

THE THEORETICAL CONSTRUCTION OF INCOME SMOOTHING MEASUREMENT

Alwan Sri Kustono

Jember University

E-Mail: alwankustono@yahoo.com

Tegal Besar Permai 2-E1, Jember, Propinsi Jawa Timur, Indonesia

ABSTRACT

The income smoothing is a dimension of the accounts manipulation theme that has been attracting a great attention in the accounting literature. A goal of manipulation widely ascribed to managers is the desire to smooth. Reported income, Income smoothing reflects reducing the possible income fluctuations so as to make it as stable as possible throughout the ism. Almost of income smoothing research in Indonesia used Eckel's index to classify smoother non smoother firms. Empirical evidences have provided support for the existence of an income smoothing behavior. The studies showed inconsistent about factors determining this smoothing. The purpose of the present investigation is twofold. First, we seek to determine if Eckel index is a reliable instrument to measure income smoothing behavior. Second, we pretend to identify the new instrument to measure incidence of income smoothing. Our research sample comprises manufacturing companies listed on the Indonesia Stock Exchange, over period of 1999-2008. This study confirms Eckel's index is not reliability instrument. The new proposed index quantifies the incidence of income smoothing without depend on n periods. The results imply that researchers should re-examine the conclusion of previous studies, particularly that determinant, factors and effect of income smoothing practices.

Key words: income smoothing, Eckel's index, coefficient of variation, reliability.

INTRODUCTION

It has been noticed that income statement is considered as one of the statements to be presented in financial reporting. For that reason, the company's earning is considered vital information for it can be used to measure the corporate performance. In other words, information of the earning can be used to assess the performance or accountability of management and also predict the ability of companies in the effort of contributing to the following earning.

In general, earning reporting is frequently not free from the accounting manipulation. Yet it appears different from the fraudulence. Accounting manipulation can be still in tolerant when it is put in the accounting rules. In contrast, fraudulence practices tend to be against the rules and accounting standards. Thus, it is delicately different from income smoothing. In fact, one

of the practices of accounting manipulation is income smoothing.

In connection with the pursuit of analyzing income smoothing in the companies, some definitions of it can be inferred. First of all, income smoothing is defined as the emphasis on the fluctuations in income levels that are considered normal for the company (Barnea et al., 1976). For another thing, Beidleman, (1973) defines income smoothing as the management efforts to reduce abnormal variations in the earning to the extent permitted by the principles of good management and accounting. Income smoothing in such instances, is as a tool used by management to reduce the variability of reported income stream relative to the target which is intentionally smoothed by using artificial or real variable. In addition, income smoothing is one-dimensional manipulation of accounts that attract the atten-

tion of many accounting literature in the realm of earnings management. Beside, income smoothing reflects the concern to reduce the possibility of fluctuations in income by making a steady flow

Research on income smoothing in Indonesia generally examine several factors which are allegedly to motivate management to do income smoothing. They identify the existence of such practices and followed by testing management motivation. The results of these studies have identified those most public companies in Indonesia have conducted income smoothing. All in all, most of the studies are uniform in terms of inferring the end results.

Testing the triggering factor of income smoothing policy by the company management has not consistently been recovered. Among the results of such studies are often inconsistent to one another. For example, Kustono (2010) stated that the inconsistency of their findings was caused by the measuring devices. These devices are thought to be unreliable. For example, Index Eckel does not have the ability to capture the practice of income smoothing between periods. In that situation, it shows that some companies are classified by grading only in one particular year. This is considered to have deviated from the definition of income smoothing.

The classification based on Eckel index for one company may also change because of changes in the period used to determine the coefficient of variation. Change of classification shows that the index is not reliable as a tool. In other words, Eckel is as an identifier of smoothing and not merely for smoothing. Kustono (2010) asserted the idea of the need for new instruments. This research is intended to correct weaknesses of the Eckel and construct an index measuring instrument which is more reliable income smoothing factor. This construction is very important because the use of measuring instrument error will cause errors either in the phase of conclusions related to the classification of sample or the determinants and impact of such classification.

THEORETICAL FRAMEWORK

It is a fact that income smoothing becomes a phenomenon which has been often proved in some previous studies. This practice has been investigated through various levels of different samples. Furthermore, income smoothing is considered to be an important factor. Research by Moses (1987) and Atik & Sensoy (2005) shows that at least 60% of the sample used in the study can be classified as smoothing the company earnings. Another proponent, such as Barnea et al. (1976) classified accounting income smoothing as inter-temporal smoothing and classification. Inter-temporal smoothing is based on the situation when cost and expenses are recognized and smoothing classification is done with the classification under ordinary cost and extraordinary one in which the ordinary post finally becomes flat.

Eckel (1981) distinguishes between income smoothing as a natural smoothing and intended smoothing. Natural smoothing is the alignments resulting from transactions that inherently produce a smoothed earning. In other words, the company's operations to generate income by collecting revenues and expenses are inherently to eliminate fluctuations in income flows. In other words, the process of generating income itself generates a stream of smoothed income. Alignment occurs without the intervention of any party.

Income smoothing is accidentally triggered by the motivation which is based on the management actions. There are two types of income smoothing: intentional, that is income smoothing of the real intention and the other one is artificial income smoothing. Real income smoothing indicates management actions that seek to control economic conditions that directly affect corporate earnings in the future. In addition, this real income smoothing affects cash flow. On the contrary, artificial income smoothing can show manipulation which is undertaken by management to smooth the earning. Thus, the action of this manipulation resulted in a fundamental or economic condition that can affect cash flow, but shifts

the cost and/or income from one period to another.

By taking for granted, such a trend can be traced from several research. Some studies, in fact, have been conducted to identify the smoothing behavior, such as motivation and its impact on future transactions, a company that has been doing income smoothing. This can also be found in other studies such as (Lev & Kunitzky, 1974; Ammihud et al., 1983, Wang & Williams, 1994; Michelson et al., 1995; Iñiguez & Poveda, 2004). These proponents also provide empirical support toward statement that management reduces the variability of cash flows and earning for the purpose of minimizing the risk of the company. Income smoothing is also intended to increase the value of the firm (Gordon, 1964; Trueman & Titman, 1988; Gibbins et al., 1990; and Chaney & Lewis, 1995; 1998).

Estimator of Income smoothing

Income smoothing can only be investigated through some periods by suspecting a certain earning rate of the targeted, e.g., both high- and low-digits earning reports. Some researchers use a two-period model by assuming that the earning target is proportional to the income report in the previous year (Copeland, 1968). In other words, the size of alignment is the magnitude of changes in the earning from one year to the next.

Other researchers also evaluated the earning target using multi-period test. The underlying assumption is that it should be an evenly increasing trend (Gordon, 1966). Some of the models used are the exponential model (Dascher and Malcolm, 1970), linear time series models (Barefield and Comiskey, 1972), time trend semi-logaritma (Beidleman, 1973) and model of the market return index (Ronen & Sadan, 1975). For example, Dopuch & Watts (1972) suggest the use of Box-Jenkins techniques to ensure the alignment model is applicable.

Models of earning target are differentiated from the real earning. Often, these models contain errors inherent profit target

because its validity can not be detected empirically. In that case, Ronen & Sadan (1975) suggested that we do income smoothing approach. In particular, income smoothing can be identified if the researcher is faced by the following four questions.

1. What is the object alignment implemented by the management?
2. What is the dimension of management is used to perform smoothing.
3. What instrument of smoothing is used by management
4. What is the object of such smoothing behavior?

In connection with the above efforts, Imhoff (1977) and Eckel (1981) developed a methodology based on testing the variability of income associated with the variability of sales. The model used to predict the existence of income smoothing or earnings variation is inter-period variant. They assume that the level of earning depends on the level of sales. The basic idea is that the change in sales can affect the earning. If the variance of income is less than the variance of sales, it can be concluded that the smoothing has been done.

Eckel (1981) model of the income smoothing is done by basing on the following premises.

1. Income is a linear function of the sales = sales-cost variable-fixed cost.
2. The ratio of variable costs to sales is in constant currency units
3. Fixed costs are constant or increasing from period to period, but not likely to decline.
4. Gross sales can only be smoothed by real smoothing; gross sales can not be artificially smoothed.

Mathematically, Eckel illustrates all the above as the following: when,

$I = S - VS - FC$, and

$FC > 0$, and

$FC_{t+1} \geq FC_t$, and $0 < VC < 1$ and

$FC_{t+1} = FC_t = FC$, so that

$CV_{\Delta s} \leq CV_{\Delta I}$

and

- I is Changes of income in one period
 S is Changes of income in one period
 CV S is Coefficient variation for income change in a certain time
 CV I is Coefficient variation for income change in a certain time

Thus, the formula for classifying the companies as smoothing and non smoothing can be formulated as the following.

$$CV I \text{ and } CV S = \sqrt{\frac{\sum (\Delta X - \bar{X})^2}{n-1}} : \bar{X}$$

In which:

- X = Changes in income (S) or income (I) between the years n to $n-1$
 \bar{X} = The average of the change in income (S) or income (I)
 n = Number of years observed.

The companies with absolute value are less than one index is categorized as a company that does the practice of income smoothing. On the contrary, companies with an index are equal to or greater than 1 are not considered practicing income smoothing. In this case, Eckel methodology has been widely replicated and expanded. For example, there are some following this formula such as Albrecht and Richardson (1990), Ashari et al. (1994), Booth et al. (1996), Carlson and Bathala (1997), Michelson et al. (1995, 2000), and Iñiguez & Poveda (2004).

The methodology above is done by classifying the sample into two groups (income smoother versus the non income smoother). In addition, the time series of the data are used to calculate the index of income smoothing (Albrecht & Richardson, 1990; Ashari et al., 1994). Like the proponents above, Moses (1987) states that research can capture the multi-period goals and the success of strategy of smoothing, whereas a single period of the study reflect only the smoothing effort.

The use of the coefficient variation is good for showing that the coefficient is the dimension of sample variability, which provides a comparison of variance among different groups (Albrecht & Richardson, 1990). Furthermore, this index is a good instrument to define the degree of income smoothing by the company (Iñiguez & Poveda, 2004). It is stated that identifying such an index by summing the area of income smoothing that effect of smoothing a set of variables that potentially (Ashari et al., 1994). Size can also explain the smoothing behavior by management (Iñiguez & Poveda, 2004), (Zmijewski & Hagerman, 1981).

Unlike other measurement of smoothing, (Dascher and Malcolm, 1970; White, 1970, 1972; Ronen & Sadan, 1975; Moses, 1987), argued that an index can be developed to identify the income smoothing by Eckel without explaining the model. This is because the model aims to estimate the expectation of a normal return which then becomes targets for reducing fluctuations in income. Eckel Index rigid is deemed to be against a variety of predictive models of income and be easily used to measure the variability of earning reports (Albrecht & Richardson, 1990; Ashari et al., 1994). Expectation for the model development is a complicated task and the insufficiency of the normal process of earning can lead to the inference as a function of residual (Imhoff, 1977; Eckel, 1981).

In Indonesia, the research on income smoothing in general use in Eckel index in relation to both smoothing and non-smoothing (Ilmainir, 1993; Zuhroh, 1996; Assih, 1998; Jin and Machfoedz, 1998; Jatiningrum, 2000; Salno and Baridwan, 2000; Muchammad, 2001; Natty, 2001; Prasetyo, 2002; Nasser and Herlina, 2003; Pramudiyatna, 2008; Noor, 2004; Sholihin, 2004; Joseph and Soraya, 2004; Juniarti and Corolina, 2005; Nurhayati, 2006; Ratnawati, 2006; Irawati and Maya A, 2007; Jayaram, 2007; Masodah, 2007; Subekti, 2007; Zen and Herman, 2007; Goddard, 2008; Kustono, 2008 & 2009, Martanti, 2008; Firman,

2009; Kurniati, 2009; Kusuma, 2009; Prapti Nur, 2009; Suranta and Merdiatusi, 2009; Vernita, 2009). The testing which was done on these studies concluded that income smoothing is something commonly done by public companies in Indonesia.

Index of Reliability in Eckel

Kustono (2010) stated that Eckel index is not a reliable measure. The use of coefficient of variation is vulnerable to the difference n (total number of years) in the measurement of income smoothing. The test results showed that the index of Eckel does not

have the ability to capture the practice of income smoothing between periods. Some companies are classified as practicing smoothing only in one particular year only, so that this is different from the definition of income smoothing. Classification based on Eckel index for one company may also change because of changes in the period used to determine the coefficient of variation. This is because that the change of classification shows the index which is not reliable as a tool in Eckel, both as smoothing and non-smoothing.

The reliability of this instrument may be

Table 1
Determinant of Income smoothing in Indonesia

No	Variabel	Supporting	Rejecting
1.	Size of company	Suranta and Merdiatusi (2009), Sholihin (2004), Dewi (2008), Kustono (2007)	Ilmainir (1993); Ashari, dkk.(1994); Zuhroh (1996); Jin and Machfoedz (1998), Pramudiyatna (2008), vernita (2009), Martanti (2008), Natty (2001), Jayadi (2007), Kusuma (2009), Subekti (2007), Firmansyah (2009), Kurniati (2009), Masodah (2007), Jatiningrum (2000)
2.	Debt Ratio	Natty (2001), Masodah (2007), Kustono (2007)	
3.	Industry sectors	Kurniati (2009), Dewi (2008)	Martanti (2008), Jayadi (2007), Subekti (2007)
4.	Stock price	Ilmainir (1993)	Assih (1998), Salno and Baridwan (2000), Prasetyo (2002), Vernita (2009)
5.	Financial Leverage	Subekti (2007), Firmansyah (2009), Kurniati (2009), Zuhroh (1996), Jin and Machfoez (1998), Yusuf and Soraya (2004)	Juniarti and Corolina (2005), Nurhayati (2006), Ratnawati (2006), Vernita (2009), Pramudiyatna (2008),
6.	Profitability	Subekti (2007)	Zuhroh (1996); Jin and Machfoez (1998), Muchammad (2001), Nasser dan Herlina (2003), Noor (2004), Pramudiyatna (2008), Zen and Herman (2007), Jayadi (2007), Vernita (2009), Kusuma (2009), Firmansyah (2009), Juniarti and Corolina (2005), Nurhayati (2006) Ratnawati (2006), Masodah (2007)
7.	Group of companies		Jin and Machfoedz (1998); Assih (1998), Irawati and Maya A (2007)
8.	NPM	Dewi (2008), Prapti Nur (2009)	Vernita (2009), Martanti (2008), Kurniati (2009) Irawati and Maya A (2007)
9.	Losser/winner		Subekti (2007), Irawati and Maya A (2007)

Source: data processed

due to the differences in the determinants of income smoothing as in public companies. Accordingly, it failed to reject the null hypothesis of the study. In other words, theories construction for generating the hypothesis can not be proved. Table 1 presents several different studies in concluding determinant of alignment.

RESEARCH METHODS

The theory building is done in this study. As such, it is considered an analytical review of unreliability of Eckel index as a measure of income smoothing instruments. The procedure testing is done by analyzing in depth through the definition of income smoothing. By doing so, a new instrument is created based on the premises that are developed from these definitions. The data were used for comparison by using Kustono's (2010) study. Such data consists of the financial statements of companies listed in Indonesia Stock Exchange during the period of 1999-2008. The population selection is based only on consideration that manufacturers should be done by filtering as by Eckel on smoothing and non-smoothing based on the industries being researched.

The use of only one industry category makes it easy to determine the average coefficient of variation of industry. The samples, then, were selected on the basis of suitability of the sample characteristics, the criteria that have been determined. As the previous research conducted, the criteria for selecting the samples in this study is all the manufacturing companies as listed on the Jakarta Stock Exchange prior to January 1, 1999 and still in operation during the period 1 January 2001 to December 31, 2008. Besides such criteria, the companies are considered to always publish audited financial statements at each reporting period; they did not conduct transactions of mergers, acquisitions, and their business groups remained unchanged during the period 1 January 2001 to December 31, 2008; they did not have negative equity in 1999, and finally they have not been delisted in the period 2000-2008.

Index-Based Classification of Eckel

In this case, Kustono (2010) did the testing of financial reporting data in 1999 to 2008 for 52 manufacturing companies in Indonesia Stock Exchange. Period of Eckel index calculation is done by using $n = 3, 4, 5$, and 6 years. To obtain uniformity of analysis, in this study and smoothing and non-smoothing classification was calculated for the years 2004 to 2007. Such classification is based to $n = 6$, a new variation coefficient that can be set for 2004. The use of $n = 6$ indicating that the coefficient of variation was calculated for six years i.e. 1999, 2000, 2001, 2002, 2003, and 2004. Therefore, the new index can be determined in 2004.

The test results showed that the Eckel index for the period $n = 3$ (three) years, have 8 smoothing companies in 2004, 8 in 2005, 6 in 2006, and 8 in 2007. For the period $n = 4$ (four) years, there are 4 smoothing companies in 2004, 6 in 2005, 7 in 2006, and 7 in 2007. For the period $n = 5$ years, there are 5 smoothing companies in 2004, 6 in 2005, 5 in 2006, and 8 in 2007. For the period $n = 6$ years, there are 6 smoothing companies in 2004, 6 in 2005, 5 in 2006, and 6 in 2007.

Based on the coefficient of variation of the testing, smoothing and non-smoothing classification is not consistent, especially for a company at a certain period. Table 2 shows that the sample no 3 is classified as a smoother in 2005 when n is used is 4. For $n = 3, 5, 6$ of sample 3 in the year classified as non-grader. Similarly, it occurs also in some other samples.

In that case, therefore, Eckel index test result raises doubts about the reliability of the index. From this fact, Kustono (2010) concluded that the classification based on the Eckel index for one company may fluctuate because of changes in the period used to determine the coefficient of variation. Change classification shows that the index is not reliable as a tool Eckel identifier grading and not grading. Eckel also no limitation period should be used for calculations.

The number of sample with the companies classified as smoother in each year of

Table 2
Results of Income smoothing Classification on Eckel Indeks

Year	Number of companies classified as practicing the income smoothing			
	n = 3	n = 4	n = 5	n = 6
2004	8	4	5	6
2005	8	6	6	6
2006	6	7	5	5
2007	8	7	8	6

testing may vary. Year 2004 for $n = 3, 4, 5, 6$ respectively show 8; 4; 5; 6 companies classified samples as smoothing. Eckel index-based classification is prone to reliability because of the significance of the influence of n in the formula.

Instrument Construction of Income smoothing

The unreliability of Eckel index as a measure of income smoothing instruments construction inspires to create a new instrument. The construction process is based on the definition of income smoothing. Some researchers of the previous income smoothing define it as follows.

Copeland (1968) defines smoothing moderate year-to-year fluctuations in income by shifting incomes from peak years to less successful periods.

Beidleman (1973):

Smoothing of reported earnings May be defined as the intentional dampening of fluctuations about the level of earnings Some That Is currently Considered to be normal for a firm.

Barnea, Ronen and Sadan (1976):

Deliberate dampening of fluctuations about some level of earnings is which is considered to be normal for the firm.

Imhoff (1977):

Income smoothing has typically been defined as a relatively low degree of earnings variability.

Imhoff (1981):

Income smoothing is a special case of in-

adequate financial disclosure statement. The smoothing of income implies some deliberate effort to disclose the financial information in Such a way as to Convey an artificially reduced variability of the income stream.

Ronen & Sadan (1981):

Income smoothing cans be defined as a deliberate attempt by management to signal information to financial users.

Koch (1981: 574):

It can be defined income smoothing is a means Used by management to diminish the variability of stream of reported income numbers relative to Some perceived target stream by the manipulation of artificial (accounting) or real (transactional) variables

Givoly & Ronen (1981: 175):

Smoothing can be viewed as a form of signaling whereby managers use Their discretion over the choice Among accounting alternatives Within Generally Accepted Accounting Principles so as to minimize fluctuations of earnings over time around the trend They believe best reflects Their view of investors' expectations of the company's future performance.

Moses (1987):

Smoothing behavior is defined as an effort to reduce fluctuations in reported earnings.

Ma (1988):

Smoothing reported earnings May be defined as the intentional reduction of earnings fluctuations with respect to Some normal levels.

Ashari et al., (1994):

Deliberate voluntary acts by management are to reduce income variation by using devices to perform certain accounting.

Beattie et al. (1994):

Smoothing can be viewed in terms of the reduction in earnings variability over the children number of periods, or, within a single period, as the movement towards an expected level of reported earnings.

Fern et al., (1994):

Attempts to reduce earnings variability, especially abnormal behavior designed to dampen increases in reported earnings.

Fudenberg & Tirole (1995):

Income smoothing is the process of manipulating the time profile of earnings or earnings reports to make the reported income stream less variable, while not Increasing reported earnings over the long run.

From these definitions can be stated that income smoothing is a way used by management to reduce the variability of flows from the figures reported earnings relative to the desired income stream with the manipulation of artificial (accounting) or real variables (transactional). Alignment can be shown as a form indication where managers use discretion to choose some alternatives within the scope of accounting generally acceptable accounting principles in order to minimize fluctuations in earnings.

Smoothing behavior is an attempt to reduce fluctuations in reported earnings. Reducing earnings volatility leads to levels approaching normal levels. Reduction efforts can be performed using instruments accounting (accounting devices). Reducing fluctuations in income do for some period by sliding toward the expected rate of earning.

Income smoothing can be seen as an attempt to reduce earnings variability, especially behavior that is designed to suppress an abnormal increase in earning. The process is expected to report earnings manipulation profile can create revenue streams that are reported are not so varied.

Income smoothing is an effort to reduce the variability of income over a certain pe-

riod, which leads to the expected level of reported earnings. Thus income smoothing can be regarded as a means used by management to reduce earnings variability among rows of the amount of earnings, which arise because of differences between the amounts of earning that should be reported with the expected earning (normal earning).

Instrument Development

According to Kustono (2010), it is clear that income smoothing is not possible only on one particular period. Engineering such income is not classified as income smoothing, but it could be a leverage income (Increasing income) or a decrease in earnings (income decreasing). Consequence management of accruals in the period now of course have an impact on the next financial reporting period. The effort has to be increasing the number of reported earnings, if earnings should be reported smaller than normal earning, or reduce the number of reported earnings, if earnings should be reported higher than normal earnings. Income smoothing is a way to shift the volatility of earnings by lowering the income level at the peak and increase when under.

Completing the premise stated by Kustono (2010), the premises for the definition of income smoothing can be asserted as the following.

Premise 1: Income smoothing can only be done during some periods.

Premise 2: Smoothing is done intentionally by tapping and tilting earnings reports so close to the expected earning.

Premise 3: Efforts for that suppression causes the low earnings reports.

Premise 4: When firms are classified as smoothing, classification is consistent at least in one consecutive period.

Premise 5: When the company classified as a smoothing in a given year, then the lengthening or shortening the period that is used to classify it will not give a different impact on the classification of that particular year.

In a study of earnings management, the

main difficulty is finding the real earning. Researchers can only access the earnings report to identify the motivation of management. Consequently, the development of investigating the instruments also found the earning the object of earning reports. Fluctuations in earnings a report (both operating earning and net income) is reflected by differences in earnings report of the previous period (t-1) with the earnings report of the current period (t). Given that income smoothing should be performed at successive periods, the earnings reports that can be used to detect such action is the previous period, the period now, and the period thereafter (t-1, t, t +1). This means that in period t, the earnings report shows the results of management actions in the previous period, and time series of these efforts are also made in the current period so that the earnings reports in three successive periods do not fluctuate either.

Fluctuations in earnings were caused by changes in foreign earning reports or inter-period earning reports. In other words, the difference is a measure of income smoothing component. Therefore, the ratio of earning change is more precise statement. This means that companies can be classified as

either non-smoothing or smoothing by looking at the ratio of consolidated earnings changes in successive periods. Companies are classified as smoothing if in a few successive periods of low earnings change the ratio than other periods.

The size is susceptible to the effects of specific aspects such as scale of enterprise companies. Companies that have relatively high sales will have a current income fluctuation which is steeper than the firms with small sales. The ratio of consolidated earnings changes need to be standardized with the sale of the change occurring. This formula is expected to minimize the impact of specific aspects of the company. Thus instruments and non-smoothing and smoothing of earnings formulated as follows:

$$PP_{it} = \frac{\frac{L_{it} - L_{it-1}}{L_{it-1}}}{\frac{P_{it} - P_{it-1}}{P_{it-1}}}$$

PP is the index of income smoothing.

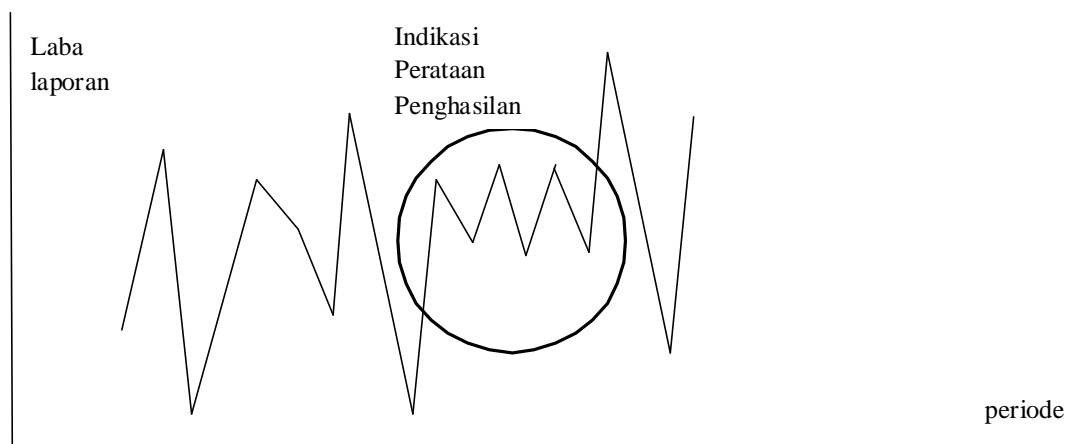
L is to Earnings Reports

P is the Sales

i is firm i

Companies are classified as smoothing if

Figure 1
Profile of Earning Report



Note: Laba laporan= earning report

Indikasi Perataan Penghasilan= indication of income smoothing

Periode= period

at least three periods (two ratios PP) has successive absolute index below 0.5. There is a consideration of the use of three periods because the practice of income smoothing is the practice of earnings manipulation that occurred in some periods. Using the ratio of change in earnings and sales, management can do the alignment when it is detected through at least three periods (two ratios, because it is used to calculate the ratio of period t and $t-1$).

The value 0.5 shows the high principle of prudence. Income derived from sales less costs. Fluctuations in earnings should be the covariance with fluctuating sales and costs. If both fluctuate parallel course PP ratio is 1. The ratio is greater than 1 indicating more earnings than sales. The ratio is less than one indicating lower earnings smoothing than sales. Emphasis on fluctuations in earnings reports will put the practice of income smoothing positing in the area under the same ratio. For conservatism, the company will be classified as a smoothing in a row when the three reporting periods (two periods of PP ratio) is below 0.5.

If the company had a ratio of 0.4 in 2004 then it could be assumed that companies make earnings management during the year 2004 (the change from 2003 to 2004). Management action taken in 2004 is not necessarily to be considered as income smoothing, because it may act in accordance with income increasing or decreasing income. Such actions can only be predicted as income smoothing, if the following year (change 2004 to 2005) fluctuations in earnings are also low.

New Instrument Based on Classification Index of Income Smoothing

New instruments are intended to avoid the influence of n (number of years) in calculating the index classification. The absence of year figure is used to avoid inconsistencies in the use of results from different periods. The test results using a new instrument show the results as in Table 3.

For 2004, there are 16 companies that are classified as the sample companies as smoothing. In 2005, there were 15 samples classified as smoothing company. In 2006, there were 11 sample firms, and in 2007, were 8 companies. The calculation was done by this new instrument is not influenced by the number of n which is used in the calculation or determination of smoothing and non-smoothing ones. Therefore, it better meets the reliability aspect of the test compared to the Eckel index. When compared to Eckel index, this new instrument provides a better reliability. The test results can be determined for each period as robust. The calculation will give the same classification for all the studies so that there is no doubt for the results or conclusions.

CONCLUSIONS, IMPLICATION, SUGGESTION, AND LIMITATION

Based on the analysis and discussion in the previous section, it can be asserted that Eckel Index is an instrument which has been used in most or all of the research on income smoothing. Such an instrument is intended to classify a company as either non-smoothing or smoothing practice. This index is based on the coefficient of variation of

Table 3
Results Classification of Income smoothing With Eckel Index

Year	Companies of Income Smoothing
2004	16
2005	15
2006	11
2007	8

sales and earnings. In addition, the formulation that is used to calculate the coefficient of variation is standard deviation. It can be seen that the number of years (n) plays an important role in the formulation because it is a common denominator.

As argued above, the consequences of the use of n are that the index becomes inconsistent during the period of calculation differences. Beside that, Eckel index becomes unreliable as a means of testing because it has no such consistency. As it is indicated, the test results show empirical support for the statement related to the unreliability of Eckel index

For that reason, the development of new instrument is required so that no misleading happening in the studies of income smoothing. It worth noting that income smoothing index developed in this study is based on definitions of income smoothing. From such definitions, it can lead to the premises to construct a new instrument.

In specific situation, the absence of influence of the period of calculation shows the reliability index of income smoothing, either as smoothing or non-smoothing classification. The result of the classification of a certain company seems in steady and not changeable. This provides an opportunity to test the determinants and motivations of a income smoothing in the study period. Finally, index of income smoothing can also be applied to the calculation of individual enterprise companies. The characteristics of individual (specific firms) are already represented on the use of earnings and cash flow of the company's sales.

Implication

Implications of the study and research are related to exploration that the Eckel Index does not qualify the reliability and the need for new instrument construction. Thus, the failure of index classification in Eckel shows inconsistency between different periods, implying doubts about the results of previous research. Study's conclusions may be disguising or distorting because of the inconsis-

tency means classifier. The existence of a new instrument that reliably provide researchers for doing research related to the determinants, motivation, and the impact of income smoothing practices.

Suggestion

Development of new instruments or tests of income smoothing instruments become absolutely necessary. Therefore, for future research, it requires that the researchers should be careful with measuring the instruments. Errors of using instruments twill yield unreliable conclusion. In other words, it will produce misleading conclusion.

Limitation

Development of new instruments income smoothing index in this study focuses more on the aspects of reliability and constancy. The testing has been made on aspects of validity as a whole, but only on the validity of the results. Future research can be done to strengthen, support, or reject the instrument of income smoothing index as proposed in this study by basing on scientific studies.

REFERENCES

- A. Muchammad, 2001, "Faktor-Faktor Yang Mempengaruhi Tindakan Perataan Laba/ Income Smoothing", Skripsi S-1 Tidak Diterbitkan, Fakultas Ekonomi Jurusan Akuntansi Universitas Airlangga Surabaya,
- Albrecht, W.D. & F.M. Richardson, 1990, "Income Smoothing By Economy Sector", *Journal Of Business Finance And Accounting* 17(5): 713-730.
- Alwan Sri Kustono, 2007, "Analisis Political Cost Dan Agency Cost Terhadap Kecenderungan Income smoothing Serta Signaling Pada Perusahaan Publik Non Keuangan Di Indonesia", Desertasi tak diterbitkan, Program Pascasarjana Universitas Airlangga Surabaya.
- _____, 2008, "Motivasi Income smoothing", *Jurnal Riset Akuntansi Indonesia*, Vol 11 No. 2:135-157.
- _____, 2009, "Penandingan

- Rerangka Kerja Eckel Dan Gibson-Prell Pada Pengujian Income smoothing”, *Jurnal Keuangan Dan Perbankan*, Volume 11, No. 2, Desember.
- _____, 2010, “Indeks Eckel: Pengidentifikasi Income smoothing Yang Tidak Reliabel, Fakultas Ekonomi Universitas Jember, (Mimeographed)”, Jember
- Amihud, Y., J.Y. Kamin & J. Ronen, 1983, “Managerialism, Ownerism And Risk”, *Journal Of Banking And Finance*, Vol. 7, No 2 (June):189-196.
- Archibald, T.R 1967, “The Return To Straight-Line Depreciation: An Analysis Of A Change In Accounting Method”, *Journal Of Accounting Research, Empirical Research In Accounting, Selected Studies 5* (Supplement): 164-180.
- Aristyatiwi Pramudiyatna, 2008, “Pengaruh Ukuran Perusahaan, Profitabilitas Dan Leverage Terhadap Perataan Laba (Income Smoothing) (Studi Empiris Pada Perusahaan Manufaktur Di Bursa Efek Jakarta)”, Skripsi Tak Diterbitkan, Universitas Muhammadiyah Surakarta,
- Ashari, N., H.C. Koh, S.L. Tan. & W.H. Wong, 1994, “Factors Affecting Income Smoothing Among Listed Companies In Singapore”, *Accounting And Business Research*. Vol. 24, No. 96: 291-301
- Atik, A. & N. ensoy, 2004, “*Detecting Income Smoothing Behaviours Of Turkish Listed Firms Through Discretionary Accounting Changes*”, (online) [http: www.Ssrn.Com](http://www.Ssrn.Com) [diunduh 12 Juni 2010].
- Barnea, A., J. Ronen & S. Sadan, 1976, “Classificatory Smoothing Of Income With Extraordinary Items”, *The Accounting Review*: 110-122,
- Beattie, V., S. Brown, D. Ewers, B. John, S. Manson, D. Thomas & M. Turner, 1994, “Extraordinary Items And Income Smoothing: A Positive Accounting Approach”, *Journal Of Business Finance And Accounting* 216: 0306-686x
- Beidleman, C.R 1973, “Income Smoothing: The Role Of Management”, *The Accounting Review* 48(4) (October): 653-667,
- Belkaoui, A. & R.D. Picur, 1984, “The Smoothing Of Income Numbers: Some Empirical Evidence On Systematic Differences Between Core And Periphery Industrial Sectors”, *Journal Of Business Finance And Accounting*, Vol, 11, No. 4 (Winter): 527-545,
- Booth, G.G., J.P. Kallunki & T. Martikainen, 1996, “Post-Announcement Drift And Income Smoothing: Finnish Evidence”, *Journal Of Business Finance & Accounting* 23(8): 1197-1211.
- Carlson, S.J. & C.T. Bathala, 1997, “Ownership Differences And Firms’ Income Smoothing Behavior”, *Journal Of Business Finance And Accounting* 24(2) (March): 179-196,
- Chaney, P.K. & C.M. Lewis, 1995, “Earnings Management And Firm Valuation Under Asymmetric Information”, *Journal Of Corporate Finance* 1: 319-345,
- Copeland, R.M 1968, “Income Smoothing”, *Journal Of Accounting Research, Empiricalresearch In Accounting, Selected Studies 6* (Supplement): 101-116,
- Craig, R. & P. Walsh, 1989, “Adjustments For ‘Extraordinary Items’ In Smoothing Reported Profits Of Listed Australian Companies: Some Empirical Evidence”, *Journal Of Business Finance And Accounting*, Vol, 16, No. 2 (Spring): 229-245,
- D. Zuhroh, 1996, “Faktor-Faktor Yang Berpengaruh Pada Tindakan Income smoothing Pada Perusahaan Go Publik Di Indonesia”, Tesis tidak diterbitkan, Program Pasca Sarjana Universitas Gadjah Mada, Yogyakarta,
- Dascher, P.E. & R.E. Malcolm, 1970, “A Note On Income Smoothing In The Chemical Industry”, *Journal Of Ac-*

- counting Research* (Autumn): 253-259,
- Dopuch, N. & R. Watts, 1972, "Using Time-Series Models To Assess The Significance Of Accounting Changes", *Journal Of Accounting Research* (Spring): 180-194,
- E.M. Nasser, & Herlina, 2003, "Pengaruh Size, Profitabilitas Dan Leverage Terhadap Perataan Laba Pada Perusahaan Go Publik", *Jurnal Ekonomi*, Vol, 7(3): 291-305
- Eckel, N 1981, "The Income Smoothing Hypothesis Revisited", *Abacus* 17(1): 28-40,
- Eddy Suranta & P.P. Merdiastusi, 2004, "Income Smoothing, Tobin's Q, Agency Problems Dan Kinerja Perusahaan", Kumpulan Materi Simposium Nasional Akuntansi (SNA) III, Denpasar Bali: 340-358
- Endang Jayadi, 2007, "Analisis Pengaruh Profitabilitas, Ukuran Perusahaan, Leverage Operasi, Dan Sektor Industri Dalam Menentukan Tindakan Income Smoothing Perusahaan (Studi Kasus Di Bursa Efek Jakarta)", Thesis Tak Diterbitkan, Universitas Jenderal Sudirman Purwokerto,
- Evy Bellia Vernita, 2009, "Analisis Pengaruh Karakteristik Perusahaan Dan Harga Saham Terhadap Tindakan Perataan Laba (Income Smoothing) Yang Dilakukan Oleh Perusahaan Manufaktur Sektor Industri Barang Konsumsi Yang Terdaftar Di BEI", Tak Diterbitkan, Fakultas Ekonomi Universitas Gunadarma Jakarta,
- Fahmi Firmansyah, 2009, "Pengaruh Leverage, Ukuran Perusahaan Dan Profitabilitas Terhadap Praktik Perataan Laba Perusahaan Manufaktur Yang Terdaftar Pada Bursa Efek Indonesia", Skripsi Tak Diterbitkan, Universitas Airlangga Surabaya,
- Fern, R.H., B. Brown & S.W. Dickey, 1994, "An Empirical Test Of Politically-Motivated Income Smoothing In The Oil Refining Industry", *Journal Of Applied Business Research* 10(1) (Winter): 92,
- Fudenberg, D. & J. Tirole, 1995, "A Theory Of Income And Dividend Smoothing Based On Incumbency Rents", *Journal Of Political Economy* 103(1): 75-93,
- Gaver, J.J., K.M. Gaver & J.R. Austin, 1995, "Additional Evidence On Bonus Plans And Income Management", *Journal Of Accounting And Economics*, Vol, 19, No. 1 (February): 3-28,
- Gibbins, M., A. Richardson & J. Waterhouse, 1990, "The Management Of Corporate Financial Disclosure: Opportunism, Ritualism, Policies, And Process", *Journal Of Accounting Research*, Vol, 28 (Spring): 121-143, "
- Givoly, D. & J. Ronen, 1981, "Smoothing Manifestations In Fourth Quarter Results Of Operations: Some Empirical Evidence", *Abacus* 17(2): 174-193,
- Godfrey, J.M. & K.L. Jones 1999, "Political Cost Influences On Income Smoothing Via Extraordinary Item Classification", *Accounting And Finance* 39 (3): 229-254,
- Gordon, M.J. 1964, "Postulates, Principles And Research In Accounting", *The Accounting Review* 39: 251-263,
- H. M Salno & Zaki Baridwan, 2000, "Analisis Income smoothing (Income Smoothing): Faktor-Faktor Yang Mempengaruhi Dan Kaitannya Dengan Kinerja Saham Perusahaan Publik Di Indonesia", *Jurnal Riset Akuntansi Indonesia* 3 (1): 17-34,
- Healy, P.M 1985, "The Effect Of Bonus Schemes On Accounting Decisions", *Journal Of Accounting And Economics*, Vol, 7, "Pp, 85-107,
- Hepworth, S.R 1953, "Periodic Income Smoothing", *The Accounting Review* 28(1) (January): 32-39,
- I. Subekti, 2005, "Asosiasi Antara Praktik Income smoothing Dan Reaksi Pasar Modal Di Indonesia", *Makalah*, Simposium Nasional Akuntansi VIII: 223-237,
- Ilmaniar, 1993, "Income smoothing Dan

- Faktor-Faktor Pendorongnya Pada Perusahaan Publik Di Indonesia, Tesis tak diterbitkan, Universitas Gadjah Mada Yogyakarta
- Imhoff, E.A 1977, "Income Smoothing-A Case For Doubt", *Accounting Journal*: 85-100,
- _____, 1981, "Income Smoothing: An Analysis Of Critical Issues", *Quarterly Review Of Economics And Business* 21(3): 23-42,
- Indriana Kurniati, 2009, "Faktor-Faktor Yang Mempengaruhi Praktek Perataan Laba Pada Perusahaan Yang Terdaftar Di Bursa Efek Indonesia", Skripsi Sarjana Tak Diterbitkan, Universitas Kristen Duta Wacana Jogjakarta,
- Iñiguez, R. & F. Poveda, 2004, "Long-Run Abnormal Returns And Income Smoothing In The Spanish Stock Market", *European Accounting Review* 13 (1):105 – 130,
- Jatiningrum, 2000, "Analisis Faktor-Faktor Yang Berpengaruh Terhadap Income smoothing Bersih/Laba Pada Perusahaan Yang Terdaftar Di BEJ", *Jurnal Bisnis Dan Akuntansi* Vol, 2(2): 145-155,
- Juniarti & Corolina, 2005, "Analisa Faktor-Faktor Yang Berpengaruh Terhadap Perataan Laba (Income Smoothing) Pada Perusahaan-perusahaan Go Public", [Http://Www.Petra.ac.id/~Puslit/Journals/Dir,Php?Departmentid=Aku](http://Www.Petra.ac.id/~Puslit/Journals/Dir,Php?Departmentid=Aku)
- Kamin, J,Y, & J, Ronen, 1978, "The Smoothing Of Income Numbers: Some Empirical Evidence On Systematic Differences Among Management-Controlled And Owner-Controlled Firms", *Accounting, Organizations And Society*, Vol, 3, No. 2, "Pp, 141-157,
- Kinnunen, J., E. Kasanen & J. Niskanen, 1995, "Earnings Management And The Economy Sector Hypothesis: Empirical Evidence On A Converse Relationship In The Finnish Case", *Journal Of Business Finance And Accounting*, Vol, 22, No. 4: 497-520,
- Koch, B.S 1981, "Income Smoothing: An Experiment", *The Accounting Review*, Vol, 56,No. 3 (July): 574-586,
- Lambert, R,A 1984, "Income Smoothing As Rational Equilibrium Behavior", *The Accounting Review*, Vol, 59, No.4 (October): 604-618,
- Lev, B. & S. Kunitzky, 1974, "On The Association Between Smoothing Measures And The Risk Of Common Stocks", *The Accounting Review*, Vol, 49, No. 2 (April): 259-270,
- Liaw S. Jin, & Mas'ud Machfoedz, 1998, "Faktor-Faktor Yang Mempengaruhi Praktik Income smoothing Pada Perusahaan Yang Terdaftar Di Bursa Efek Jakarta", *Jurnal Riset Akuntansi Indonesia* 1 (2): 174-191,
- Ma, C,K 1988, "Loan Loss Reserves And Income Smoothing: The Experience In The Us Banking Industry", *Journal Of Business Finance And Accounting* 15(4) (Winter): 487-497,
- Masodah, 2007, "Praktik Perataan Laba Sektor Industri Perbankan Dan Lembaga Keuangan Lainnya Dan Faktor Yang Mempengaruhi", *Proceeding Pesat*, Vol 2: 16-22,
- Michelson, S., J.J. Wagner & C.W. Wooton, 1995, "A Market Based Analysis Of Income Smoothing", *Journal Of Business Finance And Accounting* 228:0306-686x,
- _____, 2000, "The Relationship Between The Smoothing Of Reported Income And Risk-Adjusted Returns", *Journal Of Economics And Finance* 24 (2):141-159,
- Moses, O.D 1987, "Income Smoothing And Incentives: Empirical Test Using Accounting Changes", *The Accounting Review* 62 (2): 358-377,
- Muhammad Yusuf & Soraya, 2004, "Faktor-Faktor Yang Mempengaruhi Praktik Perataan Laba Pada Perusahaan Asing Dan Non Asing Di Indonesia", *Jurnal Akuntansi & Auditing Indonesia*, Vol 8, No 1

- Natty Marlina, 2001, "Faktor-Faktor Yang Mempengaruhi Income Smoothing Pada Perusahaan Go Public Di Bursa Efek Jakarta :Sektor Manufaktur", Thesis Tak Diterbitkan, Program Pascasarjana Universitas Diponegoro, Semarang,
- Novie Dwi Martanti, 2008, "Analisis Faktor-Faktor Yang Berpengaruh Terhadap Income Smoothing (Perataan Laba): Studi Empiris Perusahaan Yang Terdaftar Di Bursa Efek Jakarta 2005-2006", Skripsi Tak Diterbitkan, Fakultas Ekonomi Universitas Gadjah Mada Jogjakarta
- Prapti Nur Kayati, 2009, "Analisis Perataan Laba (Income Smoothing): Faktor Yang Mempengaruhinya Dan Pengaruhnya Terhadap Return Dan Resiko Saham Pada Perusahaan Go Public Di Bursa Efek Indonesia (Periode Pengamatan 2005-2008)", Skripsi Tak Diterbitkan, Universitas Muhammadiyah Surakarta,
- Prasetyo, 2002, "Pengaruh Tingkat Profitabilitas Perusahaan Dan Leverage Operasi Terhadap Tindakan Perataan Laba Pada Perusahaan Manufaktur Yang Terdaftar Di BEJ Periode 2003 – 2006", Skripsi tak diterbitkan, Fakultas Ekonomi Universitas Udayana,
- Prihat Assih & Gudono, 1998, "Hubungan Tindakan Income smoothing Dengan Reaksi Pasar Atas Pengumuman Informasi Laba Perusahaan Yang Terdapat Di Bursa Efek Jakarta", *Jurnal Riset Akuntansi Indonesia*, Vol 3 No. 1. (Januari): 35-53
- Ronen, J. & S. Sadan, 1975, "Classificatory Smoothing: Alternative Income Models", *Journal Of Accounting Research* (Spring): 133-149,
- _____, 1981, "Smoothing Income Numbers, Objectives, Means, And Implications", Reading, Addison Wesley,
- Saudagaran, S.M. & J.F. Sepe, 1996, "Replication Of Moses' Income Smoothing Tests With Canadian And Uk Data: A Note", *Journal Of Business Finance And Accounting*, Vol, 23, No. 8 (October): 1219-1222,
- Smith, E.D 1976, "The Effect Of The Separation Of Ownership From Control On Accounting Policy Decisions", *The Accounting Review*, Vol, 51, No. 4 (October): 707-723,
- Sofia Prima Dewi & Carina, 2008, "Faktor-Faktor Yang Mempengaruhi Praktik Perataan Laba Pada Perusahaan Manufaktur Dan Lembaga Keuangan Lainnya Yang Terdaftar Di Bursa Efek Jakarta", *Jurnal Akuntansi*, Vol 12, No 2,
- Solihin Yudy Sistorino, 2004, "Analisis Pengaruh Income Smoothing Dan Laba Sebelum Pajak Terhadap Nilai Perusahaan Pada Perusahaan Publik Di Bursa Efek Jakarta (Size Dan Industri Sebagai Variabel Kontrol)", Thesis Tak Diterbitkan, Program Pascasarjana Universitas Diponegoro
- Sri Daryanti Zen & Merry Herman, 2007, "Pengaruh Harga Saham, Umur Perusahaan, Dan Rasio Profitabilitas Perusahaan Terhadap Tindakan Perataan Laba Yang Dilakukan Oleh Perusahaan Perbankan Yang Terdaftar Di Bursa Efek Jakarta", *Jurnal Akuntansi & Manajemen*, Desember 2007 Vol, 2 – No. 2,
- Trueman, B. & S. Titman, 1988, "An Explanation For Accounting Income Smoothing", *Journal Of Accounting Research*, Vol, 26 (Supplement): 127-139,
- Wang, Z. & T.H. Williams, 1994, "Accounting Income Smoothing And Stockholder Wealth", *Journal Of Applied Business Research*, Vol, 10, No. 3 (Summer): 96-110,
- White, G.E 1970, "Discretionary Accounting Decisions And Income Normalization", *Journal Of Accounting Research*: 260-273,
- _____, 1972, "Effects Of Discretionary Accounting Policy On Variable And Declining Performance Trends", *Journal Of Accounting Research* (Au-

- tumn): 351-358,
- Wijayanto Kusuma, 2006, "*Analisis Faktor-Faktor Yang Mempengaruhi Income Smoothing Pada Perusahaan Yang Terdaftar Di Bursa Efek Jakarta*", Thesis Tak Diterbitkan, Universitas Muhammadiyah Surakarta ,
- Y. M. Noor 2004, "Faktor-Faktor Yang Mempengaruhi Praktik Income smoothing Bersih Pada Lembaga Keuangan Yang Terdaftar Pada BEJ", Skripsi S-1 tidak Diterbitkan, Fakultas Ekonomi Jurusan Akuntansi Universitas Airlangga Surabaya,
- Zmijewski, M.E. & R.L. Hagerman, 1981, "An Income Strategy Approach To The Positive Theory Of Accounting Standard Setting/Choice", *Journal Of Accounting And Economics*, Vol, 3 (August): 129-149,
- Zulfa Irawati & Anugerah Maya A 2007, "Analisis Perataan Laba (*Income Smoothing*): Faktor Yang Mempengaruhinya Dan Pengaruhnya Terhadap Return Dan Risiko Saham Perusahaan Go Public Di Bursa Efek Jakarta", *Benefit*, Vol, 11, No. 1, Juni 2007: 46-50.

APPENDICES

Appendix 1

Result of Index of Income smoothing

Sample no	$\left(\frac{L_{it} - L_{it-1}}{L_{it-1}} \right) / \left(\frac{P_{it} - P_{it-1}}{P_{it-1}} \right)$					
	2003	2004	2005	2006	2007	2008
11	0,28	57,15	0,03	0,14	0,12	5,04
12	7,18	13,02	0,04	34,49	14,38	535,58
13	0,92	0,32	0,06	1,87	31,32	0,22
14	0,14	15,06	1,87	222,84	0,65	2,21
15	1,09	2,74	0,04	28,49	1,24	1,68
16	0,32	0,17	12,44	0,01	0,33	2,18
17	0,41	0,02	0,08	0,08	0,66	0,24
18	0,84	1,48	8,57	0,26	2,26	2,19
19	1,82	3,57	0,22	2,71	1,06	1,26
110	0,12	0,95	0,23	32,03	3,96	0,18
111	0,74	0,12	48,72	0,73	0,12	1,88
112	0,02	0,71	0,76	0,33	1,79	0,09
113	0,97	0,01	0,96	1,25	0,09	2,29
114	0,00	0,15	0,43	1,75	0,16	1,64
115	0,64	7,12	0,26	0,07	0,13	0,01
116	2,37	0,07	10,26	6,60	0,70	-
117	3,30	3,43	8,75	15,22	0,02	1,43
118	0,00	1,37	13,50	0,56	0,54	3,43
119	7,01	0,04	0,12	1,69	0,79	0,58
120	1.133,26	0,83	4,85	0,22	4,46	85,39
121	0,13	0,39	0,60	0,82	0,10	0,14
122	0,68	3,07	9,71	2,76	2,56	3,77
123	36,13	1,91	11,64	10,20	3,31	0,53
124	1,30	40,04	5,86	1,26	0,63	1,80
125	3,89	1,15	0,10	2,91	69,28	1,50
126	0,24	0,08	0,27	4,72	0,02	0,07
127	0,26	4,61	0,43	0,73	1,42	2,83
128	1,23	2,39	2,24	4,82	15,19	8,47
129	0,02	4,12	0,22	0,00	0,51	0,02
130	7,31	2,06	5,32	12,20	1,54	25,15
131	33,32	1,20	1,61	1,19	992,04	0,95
132	6,03	0,01	2,29	6,07	10,19	0,89
133	1,31	5,58	1,65	0,15	0,46	0,00
134	0,07	4,41	0,55	1,24	1,01	0,49
135	6,18	0,79	4,67	0,21	84,24	0,20
136	0,06	1,21	7,89	0,29	1,98	0,65
137	17,85	25,99	77,73	0,88	20,21	-

Sample no	$\left(\frac{L_{it} - L_{it-1}}{L_{it-1}} \right) / \left(\frac{P_{it} - P_{it-1}}{P_{it-1}} \right)$					
	2003	2004	2005	2006	2007	2008
138	1,21	0,53	0,37	0,26	0,60	2,38
139	1,18	0,02	0,69	0,24	1,06	7,00
140	1,05	5,02	0,65	1,26	0,05	0,73
141	0,84	1,02	0,96	0,55	0,15	1,99
142	0,36	0,07	0,55	2,63	18,42	2,18
143	0,37	0,01	0,10	1,61	0,67	0,08
144	86,89	1.195,03	4,36	0,25	3,91	8,07
145	36,93	0,47	6,30	5,38	2,03	1,42
146	8,91	0,89	3,24	0,01	2,15	2,17
147	1,13	1,52	0,08	0,08	0,19	0,14
148	0,04	0,09	0,79	0,13	0,03	0,69
149	0,53	0,85	1,53	2,79	1,45	55,76
150	0,25	13,81	2,68	23,89	0,05	1,10
151	2,31	7,71	3,27	1,00	5,93	0,29
152	0,78	143,33	0,94	0,55	0,62	5,88

Appendix 2

Classification as Smoothers Based on PP and Eckel Index

Sample No	Basis of Classification				
	PP	Eckel Index			
		3 years	4 years	5 years	6 years
1	2005, 2006, 2007				
2					
3	2004, 2005		2005		
4		2007, 2008	2005	2005, 2008	2005
5		2004, 2005	2006, 2006	2006, 2007	2007, 2008
6	2004, 2006, 2007	2004, 2005, 2006, 2007	2004, 2005, 2006, 2007	2005, 2006, 2007, 2008	2005, 2006, 2007, 2008
7	2004, 2005, 2006	2001	2002		
8		2008			
9			2002		
10					
11	2002	2004, 2005, 2006, 2007, 2008	2004, 2005, 2006, 2007, 2009	2004, 2005, 2006, 2007, 2008	2005, 2006, 2007, 2008
12					
13		2004	2006		
14	2004, 2005	2004	2004	2004, 2005	2004, 2005
15	2005, 2006, 2007, 2008	2005, 2006, 2007, 2008	2006, 2007, 2008	2006, 2007, 2008	2006, 2007, 2008
16					
17	2002				
18	2003				
19	2004, 2005	2005			
20					
21	2004, 2007, 2008	2005, 2008	2005	2003	2004
22		2004, 2005	2004, 2005, 2006	2004, 2005, 2006, 2007	2004, 2005, 2006, 2007, 2008
23					
24		2007	2007, 2008		
25		2001			
26	2004, 2005, 2007, 2008	2002	2003		
27					
28			2008		
29	2005, 2006	2003	2008	2008	
30					
31					
32					
33	2006, 2007, 2008	2007, 2008	2007, 2008	2007, 2008	2007, 2008
34	2003	2006, 2007	2007	2007, 2008	
35					
36	2003	2003			
37					
38	2005, 2006				

Sample No	Basis of Classification				
	PP	Eckel Index			
		3 years	4 years	5 years	6 years
39					2007
40					
41	2001				
42	2004	2004			
43	2004				
44		2006, 2007	2007		
45					
46	2002	2002	2003	2003	
47	2005, 2006, 2007, 2008	2005, 2006, 2008	2006, 2008	2004, 2005, 2007, 2008	2004, 2005, 2006, 2008
48	2004, 2006, 2007	2004	2003	2004	2004
49					
50		2008	2003	2008	2004, 2008
51			2008		
52					

