Decline in real interest rate will decrease cost of capital. Subsequently it increases profit gained from capital ownership as well as to increasing incentive to drive higher capital accumulation. And so does the increase in real interest rate that will
increase cost of capital that drives the firm to reduce its investment. It eventually drives the curve of investment lean down. Meanwhile the increase in MPK will increase profitability upon the investment. It drives the curve to shift to the right (see Figure 1)

If it is done an adjustment of capital reserve simultaneously, MPK will gradually approach the cost of capital. When the capital reserve is on mature condition, then MPK can be expressed as follow:

\[
r = \left( \frac{P_K}{P} \right) (i + \delta)
\]  

(11)

In the long-run, MPK will be equal to real cost of capital. Reaching the mature level depends on the speed of the firm to do adjustment on its capital reserve. Investor decision is actually based on the calculation of rate of return. In other words investment actually depends on MPK\(^6\), which is a measurement of productivity of one unit capital/investment.

2.2. International Capital Flow

Foreign investment is divided into two categories which are portfolio investment and foreign direct investment (FDI). Portfolio investment is an investment in the form of financial asset i.e. bonds, stocks, and other securities expressed in domestic currency. Meanwhile, FDI is foreign investment in the form of capital goods, land, and inventory. FDI is generally conducted by multinational firms (MNCs) that serve in natural resource management, manufacturing, and services (Salvatore, 2013).

The movement of FDI could provide potential benefit and cost to the host countries. Potential benefits are the increase in salary, wages, output, exports, and tax. It is driven by the increase in investment (capital) offset by the increase in labor force and sophisticated technology that will drive higher output. Production activities that provides potential exports will benefit the host countries by gaining foreign currency to drive higher development. The flow of FDI to an industry is also expected to increase economies of scale of the industry. Besides, the inflow of foreign investment that means the existence of new competitors in the industry is expected to reduce domestic monopoly power.

Efficiency of the use of capital, as the impact of foreign investment, occurs in both home countries and host countries as there is domestic income redistribution. It can be illustrated in Graph 2 assuming there two production factors, capital and labor that are optimally utilized before and after foreign investment.

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\(^6\) MPK is measured using lending interest rate
Even though FDI provides potential benefit, the host countries need to supervise and control it thoroughly. Otherwise, it will just generate benefit for certain parties and will burden the economy. Some of potential costs that would be covered by host countries of FDI due to less supervision are the decrease in terms of trade. For developing countries, FDI could reduce domestic savings. Besides foreign companies, who conduct FDI, may create credit proposals to finance their project from the host countries. Consequently, interest rate of the host countries will go up and domestic investment will go down. The other impact of the international capital flow is that the change in balance of payment. Besides that, the flow of FDI to a country also generate risks such as increase in unemployment, less-concern on development and training, appearance of industry monopoly, and lost control of domestic policies.

2.3. Heckscher-Ohlin Theory

The theory of Heckscher-Ohlin (H-O) emphasizes on factor endowment and production factors prices assuming that both countries have the technology and preferences. Model developed by H-O is “2x2x2,” which means two countries (R and P) produce different products (X – Labor Intensive Commodities and Y – Capital Intensive Commodities) using two input factors (K and L). It is in line with one of basic assumption of H-O theory that explains the difference among countries involved in international trade. Besides, both countries that produce in constant return to scale condition applies decreasing marginal productivity for the respective input and are involved in perfect competition market. In the case of all factors do not move freely in both countries, then exchange mechanism will occur. That way its production function can be expressed as follow.

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7 Terms of trade is defined as ratio between export and import prices
Theorem of H-O-S explains the impact of international trade of input-price. The theorem considers that trade will omit or reduce difference of absolute and relative prices of production factors of each country.

2.4. Lucas Paradox

Robert E. Lucas Jr. (1990) found paradox of neoclassic theory that predicts capital that flows “downhill” from a country with capital abundant to a country with capital scarce. Nevertheless according to Lucas, what actually happens is the opposite. The difference between ratio of capital to labor drives the difference of ratio output to labor between the two countries. In order to explain that, Lucas assumed that an open economy is relatively small with production factors of capital (K) and labor (L). Besides that, production runs in a constant return to scale similar to neoclassic theory, thus it can be expressed as follow:
\[ y = f(k) = Ak^\beta \] (13)

with \( y \) as the output or income per labor, and \( k \) as capital per labor. Thus, \( MPK \) is derived from equation (13) with \( k = (y/A)^{1/\beta} \), thus:

\[
\begin{align*}
  r &= A\beta k^{\beta-1} \\
     &= A\beta(y/A)^{(\beta-1)/\beta} \\
     &= \beta A^{1/\beta} y^{(\beta-1)/\beta}
\end{align*}
\] (14)

If the model is proven, then the international capital market becomes free and perfect, and the country will receive various capital return. That way capital will flow from rich countries to poor countries. Nevertheless, Lucas argued that the assumption of the use of similar technology and trade driven by gap in factor endowments is not relevant. To explain that, Lucas uses three assumptions which are (1) gap in human capital, (2) external benefits of human capital, and (3) capital market imperfections.

2.4.1. Gap in Human Capital

According to Lucas the labor input actually ignores gap of human capital based on neoclassic model. Thus Lucas employed measurement of gap of human capital based on research of Anne O. Krueger (1968)\(^8\) that combined information about labor - education level, age, and sectors – to analyze the impact of gap of human capital on productivity measured by relative income.

\[
\begin{align*}
  r_R &= \beta A^{1/\beta} y_R^{(\beta-1)/\beta} \\
  r_p &= \beta A^{1/\beta} y_p^{(\beta-1)/\beta} \\
  \leftrightarrow r_p &= r_R \cdot (y_p/y_R)^{(\beta-1)/\beta}
\end{align*}
\] (15)

If it is assumed that the respective countries have the same productivity, the impact of human capital on \( MPK \) can be expressed as follow.

where \( r_r \) is interest rate of rich countries; \( r_p \) is interest rate in poor countries; while \( y \) is output level generated by both countries. Equation (15) can be used to compare \( MPK \) between

---

rich and poor countries. Nevertheless according to Lucas the ignorance of human capital is not the only reason why capital does not flow from rich countries to poor countries (Lucas, 1990; Pogoda, 2012).

2.4.2. External Benefit of Human Capital

The output gap among countries may be driven by gap of technology \( A \) (A). That way, its production function can be expressed as follow

\[
y = f(k, h) = Ak^\beta h^\gamma
\]

(16)

where \( y \) is output or income per labor, \( k \) is capital per labor, and \( h \) is human capital. Thus if human capital has positive impact on capital return, then the capital that flows to countries with lower human capital remain lower. Meanwhile the formula of MPK can be expressed as follow:

\[
r = \beta A^{1/\beta} y^{(\beta-1)/\beta} h^{\gamma/\beta}
\]

(17)

In estimating parameter \( \gamma \), Lucas employed method of productivity comparison from Edward Denison (1962)\(^9\) and applied it in Equation (15) using Krueger cross-country estimation method to obtain new relative capital return. It is in line with Lucas (1988)\(^11\), that \( \theta \) is expressed as the growth of human capital and \((1-\beta+\gamma)\theta \) is the change in technology (exogenous). Denison estimated \( \theta \) and \( \beta \) as productivity, while Krueger as relative human capital. The formula is subsequently restructured to generate estimation value \( \gamma \). As the result, rate of return ratio between rich and poor countries, according to Lucas, applies in the case of improvement on human capital.

2.4.3. Capital Market Imperfections

Gap of capital (MPK) that occurs between countries implies on the flow of capital goods within certain periods. Nevertheless, there is no capital flow without cost and market that are fully competitive due to political instability of the world. It is inferred to “political risks” and becomes one of determining factors of capital flow. For instance, some of rich countries that occupied other countries is mathematically explained by Lucas (considering imperialist decision) as follow:

\[
\max_k \{f(k) - [f(k) - kf''(k)] - r_w k\}
\]

(18)

---

9 Lucas interpreted that technology as the average of human capital per labor
where $r_w$ is world’s rate of return, and the first order condition on $k$ is expressed as follow:

$$\text{FOC}[k]: f'(k) + kf''(k) - r_w = 0$$

$\leftrightarrow r_w = f'(k) + kf''(k) = \beta f'(k) = \beta r \tag{19}$

The above equation expresses linear relationship between domestic and foreign capital rate of returns. According to Lucas, interest rate gap due to market imperfection would not drive rich and poor countries to make an agreement regarding borrowings. The market imperfection is not explained in neoclassic model, thus capital does not flow from rich to poor countries (Lucas, 1990; Pogoda, 2012).

III. METHODOLOGY

The research uses panel data using five ASEAN countries period 2000 – 2011. In order to answer the research questions, it is used panel data with fixed effect model (FEM) estimation. This method enables estimation result to allow individuals (cross-section) to have its own intercept. Besides that, FEM enables the analysis of heterogeneity of each individuals using dummy (Baltagi, 2008). That way, it can provide clear explanation regarding gap of capital flow in the respective countries.

In this research, empirical model is expressed as follow:

$$\text{CAP}_\text{INFLOW}_{ij,t} = f(\text{MPK}_{ij,t}, \text{GDPPC}_{ij,t}, \text{SCHOOL}_{ij,t}, \text{TFP}_{ij,t}, \text{INST}_{ij,t}) \tag{20}$$

According to the above equation (20), variables of MPK and GDP Per Capita represents neoclassic model. Meanwhile variables of school participation rate, growth of TFP, and political risks represent Lucas model. Thus, the regression equation can be expressed as follow:

$$\text{CAP}_\text{INFLOW}_{ij,t} = \beta_0 + \beta_1 \text{MPK}_{ij,t} + \beta_2 \text{GDPPC}_{ij,t} + \beta_3 \text{SCHOOL}_{ij,t} + \beta_4 \text{TFP}_{ij,t} + \beta_5 \text{INST}_{ij,t} + \varepsilon_{ij,t} \tag{21}$$

General model of FEM estimation technique with individual effect can expressed as follow:

$$Y_{ij,t} = \alpha_1 + \alpha_2 + \alpha \sum D_{ij} + \beta_2 X_{2ij,t} + \mu_{ij,t} \tag{22}$$

where $Y$ is dependent variable, $D$ is individual dummy, and $X$ is independent variables. As the research is aimed to analyze capital flow among countries considering several gaps among countries, then independent variables are expressed in relative forms as follow:

$$\text{CAP}_\text{INFLOW}_{ij,t} = \beta_0 + \beta_1 \left(\frac{X_{1ij}}{X_{1ij}}\right)_t + \cdots + \beta_5 \left(\frac{X_{5ij}}{X_{5ij}}\right)_t + \sum_{i=n} \beta_6 D_{ij} + \mu_{ij,t} \tag{23}$$
Therefore, the main model of the research is expressed as follow:

\[ CAP_{INFLOW}_{ij,t} = \beta_0 + \beta_1 \left( \frac{MPK_i}{MPK_j} \right)_{t} + \beta_2 \left( \frac{GDPPC_i}{GDPPC_j} \right)_{t} + \beta_3 \left( \frac{SCHOOL_i}{SCHOOL_j} \right)_{t} + \]
\[ \beta_4 \left( \frac{TFF_i}{TFF_j} \right)_{t} + \beta_5 \left( \frac{INST_i}{INST_j} \right)_{t} + \sum_{i=n} \beta_6 D_{ij} + \mu_{ij,t} \]  

(24)

Equation (24) is regression model equation to answer the research questions. Dependent variable is stated in the form of ratio as FDI flow is expressed in net basis\(^\text{12}\), therefore size of FDI flow is negative in this research. If the model is stated in natural logarithm, then there has to be additional constants on variable of FDI. Moreover if it is stated in natural logarithm form, the model will face problem of degree of freedom.

IV. RESULT AND ANALYSIS

4.1. Descriptive Analysis of the Capital Flow in ASEAN

ASEAN is a huge market occupied by 600 million people or is about 9% of total world population. Per capita income of ASEAN has reached USD 3,600 in 2011\(^\text{13}\). It makes ASEAN a huge potential market. Therefore it is not surprising when capital flows to this region. Besides that, ASEAN countries have also agreed to drive freer capital flow gradually based on economic development and readiness of financial system of the member countries (Djaafara et al, 2012).

Several attempts have been driven to create freer and more transparent investment climate, therefore it will attract higher integrated FDI – intra-ASEAN and extra-ASEAN – to this region i.e. Framework Agreement on the ASEAN Investment Area (FA-AIA) and Investment Guarantee Agreement (IGA). In 2008, two investment agreements of ASEAN have been completed by enacting ASEAN Comprehensive Investment Agreement (ACIA). ACIA consists of four pillars which are liberalization, protection, facilitation, and promotion. Besides that, ACIA is based on the principle of transparency, equality, and adopting international best practices. Therefore ASEAN is expected to be more competitive region to attract more FDI and the primary goal on economic integration of ASEAN Economic Community can be soon realized (Ministry of Foreign Affair Republic of Indonesia, 2012).

Since economic integration of ASEAN has been driven, there was an increase in FDI in sub-region of ASEAN. According to Hsu (2013), the increase in FDI to ASEAN is primarily driven by three aspects. The first is mutual attempts of ASEAN member countries to achieve larger economic integration and liberalization within certain periods – including the establishment of


\(^{13}\) Invest in ASEAN http://investasean.asean.org/index.php/page/view/reasons-for-investing accessed Sunday, 26 April 2015, 13:45 WIB.
Intra ASEAN-5 Capital Flows: Do They Represent Neoclassical Belief or Lucas Paradox?

ASEAN Free Trade Area (AFTA) and FA-AIA – to become the region’s attraction. The second is that Singapore, together with ASEAN member countries, has taken several steps towards trade liberalization and deregulation incentives after the establishment of World Trade Organization (WTO) in 1995. The third is that Plaza Accord in 1985 have shown significant appreciation of Japanese Yen, so that FDI to ASEAN remain increased.

In general, during 2000 until 2011 FDI that flows to each of ASEAN 5 countries, from intra-ASEAN or extra-ASEAN, is fluctuating (see Figure 4). FDI flow coming into Singapore was averagely USD 26,738.54 million. Meanwhile FDI flow to Thailand has reached USD 6,503.89 million, to Malaysia by USD 5,260.56 million, and to Indonesia by USD 5,191.70 million. According to FDI recipients, Singapore has been the largest recipient of FDI. In 2011, FDI flow to Singapore was USD 48,474.50 million of the total USD 97,538.12 million invested in ASEAN. Of the total FDI, Singapore received USD 2,386.20 million from other South East Asian countries.

![FDI Inflow and Real Interest Rate of ASEAN-5 2000 - 2011](image)

Meanwhile real interest rate in each ASEAN-5 countries during 2000 until 2011 remained fluctuating. Within the periods, the average real interest rate of Singapore was 4.08%, while the average real interest rate of Indonesia was 3.72%, Thailand was 3.56%, and Malaysia was 1.95%. At those periods, the average real interest rate of Philippines was the highest in ASEAN-5 by 4.45%.

Based on the targeted sector of the investment, FDI inflow to ASEAN 5 is mostly invested to sectors/industry supported by the existing resources of the respective countries. One of

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them is Indonesia with FDI inflow primarily invested in primary sectors such mining in 2011. It expresses that Indonesia is natural-resource abundant country (natural resource endowment). In 2011, about 63% of FDI inflow in Indonesia was invested on oil, mining, and manufacture. The government of Indonesia has attempted to improve investment climate in the country. In 2010, the government enacted Presidential Decree No. 36 to regulate liberalization of 15 sub-sector of business such as agriculture, forestry, maritime and fishery, energy and mineral resources, and manufacture sectors (Tambunan, 2013).

The flow of FDI to manufacturing industries is concentrated on electronic and automotive sectors. Some of ASEAN countries have even become center of production and core link of global value and supply chain of the industries16. In Malaysia, the main recipient sector of FDI is manufacturing industry. The government of Malaysia has also attempted to drive liberalization on manufacturing and service sectors, to promote new economic key areas, and to create strong economic condition (Rajah and Govindaraju, 2013). Manufacturing industry of Thailand has also received the largest FDI inflow by almost 55% in 2011. The concentrated FDI inflow to ASEAN on manufacturing industries is in line with FA-AIA. In that agreement, country members have agreed upon free flow of investment, primarily on manufacturing sector, both coming from intra-ASEAN and extra-ASEAN. Meanwhile, trade and service sectors – including financial industries – have dominated FDI inflow to Singapore. Service sectors have received major FDI inflow in Singapore during 2011.

<table>
<thead>
<tr>
<th>Target of Industry</th>
<th>Indonesia</th>
<th>Malaysia</th>
<th>Filipina</th>
<th>Singapura</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, Fishery, and Forestry</td>
<td>344.4</td>
<td>40.5</td>
<td>4.0</td>
<td>0.3</td>
<td>10.9</td>
</tr>
<tr>
<td>Oil, Gas, and Mining</td>
<td>3,882.0</td>
<td>2,410.9</td>
<td>-240.4</td>
<td>1.4</td>
<td>296.2</td>
</tr>
<tr>
<td>Manufacture</td>
<td>8,157.0</td>
<td>5,317.7</td>
<td>102.3</td>
<td>3,222.2</td>
<td>4,296.2</td>
</tr>
<tr>
<td>Construction</td>
<td>411.4</td>
<td>34.7</td>
<td>28.1</td>
<td>284.5</td>
<td>-79.2</td>
</tr>
<tr>
<td>Trade</td>
<td>2,881.8</td>
<td>1,154.8</td>
<td>33.5</td>
<td>13,112.2</td>
<td>321.6</td>
</tr>
<tr>
<td>Financial Sectors</td>
<td>558.5</td>
<td>1,797.2</td>
<td>211.9</td>
<td>8,876.3</td>
<td>1,337.2</td>
</tr>
<tr>
<td>Real Estate</td>
<td>587.3</td>
<td>161.6</td>
<td>118.7</td>
<td>8,447.4</td>
<td>1,110.1</td>
</tr>
<tr>
<td>Services</td>
<td>1,953.7</td>
<td>1,012.8</td>
<td>275.5</td>
<td>3,779.2</td>
<td>413.8</td>
</tr>
<tr>
<td>Others</td>
<td>365.5</td>
<td>70.7</td>
<td>-20.5</td>
<td>0.0</td>
<td>71.3</td>
</tr>
<tr>
<td>Sub Total</td>
<td>19,241.6</td>
<td>12,000.9</td>
<td>513.0</td>
<td>37,723.5</td>
<td>7,778.1</td>
</tr>
<tr>
<td>Unspecified</td>
<td>-</td>
<td>-</td>
<td>749.0</td>
<td>26,273.7</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>19,241.6</td>
<td>12,000.9</td>
<td>1,262.0</td>
<td>63,997.2</td>
<td>7,778.1</td>
</tr>
</tbody>
</table>

Note: Data of Singapore period 2011 does not include intra-company borrowings (mainly those related to activities in manufacturing and service industries).
Source: ASEAN Secretariat - ASEAN FDI Database, 30 September 2012 (quoted from ASEAN Investment Report 2012)
4.2. FDI Inflow Intra-ASEAN 5

In this research, FDI inflow of intra-ASEAN 5 is assumed to fully happen due to capital mobility creation. Besides that, ASEAN 5 countries restricted other countries out of the region to participate. The assumption is intended to identify determinants of FDI inflow to ASEAN 5. The regression estimation result on study case of intra-ASEAN is summarized in Table 3. **Downhill** and **uphill** columns express estimation of the respective cases.

In respect to the case of Singapore as home country of FDI, decision to invest in Indonesia, Malaysia, Thailand, and Philippines is mainly affected by per capita GDP, school participation rate, and quality of institution. Statistical inferences of this case assumes that independent variables in Singapore remained constant. The estimation result shows that GDP per capita has negative impact on FDI inflow. It expresses that the lower the GDP of Indonesia, Malaysia, Philippines, and Thailand, the higher the FDI inflow to those countries.

<table>
<thead>
<tr>
<th>Table 3.</th>
<th>Determinant of Intra-ASEAN 5 Capital Flow (FDI)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variables: Bilateral FDI, 2000 - 2011 (Cap_Inflow)</strong></td>
<td><strong>Downhill: Singapore - Source Country</strong></td>
<td><strong>Uphill: Singapore - Host Country</strong></td>
</tr>
<tr>
<td>Constant</td>
<td>4662.27</td>
<td>3691.29</td>
</tr>
<tr>
<td></td>
<td>(0.5663)</td>
<td>(1.9642)**</td>
</tr>
<tr>
<td>Real Interest Rate (MPK)</td>
<td>-3.97271</td>
<td>69.6647</td>
</tr>
<tr>
<td></td>
<td>(-0.2207)</td>
<td>(1.4384)*</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>-369.993</td>
<td>9635.13</td>
</tr>
<tr>
<td></td>
<td>(-1.3311)*</td>
<td>(0.4370)</td>
</tr>
<tr>
<td>School Participation Rate</td>
<td>8846.25</td>
<td>-5564.78</td>
</tr>
<tr>
<td></td>
<td>(2.4729)**</td>
<td>(-3.8188)**</td>
</tr>
<tr>
<td>Growth of TFP</td>
<td>-8.08940</td>
<td>83.1659</td>
</tr>
<tr>
<td></td>
<td>(-0.3547)</td>
<td>(1.6346)*</td>
</tr>
<tr>
<td>Political Risks</td>
<td>-3553.08</td>
<td>1662.90</td>
</tr>
<tr>
<td></td>
<td>(-2.2057)**</td>
<td>(1.3023)*</td>
</tr>
<tr>
<td>R²</td>
<td>0.4553</td>
<td>0.5113</td>
</tr>
<tr>
<td>Adjusted. R²</td>
<td>0.3436</td>
<td>0.4111</td>
</tr>
<tr>
<td>F-statistic</td>
<td>4.0763</td>
<td>5.1017</td>
</tr>
<tr>
<td>DW-statistic</td>
<td>1.4542</td>
<td>1.4583</td>
</tr>
</tbody>
</table>

Note: Italic number in parentheses is t-statistic value. Moreover t-value on Singapore-host country model has been adjusted to Newey-West error standard. *** is significance at α = 0.01, ** is significance at α = 0.05, and * is significance at α = 0.1. Source: Estimation result from the author (2015).

The empirical result shows that FDI inflow from Singapore are invested to countries with lower GDP per capita (group of developing economies). It contradicts findings from Root and Ahmed (in Appleyard, Field, and Cobb, 2011). According to them, one of variables that affect FDI
is GDP per capita. FDI inflow to any countries with higher GDP tends to be larger. It is because the income per capita shows high purchasing power to buy products from manufacturing industries.

The characteristics of FDI in Singapore cannot be separated from the policy of Singaporean authority to drive investment in middle-lower income countries. It is because small size of domestic market and high labor cost in Singapore. Besides that, the government set a policy to promote “an external wing” of Singapore. Based on its regionalization strategy, the government of Singapore facilitates local investors who are interested to invest overseas. The government of Singapore also proactively involves to prepare industrial projects – manufacturing sectors – in the host countries i.e. Indonesia. At the same time, the government of Singapore also promotes FDI from developed countries to be invested in Singapore in order to drive acquisition on new technology. Then the economy of Singapore shifted from labor-intensive industry (in 1960s) to manufacturer of value-added products and various services in 2000s (Ellingsen, Likumahuwa, and Nunnenkamp, 2006; Blomqvist, 2002, Yeung, 1999; Hsu, 2013).

Other factor that determines FDI inflow from Singapore to other ASEAN 5 countries is the quality of the institution. In conducting investment, Singapore refers to any countries with lower political risks as, in this case, the quality of institutions have negative impact on the capital flow. It reflects that the higher the risk of host countries, the lower the FDI inflow to those countries. According to AKV (2007), other factor that determines the capital flow is the quality of institution as foreign investors tend to consider the policy framework and the response of the host countries. Indonesia, for instance, there are some uncertainties related to the implementation of regional autonomy and high cost of business conduct as well as insufficient infrastructure, strict regulation on labor force, and corruption. Those factor determine the size of FDI inflow (Tambunan, 2013).

The empirical result shows that school participation rate in the host countries becomes the consideration of Singapore in allocating its FDI outflow to ASEAN. Singapore tends to drive its FDI outflow to ASEAN countries with higher school participation rate. In this research, the average school participation rate of ASEAN 5 is lower than Singapore. Therefore FDI inflow to Indonesia, Malaysia, Philippines, and Thailand from Singapore, while investment on any industries that require strong participation from human capital and sophisticated technology remained invested in the country (Singapore). Malaysia, for instance, the obstacle of FDI inflow to that country is low level of labor skill and low mastery in technology (Rajah and Govindaraju 2013). The research indicates that FDI inflow in Singapore is mainly invested in high human-capital intensive industries.

However in the case of Singapore as home country, independent variables have simultaneous impact on FDI. Meanwhile, independent variables can explain its variation on FDI to ASEAN 5 by 45.53%. The estimation is conducted by setting capital flow of FDI from Singapore to Indonesia (SGP_IDN) as a benchmark. It is mainly because capital inflow from Singapore to
Indonesia has been the largest compared to other ASEAN 5 countries. The estimation result shows that none of dummy variables are significant.

In the case of Singapore as host country expresses that investment decision of Indonesia, Malaysia, Philippines, and Thailand is strongly affected by rate of return and Lucas variables. Singapore is considered to be constant in running statistical inferences. Real interest rate has positive impact on capital Flow (FDI). It means the higher the real interest rate of the home countries, the higher the capital ouflow from those countries. It reflects that disregarding high real interest rate in ASEAN 5 countries, investors still consider to invest their capital (FDI) in Singapore considering Lucas variables.

Besides that, FDI outlow from ASEAN 5 countries to Singapore is also driven by low political risks in Singapore. In this case, the quality of institution has positive impact on capital flow. Therefore, the higher the political risks in the home country, the higher the capital outflow to Singapore. It shows that Singapore has good governance reflected by its high quality of institution so that investors would have a guarantee from any political risks that may happen in the future. Political risk index\textsuperscript{16} in Singapore is 84.04 in 2011. It expresses that Singapore has better quality of governance/institution compared to other ASEAN 5 countries; Malaysia (72.58), Philippines (62.17), Indonesia (59), and Thailand (57.17). The index indicates that the higher the index, the lower the political risks.

Meanwhile, the growth of TFP has positive impact on the capital flow (FDI). It means that the higher the growth of TFP of home countries, the higher the capital flow (FDI) to Singapore. Nevertheless, the relationship between capital flow (FDI) and TFP is still on debate whether FDI is affected by TFP or not. Several empirical studies have been conducted to measure the relationship (see Alfaro, Kalemli-Ozcan, and Sayek, 2009; Borensztein, Gregorio, and Lee, 1998; Azman-Saini, Baharumshah, and Law, 2010).

Moreover, there are at least three aspects that are likely able to explain the relationship between FDI and growth of TFP. The first is domestic absorption capacity. The second is development of financial sector. The third is level of economic openness. In this regards, domestic absorption capacity is expressed by technology gap. If domestic firms is far left behind from the multinational ones, there will be huge potential benefit during the process to catch up. In this research high growth of TFP in ASEAN 5 (except Singapore) occurs due to lower capital goods availability, so that cost of technological adjustment becomes lower.

Other factors the investors consider regarding their capital flow (to Singapore) is human capital. The result shows that, school participation rate has negative impact on capital flow. It means that the higher average of school participation rate of the home countries, the

lower capital outflow (FDI) from those countries to Singapore. In 2011, the average of school participation rate in Singapore is the highest compared to ASEAN 5 countries. In 2011, data from United Nation Development Program (UNDP) shows that school participation rate in Singapore is 10.1 years, while Malaysia is 9.53%, Philippines is 8.88% years, Indonesia is 7.51%, and Thailand is 7.32%.

The result regarding the case of Singapore as host country of FDI shows that capital flow to Singapore is not invested on production activities of natural resource-supported industries. Several industries in Singapore that received huge capital inflow of FDI are trade, financial services, and real estate. Therefore, motive of capital flow (FDI) from ASEAN 5 to Singapore is capital-intensive instead of human capital. However according to Rajah and Govindaraju (2013), Malaysia currently attempts to do economic transformation from capital-intensive industries to knowledge-based industries to face the challenge that development of human capital remained low. Meanwhile Singapore also attempts to attract higher FDI to the country, mainly the one allocated to technology-based industries.

In the case of Singapore as host country, the empirical result shows that independent variables have simultaneous impact on capital flow (FDI). Meanwhile independent variables can explain its variation by 51.13% on capital flow (FDI) from Indonesia, Malaysia, Philippines, and Thailand to Singapore. Besides that, estimation technique in this research sets the capital flow (FDI) from Indonesia to Singapore (IDN_SGP) as benchmark. The result shows that none of dummy variables have significant impact.

V. CONCLUSION

In general, capital flow (FDI) to ASEAN 5 within the period of 2000 – 2011, both intra-ASEAN and extra-ASEAN, tend to flow to Singapore. Meanwhile, the analysis of capital flow (FDI) in ASEAN 5 shows that capital flow (FDI) from Singapore as home country is only driven by Lucas variables. Instead, both variables – neoclassic and Lucas – become primary determinant of capital flow (FDI) from Indonesia, Malaysia, Philippines, and Thailand to Singapore as host country.

Among Lucas variables, the quality of human capital and political risks are important primary factors in determining intra-ASEAN FDI. Gap in human capital between home and host countries plays an important role in affecting investors’ decision regarding what sectors they are interested to invest, both domestically and overseas. It is also strongly related to labor productivity in a country. Meanwhile political risks, as proxy to represent the quality of institution (governance), also become primary consideration of investors. It is mainly because investors need an assurance and fiscal and monetary stability when economic shocks occur.

The research reveals empirical fact of “downhill” capital flow from Singapore to lower income economy of ASEAN 5. The “downhill” capital flow from Singapore to Indonesia, Malaysia, Philippines, and Thailand is part of regionalization strategy to create competitive
investment climate. It indicates investment motive of human-capital intensive. Meanwhile, the “uphill” capital flow (FDI) from ASEAN 5 countries to Singapore indicates capital-intensive investment instead of human-capital intensive investment.

The capital flow only used the proxy of FDI in the form of net basis. The capital flow (FDI) is not differentiated based on its components (capital, reinvested earnings, or intra-company borrowings). This research does not include portfolio investment either. As we know that investment is not just in physical form (plants, equipment, and inventory) as defined in FDI. Next research with similar topic could differentiate type of capital between FDI and portfolio investment as well as involving the measurement of components from each type of capital. It is intended to capture pattern of capital flow as a whole, not limited to a certain type of investment. Besides that, FDI data of this research does not consider sector-based investment. It makes characteristics of capital flow cannot be clearly identified. Next research may consider to include sector-based capital flow (FDI).

Policy implication of the research findings is that the governments of ASEAN 5 have to improve the quality of institution (governance), mainly stability of the government. Nevertheless other factors that drive high political risks in ASEAN 5 countries have to be concerned such as external and internal conflicts, corruption, quality of bureaucracy, and socio-economic condition. Therefore the governments of ASEAN 5 can implement the policy cooperation and coordination as all countries are demanded to create competitive and stable investment climate in the era of financial sector liberalization. Moreover the improvement of the quality of human capital is also necessary to attract more capital inflow and to avoid any investments that are just targeting low-cost unskilled labor and taking over production inputs. Therefore capital flow will not just benefit home countries but also host countries.

The government need to also concern about the policy of international capital flow. Huge capital flow (FDI) will be followed by huge repatriation. It will potentially destabilize domestic financial system it is not well-managed. Therefore there has to be policy series regarding foreign currency repatriation. This research does not explicitly discuss about monetary policy. Nevertheless, it does not mean it has no relevancy with central bank policies. The capital flow (FDI) is strongly related to mobilization of foreign exchange as it is one of the crucial factors in macroeconomic stability. Therefore macroprudential policy, as primary domain of Bank Indonesia, needs to concern about the characteristics of FDI.
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This paper analyzes the financial autonomy impact of the regions in Indonesia on the national economic growth. We applied panel data estimation on 26 provinces during 1990-2011, divided into three intervals of periods; long term 1990-2011, prior decentralization 1990-2000, and post decentralization 2001-2011. The estimation result shows that financial autonomy proxied by fiscal decentralization degree positively affects the growth of the national economy. However, estimation on each region shows that per capita income positively affects the economic growth only in Jawa and Bali, and is limited to the long period (1990-2011). These findings lead to an inclusive conclusion about the positive impact of fiscal decentralization on economic growth.

Keywords: Unemployment, income distribution, inflation, fiscal policy, investment

JEL Classification: E22, E24, E31, E62
I. INTRODUCTION

Implementation of regional autonomy has been done in many countries, including Indonesia. Autonomy or decentralization is meant to provide better public services and a more democratic public decision-making process. The realization of this decentralized authority from the central government to regional levels of government involves the decentralization of spending, taxes, the formation of an elected council, elect regional heads by the people, and assistance (transfer) from the central government. Decentralization generally includes political, administrative and fiscal aspects (Abhimanyu and Megantara, 2009).

In Indonesia, a serious effort to implement the decentralization was initiated after the financial and economic crisis of 1997/1998. Formally decentralization came into effect January 1, 2001, at which time the legal basis of decentralization was created by a new law, Law No.22 / 1999 on Regional Government and Law No. 25/ 1999 on Financial Balance between Central and Local Government that replaced Law No. 5 /1974. Later these laws were amended by Law Number 32 of 2004 on Regional Government and Law 33 of 2004 on Financial Balance between Central and Regional, respectively, that provides for authority and autonomy to the local government proportionately.

During ten years of the implementation of fiscal decentralization from 2001 to 2011, the regional revenues in Indonesia grew by 321.4%. The revenue increases were significantly large due to increased local revenue source of funds for tax and non-tax (BHPBP) revenues, as well as the General Allocation Fund (GAF). If we examine the revenue source, the largest component to the region is the equalization payments in the form of GAF, BHPBP, and the Special Allocation Fund (SAF), which contributed on average 73% of the total regional revenues, while the original
Regional income (PAD) only contributed an average of about 17%. The low proportion of PAD compared with non-optimal fund balance indicates local governments were exploring sources of income. It can generally be said that local government revenues are still dominated by transfers from the central government in the form of GAF and BHPBP (see Figure 1).

On the expenditure side, total expenditure in the regions from 2001 to 2011 experienced significant growth. In total, regional spending grew by 430% during that period. Meanwhile routine expenditure grew 313.8%, while the capital/construction expenditure grew by 263% for the same period. Looking at the composition of their proportional spending, it turns out that local government spending was largely for routine expenses, which reached an average of 59%, and this proportion even continued to grow over time. Meanwhile, the share of development expenditure reached an average 41% (Figure 2).

The purpose of fiscal decentralization aims to meet the aspirations of the region regarding the control over the financial resources of the state, promotion of accountability and transparency of local government, increased participation of society in the process of local development, reduced inequality between regions, ensure public service minimums in each region, and to ultimately improve the well-being of society in general (Simanjuntak, 2002). This argument cannot be separated from the Keynesian argument of development cannot be achieved only through market mechanisms, but requires the role of government through budget policy.

Fiscal decentralization can be an effective tool to improve the efficiency of public spending. This hypothesis indicates that there is potential to achieve economic efficiency in the provision of goods at the local level. There is some empirical research to support the argument for the need for fiscal decentralization, to achieve the efficient allocation of public resources (Oates, 1972), among other things. Fiscal decentralization is expected to increase revenue and improve
efficiency in the public sector and cut the budget deficit and boost economic growth (according to Bird, 1993; Bahl, Linn, 1992; Gramlich, 1993; and Oates, 1993).

Zang and Zou (1998) suggested that the decentralization of expenditures and revenues would in part improve the efficiency of the public sector, cut the budget deficit and promote economic growth. The premise holds that decentralization would improve economic efficiency because local governments would provide appropriate public services according to the needs of society. In the course of time, these efficiencies are expected to lead and accelerate to local economic growth. Brothaler & Getzner (2010) and Faridi (2011) asserted the same argument as Zang and Zou that fiscal decentralization significantly boosts short-term and long-term regional economic growth.

The question is, does the above assertions apply to Indonesia – namely, does fiscal decentralization to the regions provide a positive influence on economic growth in Indonesia? This paper examines this question for 26 provinces in Indonesia for the period 1990-2011.

The following sections of this paper outlines the theory and literature review related to the issues raised. The third section presents the data and processing methods. The fourth section presents the analysis and results, while the fifth section presents the conclusions and recommendations.

II. THEORY
Fiscal policy is generally set on state revenues and expenditures comprised of three principal activities related to, i) government policies regarding the purchases of goods and services; ii) taxation policies; and iii) policy transfer payments (e.g., social security benefits, welfare payments) to households.

For many countries the revenue sources are from taxes, non-tax revenues and foreign loans. Meanwhile expenditures are allocated into expenses that are routine and for development. The development model for government spending is classified into three parts (Mangkoesoebroto, 1997) namely:

1. Government spending, where Rostow and Musgrave (1991) argued that in the development process, the greater the percentage of private investment to GDP, the smaller the percentage of government investment to GDP will be.

2. Wagner’s Law which states that if the per capita income increases, then there would be a relative increase in government spending.

3. The Wisemen and Peacock Theory holds that economic growth (as represented by the GDP) would lead to increased tax collection although tax rates would not be increased.

Decentralization is a tool to improve public services and social welfare. Implementation of decentralization mainly consists of the distribution function / task / authority between levels
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of government. Fiscal decentralization is usually preceded by the reform of the expenditure side, followed by the revenue side.

The history of regional autonomy in Indonesia had already begun at the time of independence. This history of regional autonomy was stopped with the implementation of a centralized governance to the New Era. Then, the journey continued with growing decentralization during the reform era in Indonesia. However, the unpreparedness of the institutions and people in the face of decentralization has resulted in vertical and horizontal imbalances.

The measure and comparison of the level of fiscal decentralization between countries can be seen by looking at the amount of authority over the revenues held by a region, compared with the amount of authority of expenditures held by a region (see Figure 3).

![Figure 3. The Role of Local Governments with Respect to Total Government Revenue and Expenditure (%)](image)

From Figure 3, it can be seen that the fiscal decentralization in Indonesia places more emphasis on decentralized expenditure. Thus, the implementation of fiscal decentralization gives more priority to funding sources through the transfer to the regions, which is accompanied by broad authority to spend it.

To support and accelerate the achievement of national goals, the macro-economic policies should be done through the harmonization of the direction of the fiscal, monetary, real sector and the balance of payments. To realize this, sound macro policies need to be supported by local fiscal policy in line with national fiscal policies.

In addition to the transfer of funds to the regions, the central government also allocates a large portion of fund expenditures for central priorities in the region and services to the
community, through including among other things, subsidies, deconcentration of funds and assistance, public assistance through the National Program for Community Empowerment (PNPM Mandiri) and the Community Health Insurance Program (Assurance) (Jamkesnas), and grants. When calculated as a whole, the funds flowing into the regions reached about 60% of the state budget. Picture 1 below shows the flow of Central Government spending to regions.

Fiscal decentralization policy basically follows the principle *money follows function*, where in the load delivery authority to the regions is to be followed by the delivery of financial resources to the region. Delivery of the source of funding is mainly through the handover of authority to levy local taxes and regional redistribution, and the delivery of funding through transfers to the regions.

Fiscal decentralization in Indonesia focused on decentralization on the expenditure side, thereby granting relatively limited authority to levy local taxes and regional redistribution, but the regions were given broad authority to make expenditures according to the priorities and
needs of the region. Most of the funds were transferred to the regions as *block grants* (that can be used freely by a region and be fully accounted for at the local level, namely the DPRD).

To support the achievement of national priorities, the region was also given a transfer that is a *specific grant* (directed for use by the Central Government), through the Special Allocation Fund (SAF) so as to maintain the link between the Central Government and the region for a program (Figure 4). To maintain *governance* of the use of public funds, the management of the budget should refer to the pattern of financial management of the State as set forth in the State Finance Act package.

Transfer to region policy is intended among other things to:

- Improve the fiscal capacity of the region and reduce the fiscal gap between the center and regions and between regions.
- Align funding needs in the region in accordance with the division of government affairs.
- Improve the quality of local public services and reduce inequalities in public services between regions.
- Improve the ability of the region to encourage the regional economy.
- Support national fiscal sustainability.
- Improve the efficiency of utilization of national resources.
- Improve synchronization between national development plans and regional development plans.
Notably, the structure of the budget expenditures tends not to be proportional between routine expenditures, capital expenditures and others (Figure 5).
<table>
<thead>
<tr>
<th>Macro indicators</th>
<th>Researcher (Year)</th>
<th>Sample</th>
<th>Research methodology</th>
<th>Research result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bahl and Wallace. (2006)</td>
<td>21 Region in Russia in 1997</td>
<td>OLS regression</td>
<td>Fiscal decentralization exhibited significantly positively correlated with the level of regional economic growth</td>
</tr>
<tr>
<td></td>
<td>Pose &amp; Krojer. (2009)</td>
<td>CEE countries in 1990-2004</td>
<td>OLS regression</td>
<td>Fiscal decentralization can significantly impede regional economic growth</td>
</tr>
<tr>
<td></td>
<td>Sepulveda, CF &amp; Vazquez, JM (2011)</td>
<td>34 developing countries in Africa 1976-2000</td>
<td>GSLS</td>
<td>Fiscal decentralization significantly reduce inequality in the region</td>
</tr>
<tr>
<td>Unemployment</td>
<td>Freinkman. (2010).</td>
<td>73 Region in Russia in 2004-2005</td>
<td>OLS regression</td>
<td>Government spending is significantly boosts the quality of education</td>
</tr>
<tr>
<td></td>
<td>Vazquez and Yao (2009)</td>
<td>OECD countries in 1985-2005</td>
<td>2SLS and GMM</td>
<td>Fiscal decentralization significantly boost employment opportunities</td>
</tr>
</tbody>
</table>
The largest proportion of regional expenditure was in personnel expenses despite its continuing decline in the last 3 years. The proportion of capital expenditure was relatively small, though it had been increasing in the last 3 years.

The Table 1 above highlights the literature on the effect of fiscal decentralization. Oates (1972), Wasykuko (1987) argues that fiscal decentralization is measured from the expenditure or revenue share of local governments to the central government budget. This relationship is usually positively correlated with economic development as measured by per capita income. Similar findings of Deparap, Swarop & Zou (1996) found a positive relationship between the share of central government expenditure towards growth. Easterly and Robelo (1993) found a positive relationship with the growth of infrastructure spending.

Meanwhile Baro (1990) found different results where an increase in the central government consumption share of GDP had a negative correlation with growth and income per capita. All of these studies do not touch the decentralized level or intergovernmental composition of public expenditure on economic growth.

Zhang and Zou (1998) examined how the allocation of fiscal resources between the central and local governments influence economic growth. The research sample used provinces in China from 1978 to 1992. The results showed that the high level of fiscal decentralization of government spending inhibited growth of the provincial economy. This significant result was not in accordance with the theory and the results of other studies that argued fiscal decentralization to positively contribute to local economic growth.

Davoodi and Zou (1997), examined the fiscal decentralization and economic growth in a cross-country study and found that in developing countries there was a negative relationship, as with the world in general, however for developed countries there was no relation, even among other the developed countries.

Studies conducted by Braun and Grote (2000) on decentralization and poverty found public financing a key element of poverty reduction policies. But countries with low income have a problem of low public revenues, which averaged 17.5%; while in high-income countries revenue was nearly averaging 30%. In the regions there are problems in the design and implementation of tax collection as it was found to be not well organized and less transparent. The cost to collect revenues in countries where poverty was particularly high and sometimes exceeded the benefits of public spending. But in fact the problem is the limited public resources such as education, health care, that can help the poor to accumulate assets.

Research conducted by Nugrahanto & Muhyiddin (2008) assessed the impact of fiscal decentralization with inequality in the regions of Indonesia. The conventional view held that fiscal decentralization had increased regional inequalities because of pressure from the central government for the redistribution of income between regions, which lowered after the fiscal decentralization. On the other hand, fiscal decentralization encouraged efforts to increase local revenues to finance local expenditure, so it is not dependent on grants from the central
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The research sample used was the Indonesian provincial data from 2001 to 2004. The results showed that when fiscal decentralization increased, regional inequality increased too. However, Nugrahanto & Muhyiddin (2008) suggested a reassessment because the results of this study were inadequate to infer the impact of fiscal decentralization on regional inequality. The result was seen to be somewhat questionable because of data limitations (4 years), and it was also possible to correlate regional inequality and decentralization or other independent variables.

Swastyardi (2008) in his research on the Regional Inequality in Indonesia found that nationwide inequality was at stable levels and did not fluctuate a lot, tending to fall in the period 2001-2006. But in the period 2001-2003 national level inequality tended to go down with the exception of Kalimantan and Sulawesi. This condition indicated that the policy implementation at local government level was more effective than before fiscal decentralization was applied, where the effect of fiscal decentralization is to reduce levels of inequality. In addition there were indications that the GAF had an impact on inequality. There are three effects, namely;

1. A GAF increase followed by a decrease in inequality. This condition occurred at the national level, Sumatra, Java and Bali.
2. A GAF increase followed by an increase in inequality, this happened in Kalimantan and Sulawesi.
3. A GAF increase followed by a fluctuating pattern on inequality.

Many countries in the world implement policies in order to reduce poverty and improve income distribution, particularly through fiscal decentralization policy among others. Sepulveda,CF & Vazquez, JM (2011) conducted a study that focused on the impact of fiscal decentralization on poverty and income inequality. The sample used was 34 developing countries in Africa during the period 1976 - 2000. The results showed that fiscal decentralization had a significant impact on poverty and income inequality. Fiscal decentralization increased poverty, but reduced income inequality.

Some authors argue that fiscal decentralization leads to an optimization of the provision of public services and efforts to boost economic growth. Moreover, they argue there is a danger of fiscal decentralization that is associated with the regional competition and central redistribution. Lessman (2006) found poor countries were less able to compete in terms of fiscal mobilization compared to the richer countries, therefore, if not aided, the poor countries would remain poor. The Lessman study examined the impact of fiscal decentralization on regional disparities using panel data for 17 OECD countries from 1980-2001 year. The results showed that a high level of fiscal decentralization showed lower regional disparities.

The researchers focused on the determinants of growth in the public sector looking at the impact of an increase in fiscal federalism. Brothaler & Getzner (2010) assessed whether the fiscal decentralization contributes to economic growth in Austria. The research sample used was a province in Austria from the years 1955 to 2007. The results showed that if there was
an increase in GDP, government spending also increased. Government spending showed an active fiscal policy to reduce the unemployment rate. Cointegration test results showed fiscal decentralization was significant to encourage short-term and long-term regional economic growth.

In addition to economic growth, the success of fiscal decentralization was also demonstrated by the increased participation of local people in construction and economic activity. Vazquez and Yao (2009) developed a model to analyze the relationship between decentralization and job opportunities in the public sector. They found that the decentralization of expenditures significantly boosted employment opportunities, and reduced unemployment.

Faridi, Chaudry & Ansari (2012) examined the relationship of fiscal decentralization and job opportunities in Pakistan, and found that the effects vary depending on the fiscal decentralization and the share of revenue and expenditure of each province so as to significantly boost employment opportunities.

Bahl & Wallace (2006) examined the impact of fiscal decentralization on equalization in Russia. The samples used were 21 regions in Russia 1997. The local governments used fiscal instruments to balance a mix of spending for regional autonomy that required a larger budget to the regions and helped eliminate regional disparities. Additionally, Bahl & Wallace (2006) also developed a method to study the trade off between decentralization and equity. The point is that without priorities and a detailed understanding of the institutional arrangements and relationships between local government, the implications of equity and decentralization cannot run optimally.

Other research in developing countries include Pakistan. Pakistan is a country with an emerging economy with an economic growth rate that is not too high. In contrast to other studies of Pakistan, this research focused on fiscal decentralization as a major source of economic growth, examining fiscal decentralization to improve efficiency that would lead to economic growth. Faridi (2011) using a sample of provinces in Pakistan from 1972-2009, found that the indicators of fiscal decentralization, such as expenditure and revenue autonomy had a positive and significant impact on economic growth. Based on these results, Faridi (2011) recommended the federal government to delegate fiscal power to the provincial and district governments to improve the growth and prosperity of the people of Pakistan.

Most of the fiscal decentralization literature tends to emphasize the capacity of large fiscal decentralization in the context of public policy and services where with greater efficiency of the government, it can encourage economic growth. However, evidence of government efficiency is still rare. Pose (2009), in his writings, used a panel data approach to examine the relationship between the degree of fiscal decentralization and economic growth rates in the 16 countries in Central and Eastern Europe from 1990-2004. Pose’s findings indicated that the results in Eastern Europe were at odds with the majority’s view - there was a significant negative relationship between fiscal decentralization and economic growth. However, there were
indications that the long-term result may be different. Transfer from the central government to the region had a negative correlation with economic growth, as the tax rate was set at a local level to evolve a negative relationship with respect to the national growth rate, but had positive regional economic growth. This is consistent with the view that with its own revenue sources, a region may encourage local production to respond to local demand.

III. METHODOLOGY

3.1. Data

This study used secondary data from BPS, Ministry of Finance and other institutions. The data used was the budget, the GDP, poverty, population, Human the Development Index (HDI), spending, labor and other data relevant to the study. The data used was for the period 1990 - 2011 for 26 provinces in Indonesia.

3.2. Empirical Model and Estimation Techniques

The analytical method used in this research was descriptive analysis and panel data method with Generalized Least Square (GLS), and Static Panel Data Models (Fixed Effect Model and Random Effect Model). The data was managed using the STATA software program.

This study adopted a model based on the earlier research panel model specifications used by Muslianti (2011) and Sobari (2011):

\[ \text{Growth} = \beta_0 + \beta_1 \ln Y_{\text{cap}} + \beta_2 \ln + \beta_3 \text{Sch} + \beta_4 \text{DDF} \]

The above model was adopted from the study of Aisha (2008) entitled *The Effect of Fiscal Decentralization on Economic Growth*. The model was developed using the DDF (Degree of Fiscal Decentralization).

The degree of the size of the IMF Fiscal Decentralization adopted the *Fiscal Decentralization Indicators* that measures expenditure. These measurements are consistent with fiscal decentralization in Indonesia as it provides more emphasis on the decentralization of expenditure.

The calculation of the DDF:

\[ \text{DDF}_{it} = \frac{TB \text{ Prov}_{it}}{TB \text{ Pusat } t - \text{Trf Pusat ke Prov } it + TB \text{ Prov } it} \]

where DDF$_{it}$ is the degree of fiscal decentralization district / city i, in year t; TB Prov$_{it}$ shows total spending of districts / cities i, in year t; Centre TB$_{it}$ is the total expenditure of the central government in year t; and TRF Centre to Prov$_{it}$ is the central government transfer or equalization
payments to the province $i$, in year $t$. For the record, before the fiscal decentralization, the numbers used were the Autonomous Regional Subsidy.

**IV. RESULTS AND ANALYSIS**

This study reviewed the variations resulting from fiscal decentralization on economic growth. In addition, it also explored how the success of local post-fiscal decentralization (as represented by the Degree of Fiscal Decentralization) correlated to the variables of economic development that previously were mentioned.

Furthermore, in addition to the analysis at the national level, an estimation was also performed using a sub-sample of each region with the following distribution (see Table 2 and Figure 6):

<table>
<thead>
<tr>
<th>Region</th>
<th>Province</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sumatra</td>
<td>DI Aceh, North Sumatra, West Sumatra, Riau, Jambi, South Sumatra, Bengkulu, Lampung</td>
</tr>
<tr>
<td>Java and Bali</td>
<td>DKI Jakarta, West Java, Central Java, Yogyakarta, East Java, Bali</td>
</tr>
<tr>
<td>Kalimantan</td>
<td>West Kalimantan, Central Kalimantan, South Kalimantan, East Kalimantan</td>
</tr>
<tr>
<td>Sulawesi</td>
<td>North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi</td>
</tr>
<tr>
<td>Eastern Indonesia</td>
<td>West Nusa Tenggara, East Nusa Tenggara, Maluku, Papua</td>
</tr>
</tbody>
</table>
Figure 6 displays a comparison the degree of fiscal decentralization between the provinces in Indonesia for 2011, which was calculated by dividing the Provincial Expenditure by the Central Government Total Expenditure minus the Central Government Transfer (Fund Balance) to the Province plus the Total Provincial Expenditure. The color red in Figure 7 indicates regions that already meet the level of independence considered ‘sufficient’. Of the 26 provinces in Indonesia, there were only 10 provinces with a degree of independence that was already quite enough (rule of thumb the above ratio is 2 and shown in red).

The formula approach to fiscal decentralization of expenditure refers to a formula in line with the IMF, and is in line with the fiscal decentralization in Indonesia which places more emphasis on the decentralization of expenditures. Figure 7 shows that most provinces are still not self-sufficient in regional expenditure. This can be explained that there are several issues, among other them is the financial management of the regions themselves, as well as programs to the regions as allocated by the central government. The activities of the central government in the regions such as services to the communities through subsidies, the de-concentration funds, assistance duties, grants etc., which when calculated, the funds flowing into the region reached about 60% of the state budget. Thus, it is not surprising that local authorities in some provinces were less than the maximum in using the fiscal transfer funds.

Table 3 shows the regression results of the provincial GDP growth indicators of the regression model adopted from the Aisha (2008) study. The use of a variable percentage of the population that had completed college in Aisha study was replaced with a variable average length of school age. If the model is estimated in the form of a fixed effect it will produce a heteroscedasticity offense, so that there would be an alteration in the GLS model. The overall model proved capable in explaining the phenomenon of economic growth. Table 3 summarizes the results of the estimation seen as a whole (for 26 provinces) and per region divided into groups from the period 1990 -2011, pre-decentralization period 1990 -2000 and 2001-2011 period after decentralization. Table 3 also shows a summary of the findings of estimates for all regions. Although generally the efficient model was in the third time interval, there are several variations of the significant variables in each region.

The GDP per capita had a relationship proportional to the level of economic growth in the region and a significant influence on the national growth in the period 1990 -2011 as well as in the period before decentralization, 1990 -2000. Meanwhile a greater portion of the investment in the output should have had a positive effect on the growth of the regional economy, but national observation showed an opposite effect for the period before and after decentralization and the period prior to decentralization where increased investment had a negative correlation to economic growth.

Regions with high education had a direct correlation with economic growth. The influence of the level of education to economic growth was significantly demonstrated by the schooling variable with GDP growth in the 1990-2000 period, but in the opposite direction. On the other
hand, fiscal independence of a region was shown to have a significant correlation with regional economic growth, particularly evident after a period of fiscal decentralization (2001-2011), i.e. when fiscal independence (DDF) increased by 3%, it boosted economic growth by 1%.

**Sumatra Region**

Provincially, people with higher income levels were shown to have higher growth rates as well, which happened during the long period 1990-2011 and in the aftermath of decentralization. The inverse relationship would occur in the period before decentralization. While investment did not affect the period before and after decentralization, it had a significant inverse relationship and for a long period from 1990 to 2011.

Higher education levels were shown to have the opposite relationship with economic growth, but that only occurred in the period after decentralization. Whereas in the period before decentralization, this variable gave an effect that was directly proportional to the economic growth. Then, at any interval it was seen that the more independent regions had no fiscal effect on regional economic growth.

<table>
<thead>
<tr>
<th>Variables</th>
<th>National (PDRB)</th>
<th>Years</th>
<th>Kalimantan Region</th>
<th>Years</th>
<th>Sumatra Region</th>
<th>Sulawesi Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const</td>
<td>-15.07695*</td>
<td>1.19367*</td>
<td>5.75334*</td>
<td>Const</td>
<td>3.24071*</td>
<td>4.16614*</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.765)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Y cap</td>
<td>0.05618*</td>
<td>0.07174*</td>
<td>0.00693</td>
<td>Y cap</td>
<td>-0.01137</td>
<td>0.09903*</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.326)</td>
<td>(0.212)</td>
<td>(0.020)</td>
<td>(0.802)</td>
</tr>
<tr>
<td>Inv</td>
<td>-0.02673*</td>
<td>-0.04298*</td>
<td>0.00382</td>
<td>Inv</td>
<td>-0.01939*</td>
<td>-0.07885*</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.009)</td>
<td>(0.591)</td>
<td>(0.019)</td>
<td>(0.000)</td>
<td>(0.887)</td>
</tr>
<tr>
<td>Sch</td>
<td>0.00559</td>
<td>-0.06171*</td>
<td>0.00302</td>
<td>Sch</td>
<td>0.01194</td>
<td>-0.10166*</td>
</tr>
<tr>
<td></td>
<td>(0.389)</td>
<td>(0.000)</td>
<td>(0.641)</td>
<td>(0.588)</td>
<td>(0.003)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>DDF</td>
<td>0.00358</td>
<td>-0.00858*</td>
<td>0.03030*</td>
<td>DDF</td>
<td>-0.01008</td>
<td>-0.03092</td>
</tr>
<tr>
<td></td>
<td>(0.641)</td>
<td>(0.461)</td>
<td>(0.001)</td>
<td>(0.712)</td>
<td>(0.239)</td>
<td>(0.000)</td>
</tr>
</tbody>
</table>
Java and Bali

In this region, the model proved to be significant in the long period before and after the decentralization for all variables. More affluent areas in the region had some impact on growth, particularly for the period 1990-2011 and the period of 1990-2000. On the other hand, the high investment in the province might have had a positive influence as economic growth mainly occurred in the period after the fiscal decentralization. But in the long period (1990-2011) the effect of the investment was precisely in the opposite direction to economic growth. Similarly, the influence of higher education had an inverse correlation with the economic growth of this region in the period 1990-2011. Fiscal independence was shown have a significant and positive impact on the economic growth of this region that occurred in the period 1990-2011.

Kalimantan

Findings for Kalimantan showed high per capita incomes had a significant impact on the region’s economic growth, especially in the period before decentralization. More affluent areas in Kalimantan grew faster, which can be seen before decentralization. While investment had an inverse relationship to the length of the period of 1990-2011 and before decentralization, there was significant influence at the 95% level of significance. Higher levels of education before and after decentralization also carried an inverse relationship to economic growth with a
significant effect. Furthermore, there was a significant relationship between fiscal independence of this region with the growth rate in the province of Kalimantan, especially after the period of fiscal decentralization.

**Sulawesi**

For Sulawesi, the per capita income variable did not significantly affect the economic growth for the region in all of the observation periods. Investments had a significant effect on the economic growth of this region, but in an inverse relationship. A higher education variable was positive and had a significant impact on the economic growth of the region.

**Eastern Indonesia**

In Eastern Indonesia, the high incomes of the population had a positive and significant impact on the region’s economic growth. This was especially the case before decentralization. Similarly, investments affected growth, but with an inverse relationship. In the long period, it was also found that regions with higher levels of education had the opposite effect on the economic growth in the period 1990-2011.

The variable real GRDP per capita was hypothesized to be directly proportional to GDP growth in a province. As raised by Wagner (citation year?), an economy where per capita income increases, there would be a relative increase in government spending that would ultimately boost economic growth. For estimates at the national level, Sumatra (also after a period of decentralization), the regions of Java and Bali, Kalimantan and East regions, showed significant positive effect of income per capita to economic growth. Only in the region of Sulawesi, did the GDP per capita not have an effect on economic growth.

In accordance with the theory of the Solow growth, economic growth can be driven by high levels of investment in an area. This hypothesis can generally be proven before decentralization, but with an inverse relationship of the central government and region. Only in Java and Bali for the interval 2000-2011 this hypothesis was observed and proved to be positive and significant. This finding was due to observations where in any period, it was found that the economy of each province in Indonesia grew steadily at around 5% annually. This also explained why many estimates were not significant in this model.

Fiscal independence represented by the degree of fiscal decentralization (DDF) was hypothesized to be able to spur the movement of the economy of a region. This hypothesis was observed and proved to hold true at the national level, and the Kalimantan region for the period after fiscal decentralization. Meanwhile Java & Bali had a positive and significant effect in the period before decentralization. Financial management policies independently gave a
positive result on the growth of the national economy. The empirical results were in line with the research conducted by Oates (1993), Gramlich (1993), and others.

The variable DDF of other regions that do not affect the regional economic growth was also determined by other factors. For example in the DDF is the element of balance funds after fiscal decentralization (before the central government channels funds to subsidize autonomous regions (SDO)). As described in Section 1, the transfer of fiscal funds constantly increased and tended to result in annual inequality (Fatima, 2007). The inequality of fiscal transfers was closely related to the distribution formula of the transfer funds that was affected by the natural resources available in a region. Resource-rich regions would benefit. Additionally total regional expenditure was largely determined by the financial management of the region where the largest proportion of regional expenditure was personnel expenditure (44% of the budget) while the proportion of capital expenditure was relatively small (22%), so that the impact on economic growth was relatively large. Another factor influencing the expenditures / regional expenditures was the amount of the fiscal transfer funds that had not been used by the region in the bank, consisting of terms deposits, checking and savings account.

5. CONCLUSION

This paper analyzed the effect of fiscal decentralization policy on the level of regional economic growth in Indonesia. Using data from 26 provinces, estimated were made using a panel method, and the findings of this paper are summarized below.

The first finding is, the financial autonomy of regions was represented by the Degree of Fiscal Decentralization (DDF) for positive and significant national impact on economic growth in the aftermath of the fiscal decentralization. This means independence in fiscal expenditures would encourage economic growth in the province concerned. This condition according to Wagner’s Law states that in an economy where per capita income increased, in relative terms government spending also increased, which in turn will boost economic growth. In the sub-samples for each region, the positive influence of the growth in per capita income was only observed in Java and Bali and only valid in the long observation period (1990-2011).

The second finding of this paper is the use of national data variables per capita income had a significant and positive effect in the period 1990-2011 and the period prior to fiscal decentralization. At the regional level, the positive effect was found for the Sumatra region in the period 1990-2011 and the period after the 2001-2011 fiscal decentralization. For Java and Bali, the positive influence of per capita income was applicable to periods prior to fiscal decentralization and the period 1990-2011. For Kalimantan and Eastern Indonesia per capita income had a significant effect on economic growth in the period just before the fiscal decentralization.
The third finding, is the effect of the level of investment to economic growth would indicate an inverse relationship. The positive effects of investment on economic growth was only found in Java and Bali for the interval 2000-2011.

The above findings lead to the conclusion that the effect of fiscal decentralization on economic growth is not conclusive for cases of decentralization in Indonesia. The incompatibility of empirical evidence for this theory can be influenced by the fiscal transfer formula provided by the central government to local governments. Additionally total regional expenditure was largely determined by the financial management of the region where the largest proportion of regional expenditure was personnel expenditure (44% of the budget) while the proportion of capital expenditure was relatively small (22%) so that the impact on economic growth was relatively large.

With regard to the management of regional expenditures where local government spent larger portions on routine expenditure compared to capital expenditure, the effects of spending or local government spending cannot resolve the issue in question. The central government needs to create a mechanism that encourages local governments to maximize capital expenditures.

It should be underlined that the research in this paper had some limitations, the first is the use of better proxies than the fiscal independence index; and secondly estimations done by periodicity. As an alternative, this paper developed an approach of switching regime models.
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EXTERNAL SHOCKS AND POVERTY:  
HOW RECESSION IN EUROPE, JAPAN, AND CHINA AFFECTS THE INDONESIAN POOR

Arief Anshory Yusuf

Abstract

This paper analyzes the effect of a recession in Europe, Japan, and China on the poverty in Indonesia. We use the GTAP model and the INDONESIA-E3 model to examine the impact of a 2 percent GDP decline in these three countries on the poverty in Indonesia. The results suggest a negative impact on Indonesia’s GDP, mainly through the trade-linkages but with a small magnitude. The main reason for this finding has to do with the low dependency of Indonesia on international trade. The shock also slightly increases the poverty in Indonesia with a small magnitude. Across the household types, the negative effects of these recession go mainly to higher income households since large part of their incomes comes from the capital and skill-intensive sectors. The poor household types are likely to be the first to lose their jobs in the event of this recession, since they are less skilled. These findings urge the Indonesian government to lunch employment programs to ensure the employment continuity for these unskilled laborers in the anticipation of a global recession particularly originating from these three countries.

Keywords: Recession, GTAP, Computable General Equilibrium, INDONESIA-E3.

JEL Classification:

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1 Dr. Arief Anshory Yusuf is the Director of the Center for Economics and Development Studies (CEDS) of Universitas Padjadjaran, Indonesia. He is also a Senior Economist of the Economy and Environment Program for Southeast Asia (EEPSEA) and an Adjunct Fellow at the Australian National University. Email: arief.yusuf@fe.unpad.ac.id
I. INTRODUCTION

From the start of the “New Order” government in 1966 up until 1997, broad-based economic development in Indonesia led to an impressive four-fold increase in per capita income. As a result, poverty in the country fell dramatically. Between 1976 and 1996 the number of poor people in Indonesia declined from 54.2 to 22.5 million.

However, the Asian Financial Crisis in 1997 brought a sharp halt to this economic miracle. Between 1997 and 1998 annual GDP growth in Indonesia fell by 13 percent and the incidence of poverty increased by 7 percent. The events of 1997-98 were a painful reminder of just how vulnerable the Indonesian economy was to external shocks coming from abroad.

For this reason, the current recession in Europe raises deep concerns about the possible impact of these events on the Indonesian economy. However, to date there has not been any quantitative analysis of the possible impact of these events on economic growth and poverty in Indonesia. The purpose of this paper is, therefore, to provide a modeling-based assessment of the possible effects of a recession in Europe, Japan and China -- EJC countries, for short -- on Indonesia.

The objective of this paper is to use general equilibrium models to quantitatively assess the impact of the current recession in Europe, Japan and China on Indonesian poverty. It is expected that the results from such a general equilibrium analysis will give us important insights on how to design appropriate policy instruments for protecting the Indonesian economy from external disturbances.

The next section of this paper outlines the theory and the structure of the model. Section three outlines the data and the methodology, including the scenario of simulation. Section four provides result and analysis, while section five gives conclusion and the policy implications.

II. THEORETICAL FRAMEWORK AND EMPIRICAL LITERATURE

2.1. How external shock can affect poverty

It should be clear that what it means by external shock is in the context of exogenous change from the country’s perspective. In this case, those shocks can be a recession in a particular country, a group of countries, or one or some regions. The shocks can also be international price of commodities determined in the world market exogenous to the perspective a a particular country or the assumption of Indonesia being a small open economy.

Poverty should also be defined clearly. There are many dimension of poverty, but in this particular study, the focus is on expenditure poverty which is quantitatively measured as head-count poverty incidence, which can be written as Foster, Greer, Thorbecke (FGT) Index of poverty initially developed by Foster et al (1984):
\[ P_a = \frac{1}{N} \sum_{i=1}^{H} \left( \frac{z - y_i}{z} \right)^\alpha \]

Where \( P \) is the poverty indicator, \( N \) is the number of population, \( H \) is the number of people whose expenditure per person is below the poverty line, \( y \) is a vector of expenditure per person in increasing order, \( z \) is the poverty line, \( \alpha \geq 0 \) is a sensitivity parameter. When \( \alpha = 1 \) this become the head-count poverty incidence, which is a proportion of population living below poverty line. This indicator is what will be used throughout this paper.

Figure 1 below illustrate how external shock, like global economic crisis of a particular countries or regions can affect poverty incidence in a national economy.

The impact of an EJC recession on the Indonesian economy can work through various channels, including trade, foreign direct and portfolio investment, and other monetary or financial channels. In this analysis, the focus is on the impact through the trade channel. A recession in the EJC countries will reduce imports and exports from countries like Indonesia. The impact on the Indonesian economy is likely to be negative, and the magnitude of the impact depends largely on the share that these countries have in Indonesian exports. This is the direct
trade effect. The indirect trade effect is rather unclear. The reduction of imports from Europe, China and Japan will tend to reduce the world prices of commodities. Global deflation like this may reduce Indonesian exports yet increase Indonesian imports.

On the other hand, the decline in the export of goods from the EJC countries may increase the world prices of commodities. To some countries (including Indonesia), this might represent an opportunity to increase exports and to raise world market share. This effect tends to work positively for the Indonesian economy. To complicate things, these effects work differently among different countries, each with a different type of repercussion on the Indonesian economy. Therefore, the overall net impact on the Indonesian economy is difficult to predict and calls for a computable general equilibrium analysis.

The effect on poverty depend on the general equilibrium outcome of prices or new equilibrium prices changed due to the external shocks. There are two kind of prices that at the end will affect through different channels to households. First of all is the price of factors of production will affect household income. The impact on households will be different even though all households face the same price of capital or labor because poor and non-poor households has different composition of household income. Rich households has more capital income than labor, while poor households has more labor income.

Another channels is its impact on price of commodities. Again, although all households face the same price of commodities, the composition of household expenditures may differ. Poor household may buy less of travels but more of rice, while rich households may buy more of gasoline and other luxurious items.

The final impact on these two channels are on the real expenditure, or expenditure per capita. Poverty incidence then is used based on this real expenditure per person before and after the shocks and the difference is calculated as the impact of external shocks on poverty incidence.

2.2. Empirical literature

There have been some studies looking at the of global crisis, particuarly the 2008-2009 crisis, with particular attention on the impact on poverty. In this review, only studies that uses economy-wide model, microsimulation model, or combination of both are reviewed.

Wong (2012) quantifies the macroeconomic and poverty impacts of the 2008-2009 world economic crisis on Ecuador, including the effects of the main policy responses of the Ecuadorian Government to face the crisis. The main hypothesis highlights the magnitude of two transmission channels: trade and remittances. The study applies a single-country static computable general equilibrium model for Ecuador combined with a micro-simulation model. From a distributional point of view, the impacts of the crisis were progressive, affecting more negatively households in the highest income quintile. A key channel of transmission is the fall
in capital returns and wages of skilled labor. These factors are used intensively in the oil sector, a key sector of the Ecuadorian economy, and one of the hardest hit by the global crisis. There are differentiated poverty impacts: poverty may increase if labor is assumed sector specific, and it may be reduced if labor were mobile.

Habib et al (2010a) develop a simple micro-simulation method, modifying models from existing economic literature, to measure the poverty and distributional impact of macroeconomic shocks by linking macro projections with pre-crisis household data. The approach is then applied to Bangladesh to assess the potential impact of the slowdown on poverty and income distribution across different groups and regions. The poverty headcount rate (based on the upper poverty line) and extreme poverty rate (based on the lower poverty line) are expected to be 0.4 and 0.2 percentage points higher in 2009, respectively, as a result of the crisis.

Using a micro-simulation analysis, Ajwad et al (2009) look at the distributional impacts of the 2009 financial crisis on households in Latvia. The simulations show that Latvia experienced a sharp rise in poverty, widening of the poverty gap, and a rise in income inequality due to the economic contraction in 2009. The 18 percent contraction in gross domestic product (affecting mainly trade hotels and restaurants, construction, and manufacturing) likely led the poverty head count to increase from 14.4 percent in 2008 to 20.2 percent in 2009.

Vagar and O’Donoghue (2010) adopt a macro-micro framework in order to evaluate the impact of a global crisis on the Pakistan economy. They use a ‘top-down’ approach to combine a static computable general equilibrium model with a micro-simulation model. Our results suggest that between 2007 and 2009 the poverty headcount ratio is likely to have increased by almost 80 percent, from 22 to 40 percentage points. However, their results also show that this increase is attributable in part to the fuel and food crisis that preceded the financial crisis. They also indicate a differential impact, with wage increases for farm workers and a decrease in wages for skilled labour.

Weeks (2009) using a macro-economic model finds that the global financial crisis will cause a fall in export earnings in Sierra Leone of approximately fifteen percent in 2009 compared to 2008. He find that this decline in exports earnings could result in a fall in national income of almost ten percent and based on the income distribution in the 2003 household survey, a ten percent decline in national income would increase poverty by twelve percent of the population, or about 600,000 people.

Habib et al (2010b) uses a micro-simulation approach to assess the poverty and distributional effects of the crisis in the Philippines. They find increases in both the level and the depth of aggregate poverty. Income shocks are relatively large in the middle part of the income distribution. They also find that characteristics of people who become poor because of the crisis are different from those of both chronically poor people and the general population.
Emini et al (2010) evaluate the potential impacts of the 2008/09 global economic crisis on child poverty in Cameroon. A dynamic computable general equilibrium (CGE) model is used to simulate various scenarios of the economic crisis together with policies which respond to the crisis. The study shows that the crisis is projected to lower the real GDP growth rate by 1.3 percentage points in 2009, 0.9 in 2010 and 0.8 in 2011. The crisis would also bring about a 1.05% increase in the number of children who were poor in monetary terms in 2008 and a 4% increase in 2009, 2010 and 2011, compared to the situation without a crisis.

In their analysis, Estrades, and Llambí (2013) evaluate the impact of the 2008 global economic crisis on Uruguay an economy through two main channels: collapse in global trade and drop in capital flows. They apply a computable general equilibrium model linked to micro-simulations to analyze the distributional impacts of these policies and assess their effectiveness. They find that an increase in public investment was the only policy effective in mitigating the negative impact of the crisis on extreme poverty.

In a study which focus on conceptual framework with the application to Vietnam, Coxhead et al (2012 present a framework for understanding the direct and indirect welfare effects of a global market shock. They quantify transmission of the shock from global indicator prices to domestic markets. Then they use an applied general equilibrium model to simulate the economic effects of the price changes. A recursive mapping to a nationally representative household living standards survey permits them to identify in detail the ceteris paribus effects of the shock on household incomes and welfare. In this analysis, interregional and intersectoral labor market adjustments emerge as key channels transmitting the effects of global price shocks across sectors and among households.

Corong et al (2011) analyzes how the global crisis may have affected the Philippine economy. To the extent that the Philippines is more globally integrated through trade and labor flow channels than the financial sector, it is expected that impact of the global crisis will weigh heavily on the “real” side of the economy. A dynamic computable general equilibrium (CGE) model linked to a micro-simulation module used trace effects: from the macro-economic to the microeconomic level; from output and factor supplies and demands to commodity and factor prices; and from household incomes to levels of poverty and income distribution. Simulation results suggest that all households experience a significant reduction in real income. Both inequality and poverty increase, with urban dwellers experiencing a higher in crease in poverty relative to their rural counterparts as most export-oriented industries are located in the urban areas and returns to factors intensively used by these industries fall.

To summarize, most of the studies above suggests that global financial crisis affect the poor negatively. However, the magnitude is different; there are exceptions where the impact on poverty is negligible because the crisis affect mostly the rich; and policy responses can have significant impact on the final effect of the crisis. There is however, a methodological gap in most of the studies in how they linked global shocks into the national model. The analysis could
not really explicitly attribute the shocks to a recession in a specific countries or regions. This is because they only use a national model. In this paper, two models will be used, a global or multi-country model as well as national model to handle poverty. With a global model, we can be more specific on which countries experience a recessions. This is quite important because the impact of a recessions of different countries will have a different impact on the export demand of and the price of the commodities faced by the particular affected countries.

III. METHODOLOGY

To estimate the impact of recession in Europe, Japan, and China on Indonesia’s economy, we use the Global Trade Analysis Project (GTAP) model, a multi-country, multi-sector general equilibrium model. For this analysis, the GTAP version database is aggregated into 16 regions and 57 sectors. To simulate a recession in the Euro Zone, the European Union (EU), Japan, China, and in all combined we reduce the endowment of the primary factors. Our primary focus here is on the recession in Europe. However, we add the recession in Japan and China to the analysis to examine the potential impact of a recession in these two countries.

To reflect a reasonable magnitude of recession, we compare the forecasts of country GDP presented in the IMF’s World Economic Outlook database of 2009 and 2011. Forecasts of European GDP for 2012, 2013, and 2014 are then compared assuming that the forecast in 2009 is business as usual and the forecast in 2011 already reflects the European crisis. On the basis of this comparison, we calculate that the European recession can be defined as roughly a 2 percent deviation of GDP below baseline. We use this 2 percent deviation to simulate the endowment of primary factors in Europe, Japan, and China.

3.1. The structure of GTAP Model

*Theoretical structure*

Based on Hertel (1997) the theoretical structure of GTAP model can be summarised as follows. Readers who are interested in detailed exposition of the model can directly refer to Hertel (1997) or Brockmeier (2001).

- The production of each sector in each country is represented by a nested production function which is a combination of a Leontief, Constant Elasticity of Substitution (CES) specification. This kind of a nested or staged production is a convenient way of representing separable, constant returns-to-scale technologies. At the bottom of the inverted tree are the individual

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2 For more explanation of the GTAP model, see Hertel (1997).
3 Oceania, Japan, China, Rest of East Asia, Indonesia, Singapore, Thailand, Rest of SE Asia, North America, Latin America, Euro Zone, Rest of EU, Mid East and North Africa, sub-Saharan Africa, and the rest of the world.
inputs demanded by the firm. The primary factors of production are: land, labor, and capital. Firms also purchase intermediate

- inputs, some of which are produced domestically, and some of which are imported. For imports, the intermediate inputs must be sourced from particular exporters. The strong nature of this kind of multi-country model.

- Regional household (a representative of household for each country) behavior is governed by an aggregate utility function, specified over composite private consumption, composite government purchases, and savings. In the GTAP model we employ a special case of the Stone-Geary utility function, where by all subsistence shares are equal to zero.

- Government demands follows the Cobb-Douglas utility function.

- Factors are imperfectly mobile in a GTAP model. The mobility of these endowments is described with a constant elasticity of transformation (CET) revenue function.

**Database**

In this paper the GTAP database version 7 is used. Hertel (2008) describe the database as having 113 regions. The database was constructed from input-output table from each of the 113 countries and combined with a well-developed inter-regional trade flows data. Detailed description of the database including its construction can be found in Narayanan et al (2008).

### 3.2. The structure of INDONESIA-E3 model

**Theoretical structure**

Since the GTAP model cannot analyze distribution results within countries, we use the INDONESIA-E3 model to simulate the effect of an EJC recession on poverty in Indonesia. The strength of this multi-sector, multi-household CGE model of the economy is distributional analysis. Most of its structural features are standard, but its capacity for disaggregation of household structure facilitates analysis of how exogenous shocks affect poverty and inequality.

The theoretical structure of INDONESIA-E3 model is conventional for static general equilibrium models. In particular, the equations in INDONESIA-E3 model represent the following economic behaviour:

- Production sectors minimizing cost of production given a Constant Elasticity of Substitution technology. A system of factor demand equation is derived and specified in the model. This relates the demand for each primary factor to industry outputs and prices of each of the primary factors (labor, capital, land, and intermediate inputs). This reflects the assumption that factors of production may be substituted for one another in ways that depend on factor prices and on the elasticities of substitution between the factors.
• Users of commodities which include industries, households, investors, government sectors form a system of demand equations. This demand system for each of these users consists of three layers (nested demand system). Consumers/users choose the optimal combination of domestically-produced and imported commodities. The last layer is they choose the optimal combination of different commodities responding the prices and budget constraints that they face. For household, a Linear Expenditure Demand System (LES) is specified.

• The household supplies of skilled and unskilled labor as well as capital and land.

• A distinction between four kinds of labor: agricultural labor, manual/production worker, clerical workers, and managerial workers. These are are ‘nested’ within the industry production functions. In each industry, all kind of labor enter a CES production function to produce ‘labor’, which itself enters a further CES production function for industry output.

• A set of export demand functions, indicating the elasticities of foreign demand for Indonesia’s exports to the rest of the world.

• Rates of import tariffs and excise taxes across commodities, rates of business taxes, value added taxes and corporate income taxes across industries, and rates of personal income taxes across household types which reflect the structure of the Indonesian tax system.

• A set of macroeconomic identities which ensures that standard macroeconomic accounting conventions are observed.

In general, the demand and supply equations for private-sector agents are derived from the solutions to these agents microeconomic optimization problems (cost minimization for firms and utility maximization for households). The agents are assumed to be price-takers, with producers operating in competitive markets with zero profit conditions, reflecting the assumption of constant returns to scale.

The unique feature of INDONESIA-E3 model which is very relevant in this study is the disaggregation of household by expenditure classes which allows for precise estimates of the distributional impact and poverty incidence. In the literature of the poverty impact analysis using CGE models, this class of model is called an integrated CGE model (Bourguignon, et al, 2003). This class of model normally has disaggregated households which link each of the households to both sources of income (through market of factors of production) and expenditure (through market for commodities). This should be distinguished from other class of model which is called top-down, where the CGE model is separate from the poverty module, and between them is only one directional relationship. In the integrated model, there is no separation between CGE model and poverty module because all are in one model.

INDONESIA-E3 has been used in various research for example to analyze the distributional impact of fuel pricing reform (Yusuf and Resosudarmo, 2008); the poverty and distributional impact of carbon tax (Ministry of Finance Republic of Indonesia, 2009); greenhouse gasses.
emission from land use change (Warr and Yusuf, 2011). More detailed exposition of the model can be found in Yusuf (2008).

**Database construction**

Due to space limitation detailed construction of INDONESIA-E3’s database including all the steps and assumptions can be found in Yusuf (2006). INDONESIA-E3 model of the current version use a Social Accounting Matrix (SAM) for its database representing Indonesian economy for the year 2008. The integration of highly disaggregated households adequate for accurate distributional analysis is made possible by constructing an Indonesian Social Accounting Matrix (SAM) which serves as the core database to the CGE model. The SAM consists of up to 175 industries, 175 commodities, and 200 households (100 urban and 100 rural households grouped by percentile of real expenditure per capita). The data used for constructing the SAM include Indonesian Input-Output Table, official SAM, and most importantly household level survey data (SUSENAS). Using a general equilibrium model with a disaggregated household sector feature makes it possible to conduct controlled experiments that focus on the effects of different economic shocks on household income, expenditure, poverty, and inequality. The model identifies two categories of households, rural and urban, each of which is divided into 100 subcategories of equal population size, with the subcategories arranged by expenditures per capita.4

To link and transmit the result of GTAP simulations into the INDONESIA-E3 model, we (1) aggregate the sectors in INDONESIA-E3 into 57 to match the sectors in GTAP and then (2) introduce the change in Indonesian exports by commodities, in the world price of imports, and in the world price of exports resulting from GTAP simulations as shocks in the INDONESIA-E3 model.

**IV. RESULTS AND ANALYSIS**

Results from our GTAP simulation suggest that Indonesia is not among the countries most heavily affected by a recession in Europe. A 2 percent decline in Euro zone countries’ GDP reduces Indonesia’s GDP by only 0.052 percent relative to baseline. A 2 percent decline in all 27 countries members of the EU still reduces Indonesia’s GDP by only 0.078 percent relative to baseline (Table 1).

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4 For more on the INDONESIA-E3 model, please see Yusuf (2008).
Table 1 shows that the countries most negatively affected by a European recession are those in the Middle East and North African (MENA) region. With a 2 percent fall in the EU’s GDP, MENA’s GDP falls by almost 0.6 percent, an elasticity of 0.3. Europe is the biggest importer of this region’s energy and MENA countries are heavily dependent on energy exports.

In Asia, Singapore is the country most affected by a European recession because of its dependence on international trade. Japan and China, however, experience a slightly positive increase in GDP.

If China and Japan experience a recession of similar magnitude the impact on Indonesia’s GDP will not be stronger than the impact of the European crisis. But the impact is disproportionate because Japan and China are single countries while the EU consists of 27. A 2 percent decline in China’s GDP causes a 0.07 percent decline in Indonesia’s GDP and a similar decline in Japan’s GDP causes a 0.03 percent decline in Indonesia’s GDP. In other words, China’s potential impact on Indonesia is almost twice that of Japan’s.

The impact of recession in Japan will be felt most in Singapore, where GDP will fall 0.24 percent, and the impact of recession in China will be felt most in Thailand, where GDP will fall 0.33 percent relative to baseline. Singapore and Thailand are among the most open economies in Asia.
In sum, a European recession of a sensible magnitude (2 percent GDP deviation relative to business as usual) working through full trade linkage (taking into account indirect trade effects through other countries as well) will not have a very large negative impact on Indonesia’s GDP. The reason for this is that Indonesia’s economy depends little on external trade. This does not mean that European recession will not affect the world economy to a considerable extent; other countries, like Singapore and MENA countries, will be greatly affected.

With respect to poverty in Indonesia, the impact of a recession in Europe, Japan, and China is also small. A combined 2 percent decline in GDP in Europe, Japan, and China will increase Indonesia’s national poverty head count by only 0.19 percent (Table 2). The biggest impact will be if the recession is in either China, or all of the EU. The impact on a recession on poverty in Indonesia is small because (1) the impact on overall mean real consumption is small and (2) the impact is most strongly felt among higher income households.

As suggested in Figure 1, where percentage change in real expenditure is plotted on the percentile of expenditure per capita, the impact of recession in Europe, Japan, or China is similar. The impact increases with income status. For example, the effect of a recession in the Euro zone on real consumption of the richest 1 percent of urban households is 3 times bigger than on the poorest 1 percent. Similarly, the richest 1 percent of rural households experiences a decline in real consumption 4 times bigger than the poorest 1 percent. The result is similar in all simulations (Euro zone, EU, China, or Japan recession). The range of the ratio of the impact is between 2.3 to 2.9 for urban households, and between 3.3 to 4.4 for rural households. This suggests that the simulations have an inequality-reducing tendency.

The distributive effect discussed earlier can be explained by how recession affects (1) household income, particularly return on factors of production; and (2) the pattern of change in the household-specific consumption price index (CPI). The final effect on household real consumption is a function of those two factors.

Global recession tends to decrease the global prices of commodities. Transmitted to the Indonesian economy, this deflationary effect will tend to reduce commodity prices for domestic consumers. A careful look at how this affects households of different income status suggests that the effect is only slightly progressive if not neutral. Across all simulations, the ratio of the impact on household-specific CPI between the richest 1 percent and the poorest 1 percent is less than 1. This suggests that the progressivity of impact arises largely from the income side. Richer households tend to experience income falls far greater than poorer households.

Figure 2, which shows the simulated impact of recession in Europe, Japan and China on real income of different factors of production, explains this. Almost all factors of production experience real decline in income; however, the biggest decline is where ownership is concentrated among higher income households. Capital income declines more than labor income, and skilled labor income declines more than unskilled labor income. This pattern of impact favors poorer households whose incomes largely depend on unskilled labor.
### Table 2. Simulated Impact on Poverty

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<td>Poverty Gap P(1), %</td>
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<td>Squared Poverty Gap P(2), %</td>
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<td>0.37</td>
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<td>Change in Poverty - dP(0)</td>
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<td>0.03</td>
<td>0.04</td>
<td>0.04</td>
<td>0.10</td>
</tr>
<tr>
<td>Change in Poverty Gap - dP(1)</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Change in Sq-Pov. Gap - dP(2)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>RURAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headcount P(0), %</td>
<td>15.67</td>
<td>15.69</td>
<td>15.69</td>
<td>15.69</td>
<td>15.69</td>
<td>15.87</td>
</tr>
<tr>
<td>Poverty Gap P(1), %</td>
<td>15.59</td>
<td>2.52</td>
<td>2.52</td>
<td>2.52</td>
<td>2.52</td>
<td>2.55</td>
</tr>
<tr>
<td>Squared Poverty Gap P(2), %</td>
<td>2.51</td>
<td>0.65</td>
<td>0.65</td>
<td>0.65</td>
<td>0.65</td>
<td>0.66</td>
</tr>
<tr>
<td>Change in Poverty - dP(0)</td>
<td>0.65</td>
<td>0.08</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.28</td>
</tr>
<tr>
<td>Change in Poverty Gap - dP(1)</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.04</td>
</tr>
<tr>
<td>Change in Sq-Pov. Gap - dP(2)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headcount P(0), %</td>
<td>12.41</td>
<td>12.42</td>
<td>12.42</td>
<td>12.42</td>
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<td>12.54</td>
</tr>
<tr>
<td>Change in Poverty - dP(0)</td>
<td>0.05</td>
<td>0.07</td>
<td>0.06</td>
<td>0.07</td>
<td>0.07</td>
<td>0.19</td>
</tr>
<tr>
<td><strong>DECOMPOSITION-URBAN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unskilled labor</td>
<td>12.35</td>
<td>-11.49</td>
<td>-14.20</td>
<td>-13.57</td>
<td>-10.97</td>
<td>-37.20</td>
</tr>
<tr>
<td>Skilled labor</td>
<td>-6.96</td>
<td>-8.56</td>
<td>-7.14</td>
<td>-6.29</td>
<td>-21.18</td>
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<tr>
<td>Land</td>
<td>-0.79</td>
<td>-1.00</td>
<td>-1.05</td>
<td>-0.84</td>
<td>-2.75</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>-0.86</td>
<td>-1.03</td>
<td>-0.96</td>
<td>-0.75</td>
<td>-2.64</td>
<td></td>
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<tr>
<td>Total</td>
<td>-28.62</td>
<td>-34.73</td>
<td>-32.43</td>
<td>-26.81</td>
<td>-90.31</td>
<td></td>
</tr>
<tr>
<td>Saving</td>
<td>-4.80</td>
<td>-5.83</td>
<td>-5.44</td>
<td>-4.50</td>
<td>-15.16</td>
<td></td>
</tr>
<tr>
<td>Consumption</td>
<td>-23.82</td>
<td>-28.90</td>
<td>-26.99</td>
<td>-22.31</td>
<td>-75.15</td>
<td></td>
</tr>
<tr>
<td>Living cost</td>
<td>-19.97</td>
<td>-23.99</td>
<td>-22.73</td>
<td>-17.51</td>
<td>-61.82</td>
<td></td>
</tr>
<tr>
<td>Real expenditure</td>
<td>-3.85</td>
<td>-4.91</td>
<td>-4.26</td>
<td>-4.80</td>
<td>-13.33</td>
<td></td>
</tr>
<tr>
<td>%chg in real expenditure</td>
<td>-0.10</td>
<td>-0.12</td>
<td>-0.11</td>
<td>-0.12</td>
<td>-0.34</td>
<td></td>
</tr>
<tr>
<td><strong>DECOMPOSITION-RURAL</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skilled labor</td>
<td>-1.80</td>
<td>-2.22</td>
<td>-1.80</td>
<td>-1.59</td>
<td>-5.41</td>
<td></td>
</tr>
<tr>
<td>Capital</td>
<td>-9.06</td>
<td>-10.57</td>
<td>-10.34</td>
<td>-8.47</td>
<td>-28.23</td>
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</tr>
<tr>
<td>Land</td>
<td>-0.84</td>
<td>-1.06</td>
<td>-1.11</td>
<td>-0.89</td>
<td>-2.93</td>
<td></td>
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<tr>
<td>Others</td>
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<td>-0.58</td>
<td>-0.54</td>
<td>-0.42</td>
<td>-1.48</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>-24.63</td>
<td>-29.70</td>
<td>-28.32</td>
<td>-23.06</td>
<td>-77.91</td>
<td></td>
</tr>
<tr>
<td>Saving</td>
<td>-1.35</td>
<td>-1.63</td>
<td>-1.55</td>
<td>-1.26</td>
<td>-4.26</td>
<td></td>
</tr>
<tr>
<td>Consumption</td>
<td>-23.28</td>
<td>-28.08</td>
<td>-26.77</td>
<td>-21.80</td>
<td>-73.64</td>
<td></td>
</tr>
<tr>
<td>Living cost</td>
<td>-18.82</td>
<td>-22.65</td>
<td>-21.26</td>
<td>-16.39</td>
<td>-58.03</td>
<td></td>
</tr>
<tr>
<td>Real expenditure</td>
<td>-4.46</td>
<td>-5.43</td>
<td>-5.51</td>
<td>-5.41</td>
<td>-15.61</td>
<td></td>
</tr>
<tr>
<td>%chg in real expenditure</td>
<td>-0.10</td>
<td>-0.13</td>
<td>-0.13</td>
<td>-0.13</td>
<td>-0.37</td>
<td></td>
</tr>
</tbody>
</table>

Note: Decomposition, based on marginally poor households in urban (percentile 9) and rural (percentile 15) area. The unit is billion rupiah (2003 price), unless otherwise indicated.

Source: Author’s calculation from simulation using INDONESIA-E3 model.
Figure 1.
Simulated Impact on Real Consumption by Household Groups

Source: Author's calculation based on simulation with INDONESIA-E3 model.
Figure 2.
Simulated Impact on Real Income of Factors of Production

<table>
<thead>
<tr>
<th>Component</th>
<th>Euro Zone</th>
<th>EU</th>
<th>Japan</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal skilled labor</td>
<td>-0.13</td>
<td>-0.17</td>
<td>-0.05</td>
<td>-0.10</td>
</tr>
<tr>
<td>Formal skilled labor</td>
<td>-0.06</td>
<td>-0.09</td>
<td>-0.06</td>
<td>-0.10</td>
</tr>
<tr>
<td>Informal unskilled labor</td>
<td>-0.03</td>
<td>-0.04</td>
<td>-0.05</td>
<td>-0.05</td>
</tr>
<tr>
<td>Formal unskilled labor</td>
<td>0.01</td>
<td>0.00</td>
<td>-0.02</td>
<td>-0.03</td>
</tr>
<tr>
<td>Land</td>
<td>-0.16</td>
<td>-0.23</td>
<td>-0.31</td>
<td>-0.25</td>
</tr>
<tr>
<td>Capital</td>
<td>-0.38</td>
<td>-0.42</td>
<td>-0.44</td>
<td>-0.38</td>
</tr>
</tbody>
</table>

SOURCE: Author’s calculation based on simulation with INDONESIA-E3 model.

Figure 3.
Simulated Impact on Output of Aggregated Sectors (% change from baseline)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Euro Zone</th>
<th>EU</th>
<th>Japan</th>
<th>China</th>
<th>EU+Japan +China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Services</td>
<td>-0.03</td>
<td>-0.04</td>
<td>-0.03</td>
<td>-0.05</td>
<td>-0.12</td>
</tr>
<tr>
<td>TransComm</td>
<td>-0.08</td>
<td>-0.11</td>
<td>-0.03</td>
<td>-0.06</td>
<td>-0.19</td>
</tr>
<tr>
<td>Util_Cons</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.00</td>
<td>-0.01</td>
<td>-0.02</td>
</tr>
<tr>
<td>HeavyMnfc</td>
<td>0.11</td>
<td>0.11</td>
<td>0.12</td>
<td>0.01</td>
<td>0.24</td>
</tr>
<tr>
<td>LightMnfc</td>
<td>0.04</td>
<td>0.04</td>
<td>0.02</td>
<td>0.01</td>
<td>0.07</td>
</tr>
<tr>
<td>TextWapp</td>
<td>0.12</td>
<td>0.10</td>
<td>0.06</td>
<td>0.22</td>
<td>0.38</td>
</tr>
<tr>
<td>ProcFood</td>
<td>-0.06</td>
<td>-0.08</td>
<td>-0.06</td>
<td>-0.08</td>
<td>-0.21</td>
</tr>
<tr>
<td>Extraction</td>
<td>-0.04</td>
<td>-0.05</td>
<td>-0.18</td>
<td>-0.06</td>
<td>-0.27</td>
</tr>
<tr>
<td>OilGas</td>
<td>-0.06</td>
<td>-0.06</td>
<td>-0.07</td>
<td>-0.05</td>
<td>-0.15</td>
</tr>
<tr>
<td>Forestry</td>
<td>0.06</td>
<td>0.06</td>
<td>-0.01</td>
<td>0.04</td>
<td>0.10</td>
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<tr>
<td>OthAgrPrm</td>
<td>-0.04</td>
<td>-0.06</td>
<td>-0.05</td>
<td>-0.05</td>
<td>-0.15</td>
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<tr>
<td>EctateCrops</td>
<td>0.07</td>
<td>0.07</td>
<td>0.05</td>
<td>0.02</td>
<td>0.14</td>
</tr>
</tbody>
</table>

SOURCE: Author’s calculation based on simulation with INDONESIA-E3 model.
The pattern of impact on production factors income is largely driven by how industries respond to trading partners’ recession. As shown in Figure 3, the simulated recession in Europe, Japan, and China negatively affects output in certain sectors, most notably oil, gas, and other extractive sectors. These sectors are capital- and skill-intensive. Figure 4 shows how the contraction and expansion of output is correlated with changes in exports of those sectors.

A closer look at the impact on poverty suggests that rural areas would be harder hit than urban areas (Table 2). For example, a recession in Europe, Japan, and China combined would increase the incidence of poverty in urban areas by 0.10 percent and in rural areas by 0.28 percent. To understand this, we examine what happens to real consumption in marginally poor urban and rural households. A marginally poor household is one whose expenditure per capita is closest to the poverty line. Knowing what happens to these households shows how the simulation affects poverty incidence.

As explained in Warr, Menon, and Yusuf (2012), The basis for the decomposition is as follows. We focus on the sources of changes in the real expenditure of a particular household, say household \( h \), arising from some external shock. Upper case Roman letters, like \( Z \), will denote levels of variables and lower case Roman letters, like \( z \), will denote their proportional change, so that \( z = dZ / Z \). The levels of nominal income and nominal expenditure of household \( h \) will be denoted \( Y_h \) and \( E_h \) respectively. Let the proportional change in the nominal expenditure of household \( h \), be \( e_h = \bar{e}_h + p_h \), where \( \bar{e}_h \) is the proportional change in the household’s real expenditure and \( p_h \) is the proportional change in a consumer price index specific to household \( h \), with \( e^i_h = E^i_h / E_h \) denoting that household’s expenditure share on commodity \( i \), 

\[ E^i_h \] 

denoting its nominal expenditure on commodity \( i \) and \( p^i \) denoting the proportional change in the consumer price of commodity \( i \).

The absolute change in this household’s nominal expenditure is now

\[
dE_h = E_h e_h = E_h (\bar{e}_h + p_h) = d\bar{E}_h + E_h p_h = d\bar{E}_h + \sum_{i=1}^{I} E^i_h p^i
\]

That is, the change in nominal expenditure of the household is given by the change in its real expenditure plus the change in its true cost of living, the latter an expenditure weighted sum of the changes in the consumer prices that household actually faces, where the expenditure weights pertain to that particular household.\(^5\) The change in nominal expenditure is also equal to the change in nominal income minus the change in saving, so that \( dE_h = dY_h - dS_h \).

Disregarding any changes in transfer income or direct taxes, for simplicity, the change in nominal income is equal to the change in nominal factor income, \( dY_h = dY^f_h \).

\(^5\) It should be noted that real expenditures means expenditures measured at constant prices, defined here to mean base period prices. Thus, the levels of nominal and real expenditures in the base period are identical, meaning \( E_h = \bar{E}_h \).
Thus, rearranging terms,

\[ d\tilde{E}_h = dY_k - dS_h - \sum_{i=1}^{I} E_h^i p_i \]

The change in the household’s real income is decomposable into three components: (i) the change in its nominal factor income minus (ii) the change in its savings minus (iii) the change in its true cost of living. Importantly, the change in nominal factor income is itself additively decomposable into its factor components, as identified in the model.

This decomposition is applied to those households are those who are in the border of poverty line. They are percentile 8 household in urban area and the percentile 15 in rural area. What happens to these two representative households may explain what happens to poverty incidence.

![Figure 4. Simulated Impact on Export of Aggregated Sectors (% change from baseline)]
As shown in Table 2, the percentage change in the real expenditure of marginally poor households in urban and rural areas does not differ much. For the combined simulations, for example, marginally poor households in urban areas experience a 0.34 percent decline in real consumption while those in rural areas experience a 0.37 percent decline. This much larger impact on poverty incidence in rural areas suggests that the elasticity of poverty incidence with respect to the change in the real consumption of marginally poor households is relatively larger. The slope of the cumulative distribution function (CDF) of the real consumption of the rural households around the region of the poverty line must be higher than that of urban households. With the same magnitude of change in their consumption, the rural poor are more vulnerable to external shocks than urban households.

It is also useful to understand to what extent change in the real expenditure of the marginally poor household is driven by its decomposable drivers. The decline in the real expenditure of the poor can be generally decomposed into income effect (decline in income) and consumer price effect (increase in the price of the commodity basket of the poor or living cost). The income effect can also be decomposed (e.g., labor income, capital income). Table 2 shows how it is the case for urban and rural marginally poor households. Several conclusions can be drawn from this decomposition exercise.

First, the poverty-increasing effects come only from the income side. Poverty increases because the income of the poor decreases, not because of a rise in inflation or the cost of living. Global recession, ceteris paribus, is deflationary and as shown in Table 2, the cost of living for the poor actually falls. Second, the fall in income of the poor is largely the result of a fall in unskilled labor income. As our earlier discussion suggests, income from unskilled labor falls the least as compared to other factor income in aggregate, but this income makes up the dominant share of the poor’s income. Third, despite a decline in the cost of living, the real consumption of the poor falls because the decline in income cannot be compensated for. As a result, poverty increases in urban and rural areas.

V. CONCLUSION

The effect of a recession in Europe, Japan and China on other economies through trade linkage depends on many factors. These factors include the importance of bilateral trade between the affected countries or regions, the openness of the economy, and the country’s level of diversification in export commodities and trading partners.

The impact on poverty in the affected countries depends even more on various country specific aspects such as how the poor earn its income and how the spend their earning. If bigger part of its source of income are affected by the global crisis and the price of the commodities they intensively consumed are heavily affected, then the poor will be vulnerable to external shocks. This is empirical and this paper touch this important issue.
This paper shows that the impact of a recession in Europe, Japan, or China on Indonesia is relatively small simply because Indonesia is a relatively less open economy and depends predominantly on its domestic market. According to our analysis, the current recession in Europe, Japan and China will have only a small negative effect on Indonesia’s GDP and poverty rate.

However, results suggest that it would be wise to pay attention to China. According to our simulation, a recession in China could reduce Indonesia’s GDP two times more than a recession of similar magnitude in Japan.

This analysis shows that a recession in Europe, Japan, and China would have its largest negative impact on richer households in Indonesia. Richer households would suffer the most because their incomes are largely dependent on the capital- and skill-intensive sectors of the economy. With respect to the poor, our analysis suggests that a recession in Europe, Japan or China will not have much of an impact on prices in Indonesia. In other words, the cost of the living of the poor will not be much affected. Policymakers in Indonesia should therefore concentrate less on pricing policies and more on employment policies to protect the poor from loss of employment. Since they are less skilled, the poor are likely to be the first to lose their jobs in the event of a recession.

Finally, our analysis does not cover the effects of recession in Europe, Japan and China on economic channels other than trade, such as foreign direct investment and the financial sector. The general equilibrium model used in our analysis does not cover the financial sector, so other studies focusing on this channel are warranted. In addition, in the longer term, poverty is affected by various factors other than income and prices. Human capital accumulation, social assistance policies and equality of opportunity are important in poverty alleviation. This effects are not accounted for in this analysis.
REFERENCES


James Foster, Joel Greer and Erik Thorbecke, A Class of Decomposable Poverty Measures, Econometrica, Vol. 52, No. 3 (May, 1984), pp. 761-766


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