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COMPETITIVENESS OF PROFIT-LOSS-SHARING MODE OF FINANCING USING CONSTANT MARKET SHARE COMPETITIVENESS INDEX

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Abstract*: A systematic method is needed in understanding and measuring the progress in the development of Islamic financial instruments. This paper addresses the issue of the competitiveness of profit-loss-sharing (PLS) instruments relative to the conventional instruments in a country. The widely employed descriptive Constant Market Share (CMS) analysis tools normally used in analysing the competitiveness of exports of a country is proposed to be used in this case. As the identities used in CMS analysis are general mathematical identities originated from the product rule for the differentiation of the product of two functions and relate to changes in shares of entities out of the total share in discrete cases, thus it can be explored to be used for other fields other than the change in exports. However, CMS analysis measurement is prone to a number of methodological shortcomings which stem from the CMS identities used in the analysis. Namely, the discrete approximation of continuously changing trade patterns, the interaction effects residual from the CMS identities decomposition and the arbitrary choice of weights attached to base periods. Aisha Nuddin et al., (2018) introduced a net-share approach index and geometric framework to address some of the shortcomings of the classic CMS analysis approach. This paper demonstrated how the CMS net-share approach index can be used in analysing the competitiveness of different modes of investment instruments in a country. As an example, an application of this method in analysing the performance of PLS mode of financing in Malaysia in year 2015 is presented at the end of the paper.*

Keywords: *Profit-Loss-Sharing, Constant Market Share, Competitiveness*

Introduction

The concept of competitiveness in economics can be divided into two levels. The first is the firm or micro-economic level while the second is the macro-economic level. There exists a reasonably clear notion of competitiveness at the firm or micro-economic level which relates to the increase and decrease of the firm's market share. On the other hand, as for the macro-economic level there is no commonly accepted definition for competitiveness (Siudek and Zawojska, 2014). As competitiveness measures the performance of an entity in terms of

commodities with respect to other entities for a given period, the change in commodities share (either positive or negative) of an entity can be considered as the competitiveness of the entity. This is consistent with Porter et al. (2008) who stated that; "The most intuitive definition of competitiveness is a country's share of world markets for its products. This makes competitiveness a zero sum game, because one country's gain comes at the expense of others" (p.2).
As for this paper, it is interested in the performances of profit-loss-sharing (PLS) (*mudharabah* and *musyarakah*) financial instruments. How is the performance of the financial instruments measured? In Islamic finance literatures, the performances of PLS instruments are measured based on the percentage share of PLS trades out of the total values of all Islamic finance trades of a country. Nonetheless, there is still no specific method which is used in analysing the performance of any investment instruments of a country.

The objective of this paper is to develop a more systematic method of analysing the performances of PLS instruments of a country. The method proposed is actually an extension of the Constant Market Share Competitive (CMSC) index proposed by Aisha Nuddin et al. (2018).

CMS analysis attempts to quantify the extent to which a country is competing in a commodity or commodities of markets relative to other countries in a given region. As CMS analysis tools are based on the general mathematical identities related to differentiation, it is supposed to be applicable to other field other than analysing change in exports of a country.

In this paper the CMSC index together with its geometric device are proposed for the analysis of competitiveness of different modes of investment instruments in a country. Finally, an example of the analysis is presented at the end of this paper.

CMS Analysis and Area Representation of CMS Identities

Constant market shares (CMS) analysis which decomposes the change in a country's export into competitive and growth effects is a method normally used for analysing changes in the exports of a country. The increase or decrease in the quantity of a country's exports due to the increase or decrease in the country's market share (with global or regional exports remaining constant) is defined as the competitive effect (CE). On the other hand, the increase or decrease in the quantity of a country's exports that are due to an increase or decrease in the global or regional export only is defined as the growth effect (GE) (with country's exports share remaining constant). This method was first introduced by Tyszynski (1951) in the analysis of international trade. This were followed by other authors such as Perloff et al. (1960), De Lombaerde and Verbeke (1989), Leamer and Stern (1976), Hoen and Van Leeuwen (1991), Othman and Abdul Rashid (1993), Amador and Cabral (2008), Skriner (2009), Jimenez and Martin (2010), Rahmaddi and Ichihashi (2012), González Pandiella (2015) and Bonanno (2016).

Even though the method is widely used in analysing countries' exports, in actuality, it is a tool to study the performance (competitiveness) of several business entities in competing for the market share of commodities or services which changes in a locality (country, region or world). As for this paper, this method is to be used in the analysis of the competitiveness of Islamic-PLS's instruments as compared to Islamic-non-PLS's instruments and conventional instruments.

Let us start with a general case, by assuming *n* modes of financing are competing for the market share of customers in a country within a given period. The total amount of loan transactions in the country within the period is the sum of all loans from the *n* modes of financing in the specified period. It is useful to begin with explaining the formulation of CMS model which is derived from equation (1) given below:

$$p(t) = s(t)Q(t) \qquad (1)$$

where $p(t)$ is the total amount of loan transactions by the focused mode of financing at time *t* whereas $Q(t)$ is the total amount of loan transactions in the country at time *t*. Thus, $s(t) = \frac{p(t)}{Q(t)}$ is the share of loan transactions of the focused mode of transactions at time *t* out of the total amount of loan transactions in the country. Differentiating equation (1) with respect to time *t* we obtain the following equation:

$$\frac{dp}{dt} = s\frac{dQ}{dt} + Q\frac{dp}{dt} \qquad (2)$$

As equation (2) refers to infinitesimally short time period whereas CMS analysis is always applied over a discrete period of time, Richardson (1971) derived several CMS identities which are applicable to discrete time period given as follows:

$$\Delta p = s^0 \Delta Q + Q^1 \Delta s \qquad (3)$$

$$\Delta p = s^1 \Delta Q + Q^0 \Delta s \qquad (4)$$

$$\Delta p = s^0 \Delta Q + Q^0 \Delta s + \Delta Q \Delta s \qquad (5)$$

$$\Delta p = (\theta s^0 + (1-\theta) s^1)\Delta Q + ((1-\theta)Q^0 + \theta Q^1)\Delta s \text{ for } 0 < \theta < 1 \qquad (6)$$

where Δ represents a change and the superscripts represent the initial and subsequent time periods. Figures (1) to (7) present Richardson's identities using area representation which make them easier to visualise.

Even though many CMS studies applied equation (3) but there are also other identities available that can be applied. The ability to choose more than one identity causes inconsistency in the value of CE and GE in a CMS analysis. This inconsistency problem is referred to by Richardson (1971) as the "index number problem". The author suggested using more than one identity in an analysis to reduce the effect caused by the problem.

The following figures demonstrate the decompositions of Δp using area approach. We can see the effect of using different identities on the values of CE and GE from the change in the areas of the rectangles representing them in the figures.

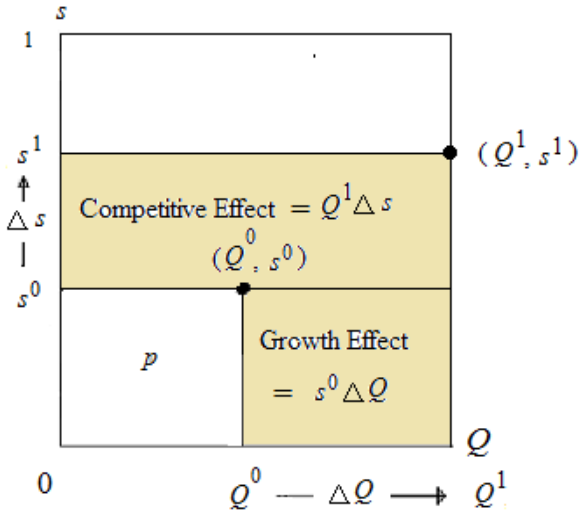

Figure 1: Area representation of Equation (3) for **ΔQ > 0 and Δs > 0**

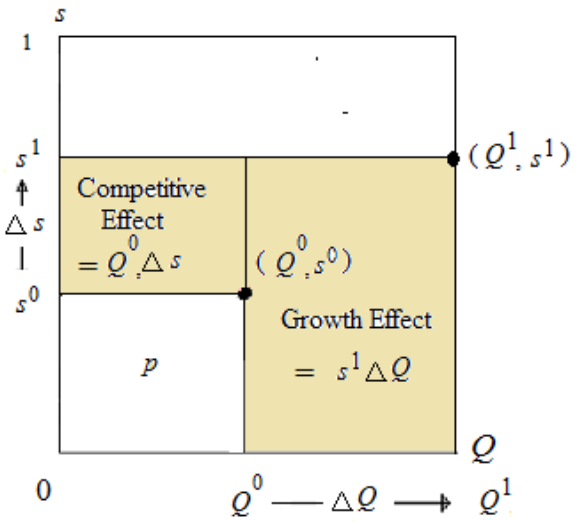

Figure 2: Area Representation of Equation (4) for **ΔQ > 0 and Δs > 0**

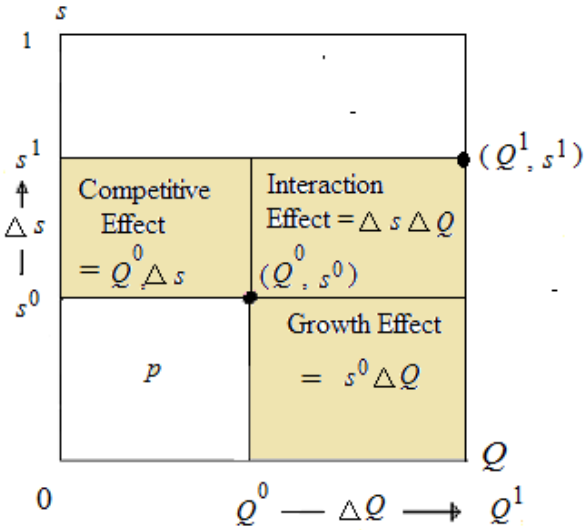

Figure 3: Area Representation of Equation (5) for **ΔQ > 0 and Δs > 0**

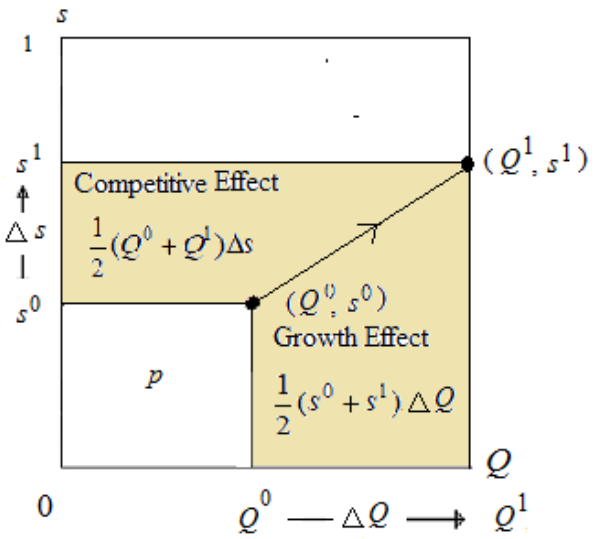

Figure 4: Area Representation of Equation (6) for **ΔQ > 0 and Δs > 0 and θ = 0.5**

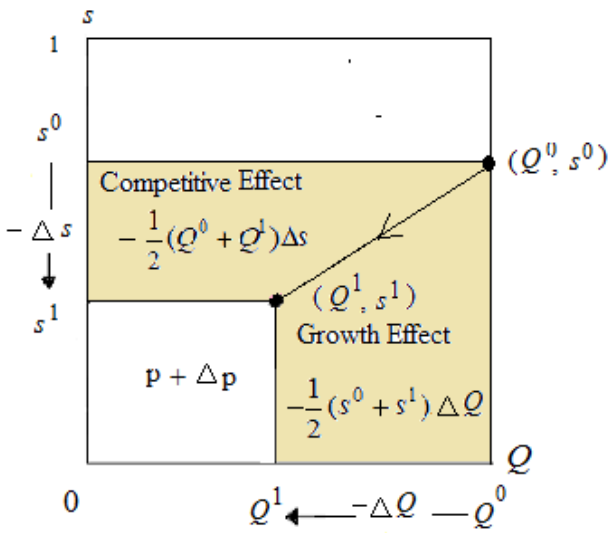

Figure 5: Area Representation of Equation (6) for **ΔQ < 0 and Δs < 0 and θ = 0.5**

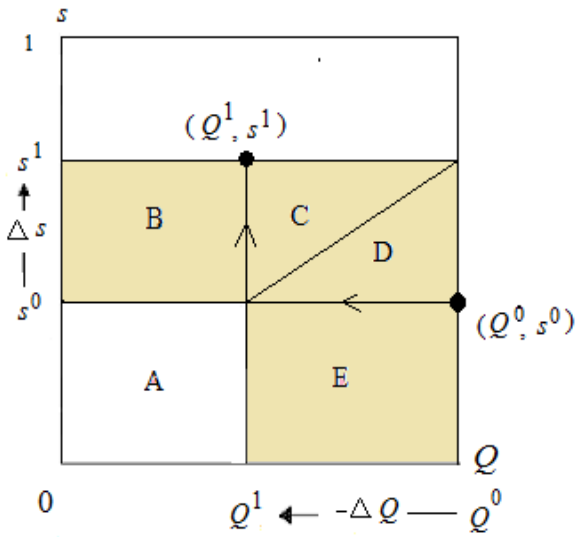

Figure 6: Area Representation of Equation (6) for **ΔQ < 0 and Δs > 0 and θ = 0.5**

In Figure 6, let the alphabets represent the areas of the regions such that A = area of region A, B = area of region B and so on. Initial value of *p* is A + E which change to A + B, as (Q^0, s^0) moves to (Q^1, s^1) . In this case *Q* decreases while *s* increases. Using the area representation in Figure 6, as $\mathbf{(Q^0, s^0)} \rightarrow \mathbf{(Q^1, s^1)}$ we obtain

$$p = A + E \rightarrow p + \Delta p = A + B$$

$$p + \Delta p = A + B \Rightarrow \Delta p = A + B - p = A + B - (A + E) = B - E$$

Using equation (6) with $\theta = 0.5$ we have:

$$\Delta p = \frac{1}{2}(Q^0 + Q^1)\Delta s - \frac{1}{2}(s^0 + s^1)\Delta Q$$

B – E = (B + C) – (D + E) since C = D

The area approach satisfy the Milana's Identity in which

$\Delta p = B - E$, $CE = B + C$ and $GE = -(D + E)$.

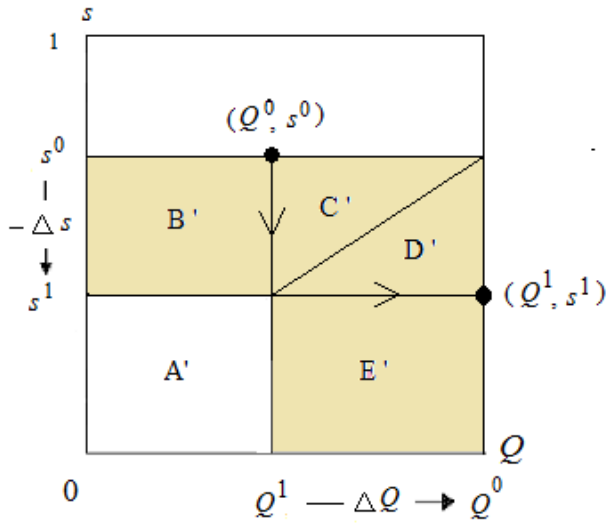

Figure 7: Area Representation of Equation (6) for **ΔQ > 0 and Δs < 0 and θ = 0.5**

In Figure 7, the initial value of p is $\mathrm{A'} + \mathrm{B'}$ which change to $\mathrm{A'} + \mathrm{E'}$, as (Q^0, s^0) moves to (Q^1, s^1). In this case s decreases and while Q increases. Using the area representation in Figure 7, as $(Q^0, \mathrm{s}^0) \rightarrow (Q^1, \mathrm{s}^1)$, we obtain

$$p = \mathrm{A'} + \mathrm{B'} \rightarrow p + \Delta p = \mathrm{A'} + \mathrm{E'}$$

$$p + \Delta p = \mathrm{A'} + \mathrm{E'} \Rightarrow \Delta p = \mathrm{A'} + \mathrm{E'} - p = \mathrm{A'} + \mathrm{E'} - (\mathrm{A'} + \mathrm{B'}) = \mathrm{E'} - \mathrm{B'}$$

Using equation (6) with $\theta = 0.5$ we have:

$$\Delta p = -\frac{1}{2}(Q^0 + Q^1)\Delta s + \frac{1}{2}(s^0 + s^1)\Delta Q$$

$$\mathrm{E'} - \mathrm{B'} = -(\mathrm{B'} + \mathrm{C'}) + (\mathrm{D'} + \mathrm{E'}) \text{ since } \mathrm{C'} = \mathrm{D'}$$

The area approach satisfy the Milana's Identity in which

$$\Delta p = \mathrm{E'} - \mathrm{B'}, \quad \mathrm{CE} = -(\mathrm{B'} + \mathrm{C'}) \text{ and } \mathrm{GE} = \mathrm{D'} + \mathrm{E'}.$$

In the discrete formulation of equation (2) an extra element given by $\Delta s \Delta Q$, named as the interaction effect arises as the same base year is used in their formation. In Figure 1, we can see that equation (3) allocates $\Delta s \Delta Q$ to CE only while in Figure 2, it shows that equation (4) allocates $\Delta s \Delta Q$ to GE only. In addition, Figures 3 shows that in equation (5), $\Delta s \Delta Q$ is alone and considered as the interaction effect.

Identity (6) with $\theta = 0.5$ divides $\Delta \mathrm{s} \Delta \mathrm{Q}$ equally between CE and GE for all possibilities of $\Delta \mathrm{s}$ and $\Delta \mathrm{Q}$ and decomposes Δp as the sum of the areas of two trapeziums as shown in Figure 4, Figure 5, Figure 6 as well as in Figure 7.

Equation (6) with $\theta = 0.5$ can also be obtained by adding identities (2) and (3) which are in conformity with Richardson's (1971) suggestion which stated that better results can be obtained by using both identities in an analysis. In addition, Milana (1988) also demonstrated in the light of index number theory that the most accurate discrete time approximation of equation (2) is equation (6) with $\theta = 0.5$. Thus, it is reasonable that Aisha Nuddin et al., (2018) used equation (6) in the formulation of CE and GE.

The increase in the amount of loan transactions by a focused mode of financing can be analysed using the CE and GE values; whether they are caused by the competitiveness of the mode of financing or by the growth in the total amount of loan transactions in the country. We can also compare the CEs between the focused mode of financing and the other mode of financings in a country in order to determine the level of competitiveness between the *n* modes of financing in the country. As the value of CE is affected by the total growth of loan transactions in the country caused by the interaction effect, this study proposed the used of Aisha Nuddin et al., (2018) CMSC index together with its geometrical tool to realistically reflect the competitiveness between the *n* modes of financing.

Review of the Geometrical Tool for CMS Analysis

In this section, Aisha Nuddin et al. (2018) geometrical tool for CMS analysis is presented. The geometrical tool is named Constant Market Share Space (CMSS). Within the CMSS, changes and differences in CE and GE between units of analysis can be visualised as well as changes in CE and GE between two different periods.

The CMSS is a two-dimensional space which is able to capture each and every CE and GE of a mode of financing for a certain period of time where the CE and GE can be positive, negative or zero. The CE is depicted on the vertical axis (+/-CE) and the GE on the horizontal axis (+/-GE) which consist of a two-dimensional space that has four quadrants where the side lengths of the CMSS are given by twice the maximum of the largest absolute value of whichever is larger of the CE or GE for the period of study. Figure 8 presents a hypothetical CMSS where the CE and GE for the loan transactions by any *n* modes of financing in a period of analysis can be represented by a single coordinate point in the CMSS. Points *P* and *Q* in Figure 8 are coordinates of two representative modes of financing in which *Q* have positive values while *P* have negative values for both CE and GE. The length of the vertical and horizontal axis are equal and each quadrant is a square which means that the positive and negative sides are equal in length with the maximum length of the side is given by the absolute value of whichever is larger between the CE or the GE.

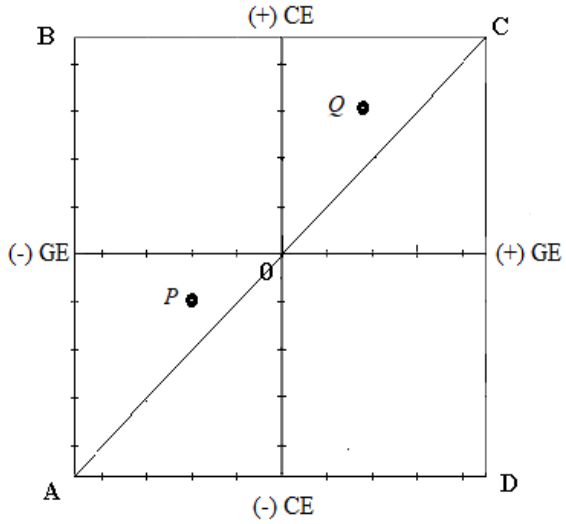

Figure 8: Constant Market Share Space (CMSS)

A CMSS for *n* modes of financing given by Aisha Nuddin (2018) can be written in set notation as;

$$\text{CMSS} = \{ (x, y) \mid -|\max(\text{CE}_t, \text{GE}_t)| \le x \le \max(\text{CE}_t, \text{GE}_t), \\ -|\max(\text{CE}_t, \text{GE}_t)| \le y \le \max(\text{CE}_t, \text{GE}_t),\ t = 1, 2, 3, \ldots, n \}. \quad (7)$$

CMSS is a square box in which all values of CE and GE of the analysis are captured within the dimensions of the space. The axes are labelled in accordance with the Cartesian coordinates system in which the centre is the origin, (0, 0) which represents the unique position where (CE, GE) = (0, 0). The sum of all the CEs of a CMS analysis which are below the *x*-axis is equal to the negative sum of all the CEs of the analysis which are above the *x*-axis (Aisha Nuddin et al., 2018).

In a CMSS, all the coordinate points representing the modes of financing in a CMS analysis are to the right of the vertical axis if there is an increase in the total amount of loan transactions in the country and all the coordinate points representing the modes of financing are to the left side of the vertical axis if there is a decrease in the total amount of loan transactions in the country (Aisha Nuddin et al., 2018).

From equation (6) with $\theta = 0.5$, $\Delta p = \text{CE} + \text{GE}$ thus, for any specific Δp, the locus of equi-Δp can be represented by a straight line with a slope of minus unity in the CMSS (lines parallel to diagonal BD). Hence, the loci of equi-Δp are straight lines perpendicular to the diagonal AC of the CMSS as seen in Figure 9.

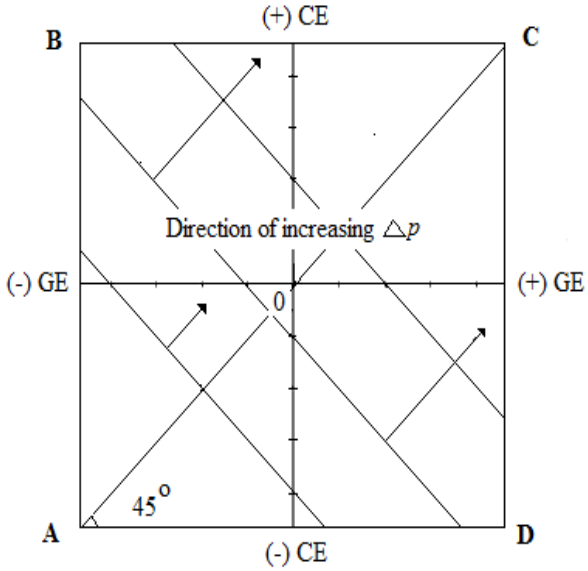

Figure 9: Isoclines of Equi-Δp

For all of the loci of equi-Δp, its corresponding Δp is the vertical intercept where

$$\forall \Delta p_t > \Delta p_{t-1} \Rightarrow (\text{CE} + \text{GE})_t > (\text{CE} + \text{GE})_{t-1} = \Delta p_{t-1}.$$

Figure 9 shows the direction of increasing Δp isoclines within the CMSS.

Review of the Constant Market Share Competitiveness Index

Aisha Nuddin et al. (2018) used Milana's identity (equation 6) in decomposing the change in the total amount of loan transactions by a focused mode of financing into GEs and CEs for the formation of the CMSC index. The index measures the competitiveness of a focused mode of financing while CE measures the effect of the competitiveness. The proposed CMSC index is based on changes in the market share of the loan transactions of the focused mode of financing in a specific period. This index together with CE and GE will be analysed using the CMSS in determining the performance of a mode of financing with respect to the other modes of financing.

To develop the index, let $p(t)$ equals the total amount of loan transactions of a focused mode of financing at time t while $Q(t)$ equals the total amount of the loan transactions in the country at time t. Let $s(t) = \dfrac{p(t)}{Q(t)}$ be the share of the loan transaction of the focused mode of financing at time t out of the total amount of loan transactions in the country.

Let $s(0) = \frac{p(0)}{Q(0)} = s^0$ be the share of the loan transactions of the focused mode of financing at the beginning of the analysing period while $s(1) = \frac{p(1)}{Q(1)} = s^1$ be the share of the loan transactions of the focused mode of financing at the end of the period of analysis.

The change in the share, $\Delta s = s^1 - s^0$ measures the change in the loan transaction's shares of the focused mode of financing in a particular period.

The formula for the CMSC index is given as;

$$\text{CMSC}(s^1, s^0) = \frac{s^1 - s^0}{\max(s_t^1, s_t^0)} = \frac{\Delta s}{\max(s_t^1, s_t^0)} \qquad (10)$$

CMSC index exhibits proportionate scaling since the rate of change of $\text{CMSC}(s^1, s^0)$ with respect to s^0 is equal and opposite to the rate of change of $\text{CMSC}(s^1, s^0)$ with respect to s^1 as shown by the following partial derivatives where; $\frac{\partial \text{CMSC}(s^1, s^0)}{\partial s^0} = -1$ and $\frac{\partial \text{CMSC}(s^1, s^0)}{\partial s^1} = 1$.

The loci of equi-Δs values are perpendicular lines to the main diagonal of the CMSS presented in Figure 10. Point U and W in the graph are on the same line, so both acquire the same CMSC index value. Note that Δs is positive for $s^1 > s^0$ and is negative for $s^1 < s^0$, thus it is positive for points above the diagonal AC and negative for points below the diagonal AC.

The index in equation (10) is not exactly the same as in Aisha Nuddin et al. (2018). To simplify the index, in this writing the denominator is not multiplied by 2, this can be done as it does not affect the proportionality of the index.

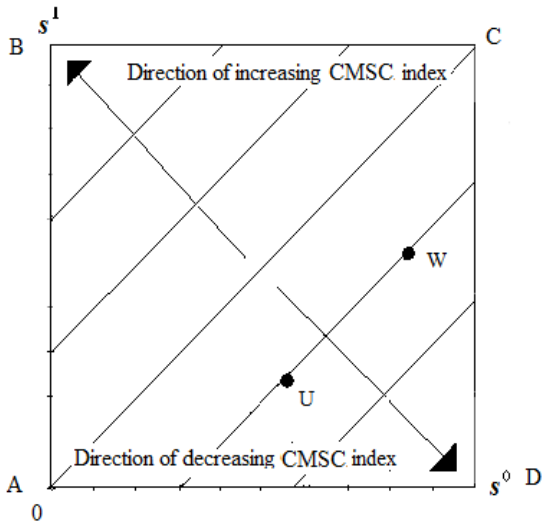

Figure 10: Isoclines of Equi-Constant Market Share Competitiveness Index in s^1 versus s^0 graph

In the formation of the index, Δs is divided by $\max(s_t^1, s_t^0)$ to differentiate the index between different ranges of shares. $\text{Max}(s_t^1, s_t^0)$ represents the range of the share in the period since every share in the period is less than it. In addition, Figure 11 illustrates the effect of the division of Δs by $\max(s_t^1, s_t^0)$ in two different periods.

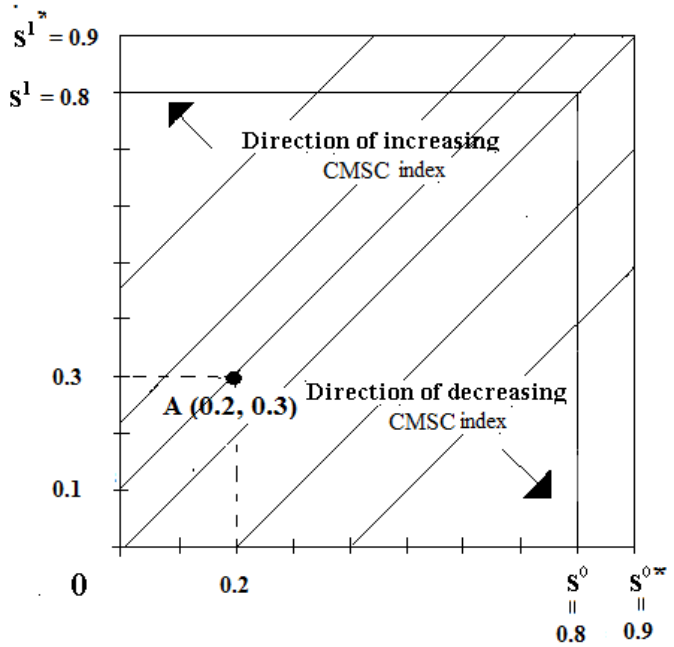

Figure 11: Two Different Periods of Constant Market Share Competitiveness Indices with Two Different $\mathbf{max(s_t^1, s_t^0)}$ in s^1 versus s^0 Graph

Now, let us see the difference in CMSCIs when $s^0 = 0.2$ and $s^1 = 0.3$ in two different periods with different $\max(s_t^1, s_t^0)$. Let $\max(s_t^1, s_t^0) = 0.8$ in one of the periods and $\mathbf{max(}s_t^1, s_t^0\mathbf{)} = 0.9$ in the other period.

For the first period $\text{CMSCI}(0.2, 0.3) = \dfrac{0.3 - 0.2}{0.8} = 0.125$ and for second period is given by

$\text{CMSCI}(0.2, 0.3) = \dfrac{0.3 - 0.2}{0.9} = 0.111.$

The index $\text{CMSCI}(s^1, s^0)$ is higher when $\max(s_t^1, s_t^0)$ is smaller. This relates to the stiffness of the competitions since a small range implies that the shares are close to one another and the competition is stiffer. The proposed index captures this stiffness aspect with a divison by $\max(s_t^1, s_t^0)$.

Finally, we consider the locus of equi-CMSCI in the CMSS. From equation (7) the competitiveness effect is given by $\text{CE} = \dfrac{1}{2}(Q^0 + Q^1)\Delta s$,

$$\text{so } \Delta s = \left(\frac{2}{Q^0 + Q^1}\right)\text{CE}. \qquad (11)$$

As can be seen, $\text{CMSCI}(s^0, s^1) = \dfrac{s^1 - s^0}{\max(s_t^1, s_t^0)} = \dfrac{\Delta s}{\max(s_t^1, s_t^0)} \propto \Delta s.$

Following from equation (11) we have

$$\text{CMSCI}\,(s^0, s^1) = \frac{\Delta s}{\max\,(s_t^1, s_t^0)} = \left(\frac{2}{\max\,(s_t^1, s_t^0)(Q^0 + Q^1)}\right)\text{CE}\,.$$

Since Q^0 and Q^1 are constants and positive in the period of analysis, thus CMSC index is a multiple of the CE and are both proportional to each other respectively. Proportionality of CMSC index and CE implies that loci of equi-CMSC index are the same as the loci for equi-CE. Thus, loci for equi-CMSC index are horizontal lines parallel to the *x*-axis as shown in Figure 12. Furthermore, CMSC index are negative for points below the horizontal axis and positive for points above it.

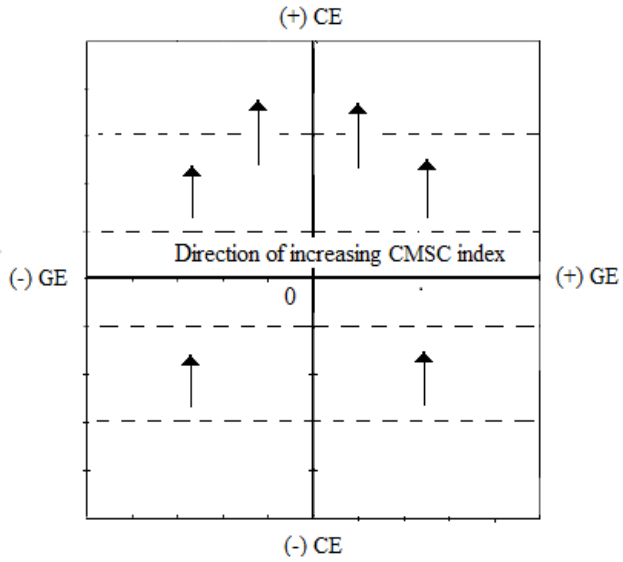

Figure 12: Isoclines of Equi-CMSC index in CMSS

The CE and GE values of any mode of financing in an analysing period are represented as a coordinate in a CMSS. The definition of CMSS as in equation (7) enables it to capture all CE and GE values of all the modes of financing in a country. The performance of a mode of financing can be analysed by its coordinate position in the CMSS and its CMSC index value. Also, CMSC index expresses the competitiveness of a mode of financing while CE expresses the effect of the competitiveness of the loan transactions by the mode of financing. On the other hand, GE reflects the effect of the total change in loan transactions in the country (structural change) on the loan transactions by the mode of financing. CMSC index as defined here does not depend on a base period but it illustrates the competitiveness of a mode of financing relative to all the other modes of financing in the CMSS. This property of CMSC index solved the inconsistency problem, which was referred to as the "index number problem" by Richardson (1971).

CMSS can be divided into four partitions with respect to any focused mode of financing, *p* as shown in Figure 13. All modes of financing in Partition I are more competitive than mode of financing *p* but with less total change than the total change in *p* given by (Δp). Also, all modes

of financing in Partition *II* are more competitive than mode of financing *p* and have higher total change than Δp whereas all modes of financing in Partition *III* are less competitive than *p* but have higher total change than Δp. Finally, all modes of financing in Partition *IV* are less competitive than *p* and have less total change than Δp.

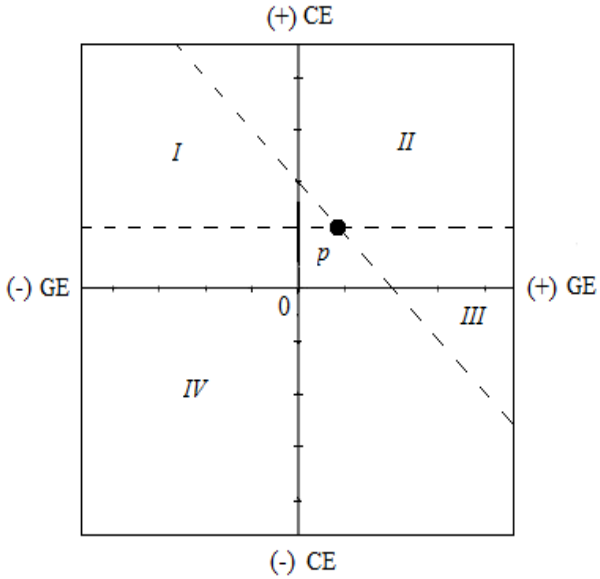

Figure 13: Constant Market Share Space's partitions with respect to a focused entity

Even though a mode of financing can have the same competitiveness over two different periods, the effects of the competitiveness might not be the same as shown by their CE values since the total loan transactions in the two periods might be different. Note that, CMSC index is defined as the measure of competitiveness and while CE as the effect of the competitiveness. Using all these measures, we can compare the business performance of a mode of financing over several different periods of analysis and can also analyse the change in loan transactions by a mode of financing on any particular sector (houses, cars, etc.).
Next section illustrates the usefulness of the new approach in analysing the performance of different modes of financing.

Analysis of the Performance of PLS mode of Financing in Malaysia in 2015

In this section, the CMSC index, Milana's identity and the CMSS are utilised to analyse the performance of the PLS mode of financing (*Mudharabah* and *Musyarakah*) in Malaysia for the year 2015. The data is obtained from the Central Bank of Malaysia's Official Website. The modes of financing are divided into four types, namely, PLS *mudharabah*, PLS *musyarakah*, Islamic non-PLS and Conventional financings. Abbreviations for the modes of transactions are PLS1, PLS2, INPLS and CONV respectively whereas values in all figures are in RM million. The best analysis should be done annually but since some data in 2014 are not available, the following analysis is done with the year 2015 data in six months intervals. The initial interval's transactions, *p* is the amount involved in the transactions between January, 2015 and June, 2015 while the following interval's financings, $p + \Delta p$ is the amount involved in the transactions between July, 2015 and December, 2015. The computations of all relevant figures are given in Table 4 and the CMSS for the analysis is given in Figure 17.

The most competitive mode of transaction is the Islamic non-PLS mode of financings (INPLS) with CMSC index equals to 0.007603 and CE equals to RM 47049.07 millions. The least

competitive during the period is the conventional mode (CONV) with CMSC index equals to - 0.009399 and CE equals to - RM58161.78 millions. This implies that CONV lost more share than the other modes even though it had the highest increase in financings which is RM 206311.3 millions. This increase in financings is due to the increase in the total financings in Malaysia in 2015. This is shown by the GE for CONV, that amount to RM 264472.8402 millions. As for the *mudharabah* financings the amount increased is very small with CE value RM 20.43079285 millions and it lost its share as shown by its CMSC index which is -0.0000017. On the other hand, CMSC index for *musyarakah* mode is 0.001797 while its CE is RM11123.13 millions.

The competitiveness and the increase in the amount involved in the modes of financing can be clearly seen in the CMSS as given by Figure 17. The coordinate representing CONV is the highest position with respect to equi-Δp isoclines which implies that it has the highest increase in financings but its position is the lowest with respect to equi-CMSC index isoclines which implies that it is the least competitive. The coordinate point representing the *mudharabah* mode (PLS1) is very close to the origin which implies that there is almost zero change in the amount and share of this particular mode of financing. As for the *musyarakah* mode (PLS2), its position above the *x*-axis in the first quadrant implies that it is competitive with a positive change in the amount of financings. All coordinates points representing the modes of financings are on the right side of the vertical axis which implies that there is an increase in the total financings in Malaysia in 2015.

Table 4: Analysis of the performance of PLS (*Mudharabah and Musyarakah*) modes of transaction in Malaysia in 2015

	1	2	3
Modes of Transactions	p	Δp	$p + \Delta p$
Mudharabah (PLS)	465.70	9.80	475.50
Musyarakah(PLS)	147756.50	17845.90	165602.40
Islamic non-PLS	1975818.00	134763.50	2110581.50
Conventional	6055270.00	206311.20	6261581.20
Total	8179310.20	358930.40	8538240.60

	4	5	6
Modes of Transactions	s^0	s^1	$\Delta s = s^1 - s^0$
Mudharabah (PLS)	0.000056936	0.000056906	- 0.000001245711
Musyarakah(PLS)	0.018064665	0.019395377	0.001330712544
Islamic non-PLS	0.241562913	0.247191617	0.005628703971
Conventional	0.740315485	0.733357314	-0.006958170145
Total	1	1	0

	7	8	9
Modes of Transactions	CMSC index	$CE = \frac{1}{2}(Q^0 + Q^1)\Delta s$	$GE = \frac{1}{2}(s^0 + s^1)\Delta Q$
Mudharabah (PLS)	-0.00000168267	-10.41262204	20.43079285
Musyarakah (PLS)	0.001797	11123.12728	6722.766392
Islamic non-PLS	0.007603	47049.07229	87714.51383
Conventional	-0.009399	-58161.78144	264472.8402
Total	0	0	358930.6000

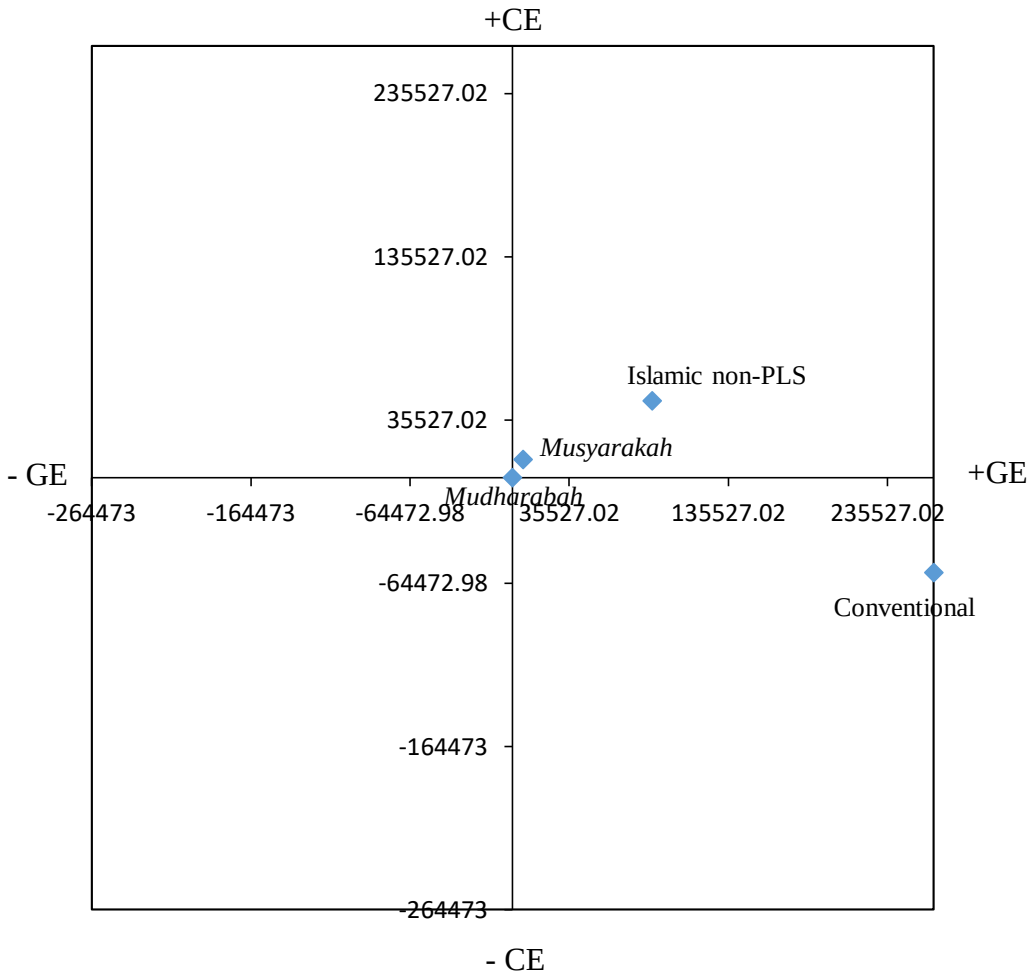

Figure 17: CMSS for the analysis of the performances of PLS modes of financings in Malaysia in year 2015

The example of the application of the new method of analysis in the example above clearly showed its applicability in measuring the competitiveness of different modes of financings in a country with easy to interpret index and geometric tool. The analysis gives the index of competitiveness (CMSC index), the effect of the competitiveness (CE) and the effect of the total change of the amount of financings (GE) for each mode of financings. The performance of each mode of financings can also be visualised by using the CMSS.

Conclusions

This paper demonstrated how the new CMS net-share approach index can be used in analysing the competitiveness of different modes of investment instruments in a country. Example of the application of the new index together with the geometric device is demonstrated in the analysis of the performances of different modes of financings in Malaysia in 2015.

This approach is a general descriptive analysis tool and is applicable not only for analysing competitiveness of modes of financing but is also applicable for measuring the competitiveness of business entities competing for the market share of a commodity or service in a specific region within a given period. It is applicable across products, sectors or even industries for any number of years. The proposed geometric framework in tandem with Milana's (1988) identity together with the new index (CMSC index) helps in solving the inconsistency in CMS analysis.

References

Aisha Nuddin, A. J., Azhar, A. K. M., Gan, V. B. Y., & Khalifah, N. A. (2018). A new constant market share competitiveness index. Malaysian Journal of Mathematical Sciences, 12 (1), 1-23.

Amador, J., & Cabral, S. (2008). The Portuguese export performance in perspective: A constant market share analysis. Economic Bulletin and Financial Stability Report Articles, Banco de Portugal, 201-221.

Bonanno, G. (2016). Constant market share analysis: A note. Economics and Econometrics Research Institute (EERI), Research Paper Series No 07/2016.

De Lombaerde, P., & Verbeke, A. (1989). Assessing international seaport competition: a tool for strategic decision making. *International Journal of Transport Economics*, 16(2), 175-192.

González Pandiella, A. (2015), "A Constant Market Share Analysis of Spanish Goods Exports", *OECD Economics Department Working Papers*, No. 1186, OECD Publishing, Paris, https://doi.org/10.1787/5js69lb4b5mt-en.

Hoen, H. W., & Van Leeuwen, E. H. (1991). Upgrading and relative competitiveness in manufacturing trade: Eastern Europe versus the newly industrializing economies. *Review of World Economics*, 127(2), 368-379.

Jiménez, N., & Martín, E. (2010). A constant market share analysis of the Euro Area in the period 1994-2007. *Economic Bulletin*, (Jan).

Leamer, E. E., & Stern, R. M. (2017). *Quantitative international economics*. New York: Routledge.

Milana, C. (1988). Constant-market-shares analysis and index number theory. *European Journal of Political Economy*, 4(4), 453-478.

Othman, S., & Abdul Rashid, Z. (1993). Constant market share analysis of the ASEAN timber trade. *Pertanika Journal of Social Sciences & Humanities*, 1(1), 71-80.

Richardson, J. D. (1971). Constant-market-shares analysis of export growth. *Journal of International Economics*, 1(2), 227-239.

Perloff, H. S., Dunn Jr, E. S., Lampard, E. E., & Keith, R. F. (1960). *Regions, resources, and economic growth*. Baltimore: John Hopkins Press.

Porter, M. E. (2008). *On competition*. Boston: Harvard Business Press.

Rahmaddi, R., & Ichihashi, M. (2012). How do Export Structure and Competitiveness Evolve Since Trade Liberalization? An Overview and Assessmentof Indonesian Manufacturing Export Performance. *International Journal of Trade, Economics and Finance*, 3(4), 272-280.

Siudek, T., & Zawojska, A. (2014). Competitiveness in the Economic Concepts, Theories and Empirical Research. *Acta Scientiarum Polonorum. Oeconomia*, 13(1), 91-108.

Skriner, E. (2009). *Competitiveness and specialisation of the Austrian export sector: A constant-market-shares analysis*. Vienna: Economics Series, Institute for Advanced Studies.

Tyszynski, H. (1951). World Trade in Manufactured Commodities, 1899-1950. *The Manchester School*, 19(3), 272-304.