

Using “Eckel” Model to Measure Income Smoothing Practices: The Case of French Companies

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Abstract—Income smoothing represents an attempt on the part of the company's management to reduce variations in earnings through the manipulation of the accounting principles. In this study, we aimed to measure income smoothing practices in a sample of 30 French joint stock companies during the period (2007-2009), we used Dummy variables method and “ECKEL” model to measure income smoothing practices and Binomial test according to SPSS program, to confirm or refute our hypothesis. This study concluded that there are no significant statistical indicators of income smoothing practices in the sample studied of French companies during the period (2007-2009), so the income series in the same sample studied of is characterized by stability and non-volatility without any intervention of management through accounting manipulation. However, this type of accounting manipulation should be taken into account and efforts should be made by control bodies to apply Eckel model and generalize its use at the global level.

Keywords—Income, smoothing, “Eckel”, French companies.

I. INTRODUCTION

CREATIVE accounting is a type of accounting manipulation that enables managers to ‘cook accounting books’ and ‘window-dress’ their company by taking advantage of the loopholes in accounting standards. Creative accounting is not against laws and accounting standards, so it can be a highly dangerous instrument of deception. the financial statements users can be misled when making decisions based on manipulated accounting numbers [1].

There three types of creative accounting, Earnings management, Income smoothing, and aggressive accounting. When the board of directors can manage its profits up or down by reducing the income if it is high or increasing it if it is low, to reduce the sharp fluctuations in the profit level and stabilize the prices of shares in the market, this is called the *income smoothing practices*.

Income smoothing can be defined as the managers’ attempts to use their reporting discretion to intentionally dampen fluctuations of their firms’ income realizations [2].

It can also be called income-easing. It is meant to transfer the net profit earned during a given accounting cycle from low-income to high-income years, to create a stable series of income to shareholders and stakeholders in the company and in the financial market.

In other words, income smoothing is engaged in order to help the management to increase the perceived value of its services (Lambert, 1984) [3].

One of the most famous definitions of income smoothing presented by “Mulford & Comiskey, 2002”, they defined income smoothing that is “A form of earnings management designed to remove peaks and valleys from a normal earnings series, including steps to reduce and “store” profits during good years for use during slower years” [4].

From the above definitions, it can be concluded that the income smoothing practices is the management of the desired profits to eliminate the fluctuation in the natural income path and usually involves the steps of income reduction in high-income years for transfer to low-income years.

Income smoothing aims to produce a relatively stable series of profits in order to reduce risk, and consequently to increase the value of the enterprise in the long run.

Income smoothing can be as *natural* as it can be *artificial*, the natural Income smoothing is intended to generate relatively stable natural income through the nature of plant operations, production and operation, the artificial Income smoothing takes two directions:

The first trend is the real introduction of income through transactions and real transactions. This is done by making some administrative decisions that may affect the timing of the financial events and thus reflecting the inflows and outflows and the quality of the financial statement. For Example:

- The actual selection of specific projects and the timing of operations decisions,
- Business decisions such as choosing an advertising plan or a research and development project.
- Change in plant production or investment decisions at the end of the year based on the management's knowledge of how the entity is performing until this year.

The second type of artificial income smoothing, is an accounting manipulation by the management in order to mitigate income fluctuations, whereby management can prepare the income by allocating the cost to the accounting periods or by internal classification of income statements elements.

It should be noted that the subject of income in which fluctuations are mitigated varies are:

- Net final income.
- Earnings per share.
- Rate of return on equity.
- Coupon return.
- Rate of return on assets.
- Unusual income per share.
- Ordinary income per share before extraordinary items.

- Operating income per share.
- Earnings per share decrease.
- Operating income.
- Ordinary income,
- Ordinary income before tax and extraordinary items.
- Net income from continuing activities.
- Net income after taxes.

In this study, we aim to answer to the following question:

How does "Eckel" model can be used to measure income-smoothing practices?

For this purpose, we followed an analytical descriptive approach to measure the income smoothing practices using the "Eckel" model in a sample of 30 French joint stock companies registered in the SBF250 index during the period 2007-2009.

The hypotheses of our study were formulated as follows:

- **The nihilistic hypothesis (H0):** *There are no significant statistical indicators of income smoothing practices in French companies during the period 2007-2009.*
- **The Alternative Hypothesis H1:** *There are significant statistical indicators of income smoothing practices in French companies during the period 2007-2009.*

II. DATA AND METHODOLOGY

The Eckel model, or the so-called "coefficient of variation model" since 1981 is one of the most widely used models for measuring income-smoothing practices. Eckel developed this model from a set of assumptions that:

- Income is a linear function of sales = sales - fixed costs - variable costs.
- The ratio of variable costs to sales is in fixed currency units.
- Fixed costs are fixed or increasing from period to period but are not likely to decrease.
- Total sales value can only be paved by real boot and cannot be paved through artificial boot.

The "Eckel, 1981" model is based on comparing the income variance with the sales variance to determine whether or not the company smoothed its income. The income behavior index is calculated by dividing the absolute value of the variable variance coefficient of income between year t and year $t-1$ by the absolute value of the coefficient Variance in sales change between year t and year $t-1$, according to (1):

$$SB = |CV\Delta S| / |CV\Delta I| \dots \dots \dots (1)$$

|CV Δ I|: The absolute value of variance coefficient change in income between year t and year $t-1$.

|CV Δ S|: The absolute value of variance coefficient change in sales between year t and year $t-1$.

SB: smoothing behavior, or income smoothing index between year t and year $t-1$.

If the SB index is less than one between the year t and the year $t-1$, the company practiced income smoothing. If, however, the SB index is equal to or greater than one between the year t and the year $t-1$, the company didn't practice income smoothing.

The community of our study consists all joint stock French companies registered in the SBF250 index, which consists of 250 companies, during the period from 2007 to 2009, assuming that they belong to the same sector. The sample studied includes 30 French companies which meet the following conditions:

- They have all necessary data for conducting the study tests, in particular financial statements,
- They have not been incorporated or stopped trading during the study period,
- Companies of a financial nature, such as insurance companies, banks, should be excluded from the sample due to their own accounting system.

In order to test the hypothesis of income smoothing practices in the sample of French companies, we applied the model "Eckel, 1981" during the period 2007-2009, using *the income value before taxes*, according to the following steps:

Step 1: The calculation of income smoothing index for the two periods 2007-2008 and 2008-2009:

By dividing the absolute value of variance coefficient of change in income before taxes between year t and year $t-1$ on the absolute value of variance coefficient of change in sales between year t and year $t-1$ in the two periods 2007-2008 and 2008-2009.

Step 2: Determination of the percentage of companies that practiced income smoothing during the two period 2007-2008 and 2008-2009:

After calculating the income-smoothing index in the sample studied of french companies during the periods 2007-2008 and 2008-2009, applying the Eckel model, we can determine the percentage of companies that practiced income smoothing,

If the ratio of the index is *less than one* between the year t and the year $t-1$ there is a smoothed income and we give to the company an imaginary variable **(1)**, if the ratio of the index is *equal to or greater than one* between the year t and the year $t-1$, the company is classified as non-practiced for income smoothing and we give an imaginary variable **(0)** [5].

III. EXPLAINING RESULTS

A. Analysis

Through the results obtained, we found that the proportion of French companies that are subject of income smoothing practices (before taxes) during the period 2007-2008 is estimated at 37%, by 11 out of 30 companies.

As for the period 2008-2009, it is clear to us that the percentage of French companies whose practiced income smoothing is determined according to the income before taxes is estimated at 47% by 16 out of 30 companies.

In order to test the hypothesis regarding the existence of statistically significant indicators of income smoothing practices in the sample studied of French companies during the period of 2007-2009, we used the "Binomial Test", through this test we can see how different data for income smoothing practices, And we have given it two imaginary variables (0.1) for a default mean of 0.5 Fig. 1.

TABLE I
INCOME SMOOTHING INDEX (BEFORE TAXES) DURING THE PERIOD 2007-2009

French companies	2009-2008		2008-2007	
	IS practices	IS Index	IS practices	IS Index
ACCOR	0	4.52	1	0.11
AIR FRANCE	1	0.78	0	13.26
AKKA TECHNOLOGIES	0	21.29	0	1.98
ALCATEL	0	6.10	1	0.03
ALES GROUPE	1	0.39	0	2.24
ALSTOM	1	0.87	1	0.99
ALTEN	0	1.93	0	12.68
ALTRAN	1	0.64	0	9.16
ANOVO	0	9.21	0	133.18
AREVA	1	0.28	0	22.49
ASSYSTEM	0	1.29	0	1.09
ATARI	0	3.98	1	0.30
AUDIKA	0	27.61	0	8.13
AVENIR TELECOM	0	1.55	1	0.33
BACOU-DALLOZ	0	34.50	1	0.23
BAINS DE MER MONACO	1	0.38	1	0.20
BENETEAU	1	0.91	1	0.37
BIOMERIEUX	1	0.36	0	3.62
BOIRON	0	1.10	0	5.13
BOUYGUES	1	0.48	0	51.69
BULL	0	2.27	1	0.04
CAMAIEU	0	14.40	0	5.80
CANAL+	1	0.32	0	3.65
CARREFOUR	1	0.21	0	24.08
CEGEDIM	0	23.34	0	3.80
CHARGEURS	0	13.92	1	0.82
CIMENTS FRANCAIS	1	0.47	0	1.63
CNIM	1	0.35	1	0.44
DASSAULT SYSTEMES	0	1.80	0	2.27
DELACHAUX	1	0.01	0	44.02

TABLE II
INCOME SMOOTHING PRACTICES IN THE SAMPLE STUDIED OF FRENCH COMPANIES DURING THE PERIOD 2007-2009

The period	Income smoothing practices		Non-smoothed income	
	frequency	percentage	frequency	percentage
2008 -2007	11	%37	19	%63
2009 -2008	14	%47	16	%53

Binomial Test					
IS	Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
	Group 1	,00	35	,58	.245 ^a
	Group 2	1,00	25	,42	
	Total	60	1,00		

a. Based on Z Approximation.

Fig. 1 Binomial Test

The results of the binomial test show that the sample studied of French companies have practiced income smoothing during the period 2007-2009 by 42% with a total of 25 out of 60 views, while the percentage of non-practice is 58% with a total of 35 of 60 views, For the advantages of this test, the value of sig= 0, 245 is more than 0,05. Thus, the alternative hypothesis was

rejected and the nihilistic hypothesis is accepted, so we can conclude that:

There are no significant statistical indicators of income smoothing practices in French companies during the period 2007-2009.

IV. CONCLUSION

In light of the theoretical and practical analysis of this study, the following results can be obtained:

- Income smoothing practices is a form of accounting manipulation practiced without breaking laws and accounting standards.
- The accountant prepares income by using his knowledge of accounting rules and standards, as well as gaps in international accounting standards for the transfer of income from high-income years to low-income years and thereby reducing volatility from one year to another.
- Income smoothing is often intended to cover deficit and misinformation of financial data. Therefore, it is not possible to eliminate such practices associated with the opportunistic motive of the administration. Rather, it is necessary to define a line of defense governed by the effective control mechanisms to limit these practices to the

lowest possible level, including the activation of corporate governance as a control system and business ethics.

- Using Eckel model we concluded that there are no significant statistical indicators of income smoothing practices in the sample studied of French companies during the period 2007-2009.
- The majority of income series in the same sample studied of French companies is characterized by stability and non-volatility without any intervention of management through accounting manipulation in the income series.

Finally, we hope that future studies will deepen this subject and try to move from measuring income smoothing practices to searching the effective solutions to reduce and limit these dangerous manipulation practices in accounting profession.

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