Evaluating Malaysian Palm Oil Industry using Discounted Cash Flow Approach

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Abstract

This research is a case study involving an oil palm plantation company (Case Company) which owns seven oil palm plantations. These seven plantations had all been valued by Licensed Property Valuers (LPV) who used the market comparison method. The research study applies the Discounted Cash Flow Method (DCF Method), a quantitative financial model as a business valuation method, to value the seven plantations. This research study starts out by looking for an alternative or comparative business valuation method so that it can be used as an additional valuation tool in the loan credit evaluation process, in addition to the LPV valuation. The test results show the two sets of values to be significantly similar. The results of the study supported the DCF Method for valuation for the palm oil plantations. This finding is important because it is of tremendous benefit to both practitioners, especially, those in the banking industry, and the academia to have a financial business valuation model that can be used to enhance the loan credit evaluation process. This gives the confidence that the DCF Method can be considered to be used for valuation purposes for bank loan collaterals. However, because of some limitations of this research study, this study should be replicated for further studies to be conducted to further reaffirm the proposal for the DCF Method to be completely accepted as a business valuation approach for bank credit purposes.

1. Introduction

Malaysia currently accounts for 39% of the world's palm oil production and 44% of the world's exports, being one of the biggest producers and exporters of palm oil and palm oil products. Malaysia also accounts for 12% and 27% of the world's total production and exports of oil and fats, if other oils and fats production in the country were taken into account. Malaysia plays a vital role in fulfilling the growing global needs for oils and fats sustainably. The industry has flourished in a way it has never been before thanks to Malaysia's position as the world's leading palm oil producing country. We are currently making the downstream manufacturing into an industry itself by churning out a wider variety of by-products. This is made possible due to continuous R&D efforts and this allows Malaysia to remain heads and shoulders above its other competitors.

This study starts out by looking for an alternative or comparative business valuation method so that it can be used as an additional valuation tool in the loan credit evaluation process, in addition to the LPV valuation. This alternative business valuation method is identified as a financial model using the Discounted Cash Flow Method (DCF Method). The DCF Method is applied to seven (7) oil palm plantations belonging to one plantation company to calculate the DCF values of the seven plantations. These seven plantations had all been valued by the LPVs earlier. Hence, the calculated DCF values can be tested statistically against the LPV values. The test results show the two sets of values to be significantly similar. This gives the confidence that the DCF Method can possibly be considered to be used for valuation purposes for bank loan collaterals. However, because of some limitations of this research study, this study should be replicated for further studies to be conducted to further reaffirm the proposal for the DCF Method to be completely accepted as a business valuation approach for bank credit purposes.

The study applies corporate finance theory to identify and develop an alternative and comparative business valuation method. The study applies this business valuation method to the seven plantations of the Case Company, and analyse the results to see if the method can be used as a tool, in addition to the LPV's valuation, in bank lending so as to enhance the credit evaluation process. Loan credit evaluations always require property valuations of the collaterals to be carried out by a licensed property valuator as collateral are important for credit risk management (Koziol, 2007). It reduces the risk of losses of the banks in case of borrowers' default (Voordeckers&Steijvers, 2006). Hence, ascertaining the value of the collateral is of major issues to the banking industry. Business managers and investors often use project cash flows (PCF) for the evaluation of investments in projects for the purpose of capital budgeting. The PCFs were often discounted using the Discounted Cash-Flow Method (DCF) to calculate the Net Present Values (NPV).In this study, the DCF Method is applied to the seven palm oil plantations of the Case Company to calculate the NPV.

Loan credit evaluations always require property valuations of the collaterals to be carried out by a licensed property valuator. Collateral is important for credit risk management (Koziol, 2007). It reduces the risk of losses of the banks in case of borrowers' default (Voordeckers and Steijvers, 2006). Hence, ascertaining the value of the collateral is of major importance to the banking industry. This DCF Method of business valuation may be applicable to other industries other than the oil palm industry, if information is available from reliable sources for preparing the project cash flows.

In the banking industry, the valuations of properties and assets for bank loan purpose are invariably done by LPV. These valuations are almost all done on the market comparison basis by comparing with recent similar transactions. However, in an inactive market, such comparisons become difficult, and sometimes the asset in question is compared with other assets with may not be directly comparable, or compare with transactions long ago. This situation becomes problematic for the credit evaluation of the loan application. Therefore, a search to find a way out of this problem is desirable for

the banking industry. In addition, there have been no previous published studies in the local banking industry nor academia have been done on the business valuation of oil palm plantations using the DCF Method. Therefore, it would be interesting to conduct the research on this case study so as to help to fill in the gaps in the finance literature and the banking industry on the business valuation of palm oil plantations using the DCF Method. Essentially, this study represents the first time that a business valuation for oil palm plantations is carried out in the local banking industry in Malaysia.

2. Literature Review

Oil palm cultivation began in 1917 after the start of the rubber industry, where the plantation sector started off in 1896. The growth was initially very slow and it was only during the last 50 years that plantation development was accelerated through large-scale investments in the cultivation of the oil palm. After approving oil palm as one of the approved crops for diversifying the country's agricultural development, production increased by almost 160 times within 45 years. Production increased from 94,000 metric tons in 1960 to 15 million metric tons in 2005, representing a compound annual growth of 11.93% per year. These figures illustrate the tremendous contribution that Malaysian palm oil has made to the world food sources, as well as the success it brought to the oil palm industry.

Malaysia's tropical climate, which is marked by all-year-round temperatures ranging from 25 °C to 33°C and evenly distributed rainfall of 2000 mm per year, provides the best condition for the oil palm to thrive. Not many countries have similarly ideal temperatures and rainfall patterns like Malaysia, some of them experience several months of drought even though they are said to be suitable for oil palm cultivation. Only countries located within 10 degrees latitude of the equator with even distribution of rainfall like Malaysia and Indonesia are able to emerge as major producers of palm oil.

Palm oil accounts for 33% of world production of oils and facts (Annual Report Malaysian Palm Oil Council, 2014). Malaysia accounts for 39% of world palm oil production and 44% of world exports (Malaysian Palm Oil Industry, 2015). According MPOC Annual Report (2014), as at the end of 2014, Malaysia has total area of 5.39 million ha under oil palm plantation and production of 19.67 million tons, and it accounts for about 39 % of world palm oil production and 44% of total global palm oil exports. Future increase in demand for palm oil is inevitable due to global population growth, economic development and demand for biofuel. (Murphy, 2014). Hence, the potential for banks to finance loans related to the oil palm industry remains strong.

In recent years, banks are putting more emphasis on the management of credit risk (Nilsson &Öhman, 2012). This is partly due to the global economic downturn (Arnold, 2009; Roberts and Jones, 2009), and partly due to the provisions of the Basel Accords (Wahlstrom, 2009). Credit risk is defined as "the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms." (Basel Committee on Banking Supervision, 2000). It is part of the processing of loan applications (Zambaldi, Aranha, Lopez, &Politi, 2011; Gavalas&Syriopoulos, 2014).

The requirement for collaterals for bank loans is important because collaterals are credit risk management tools (Mishkin, 2004). Therefore, the credit risk evaluation for a bank loan normally requires, amongst other things, that collateral be given for the bank loan, in the form of a property that is to be mortgaged to the bank under a charge pursuant to the Sarawak Land Code. A property valuation of the collateral is required to determine the value of the property. The value of the collateral is important to the bank because in the event of the default of the borrower to pay the loan, the bank can then exercise its legal rights to auction off the property to recover the amount of loan and interest outstanding and owing by the defaulting borrower (Van Gestel&Baesens, 2009). On a theoretical basis, the collateral reduces the lender's risk and hence, makes the financing conditions more favourable (Voordeckers&Steijvers, 2006). Currently, the valuation of the property for the purpose of the bank loan is invariably carried out by a LPV. This research study addresses the issue of identifying a suitable alternative business valuation method for bank loan collateral, using the DCF Method, in addition to the currently accepted LPV valuation.

Following the stock market crash of 1929, discounted cash flow analysis gained popularity as a valuation method for stocks (Fisher, 1930). The first published articles on discounting of income and the respective appropriate discount rates first surfaced in the 1930s (Brealey& Myers, 1996). Later, the Modigliani and Miller theorem (1958) proposed the discounting cash flow approach. From the 1960s to the early 1980s, the discounting cash flow method became commonly used for asset valuation (Myers, 1974; Miles &Ezzell, 1980). "There is an almost unanimous consensus that the discounted cash flow (DCF) methods represent the theoretically sound methods to be used for appraisal aims." (Magni, 2006).

Livingstone and Grossman (2002) had earlier suggested that the valuation of a business can be made on the basis of cash-flows of the business. This value of the business can be arrived at by discounting the cash-flows of the business (Easton, Wild, Halsey,&Mcanally, 2015). The DCF Method is most widely used to value an asset (Petre&Bunea-Bontaş, 2010). It is generally recognized as one of the most popular valuation methods (Magni, 2008; Patena, 2011). It has been perceived to be significantly important (Imam, Barker &Clubb, 2008) and it is considered basic foundation on which all other valuation methodologies are built (Stephen, 2014). The DCF Method is invaluable especially for large transactions or financial agreements involving considerable and predictable payment streams (Moneycation, 2011). The values can be well estimates for cases where the future cash flows can be projected with a high degree of confidence (Stephen, 2014).This is exactly the case for this research because the palm oil industry exhibits high visibility in its operations. It is easy to predict capital investment, sales, and operating expenses and with a high degree of certainty for the industry due to its transparency.

The DCF method has many distinct advantages. Firstly, because the DCF method is based on fundamentals of the asset, it should be less exposed to the market moods and perceptions (Black, 2010). Since it relies on the fundamental expectations of the business or asset, it is less influenced by external factors which may be volatile. Secondly, the method truly captures the underlying fundamental drivers of a business, by allowing the valuator to estimate how much the future stream of cash flows is worth at today's value. Hence, it comes closest to estimating the intrinsic value of the asset (Stephen, 2014). Thirdly, it gives provisions for changing operating strategies to be taken into consideration in the valuation. It takes into account the explicit financial performance of all future years of the business, unlike traditional techniques which do not do so. Hence, the advantage of a DCF valuation is that it allows the future free cash flows in all future years to be valued so as to give the true or intrinsic value of the business (Wilson, 1997).

3. Research Methodology

This case study is a quantitative financial study based on this principle. It uses the DCF Method to estimate the NPV of the project to come up with an independent business valuation of the target oil palm plantation assets. Primary data are those obtained first-hand from the original data sources, such as individual enquiries in the forms of conversations, interviews, questionnaires, and observations (Scheurich, 2007). In this study, the primary data are collected through interviews with the managers and staff of the case company using a pre-prepared Questionnaire to extract information on the operations of the company. The relevant questions in the Questionnaire are designed to cover all the information required for the study.

This case study is a quantitative financial study based on this principle. It uses the DCF Method to estimate the NPV of the project to come up with an independent business valuation of the target oil palm plantation assets. This study involves a multi-method approach of data collection that includes both primary and secondary sources of data. Primary data are those obtained first-hand from the original data sources, such as individual enquiries in the forms of conversations, interviews, questionnaires, and observations (Scheurich, 2007). In this study, the primary data are collected

through interviews with the managers and staff of the case company using a pre-prepared Questionnaire to extract information on the operations of the company.

The combined used of the questionnaire and interviews allow the data to be checked and reconfirmed, especially in cases where the information given in unclear or doubtful. The questionnaire provides a pre-determined and efficient way of collecting responses because each plantation manager is asked to respond to the same set of questions (Saunders, Thornhill& Lewis, 2003). The secondary data for this study were obtained from information from the files of the Bank, and published sources, such as the MPOB, MPOC, Bank Negara Malaysia, Bloomberg, and so on.

4. Findings
4.1 Correlation Coefficients

The correlation coefficients for the regressed line are calculated and shown in Table 1 below.

Table 1:   Correlation Coefficients

Pearson-Product Moment Correlation Coefficient	R	0.89
Coefficient of Determination	R^2	0.792

The Pearson-Product Moment Correlation Coefficient, R, is calculated to be 0.89. The positive value of R means that two values systematically vary in the same direction. The high value of R indicates that the regressed line can be used reliably to project future prices of CPO (Shayib, 2013). The Coefficient of Determination, R2, is calculated to be 0.792. This means that the regressed line, indicating that the regression line can give a good prediction of the CPO prices, able to explain 79.2% of the price values.

4.2. Descriptive Statistics

The descriptive statistics for the DCF values and LPV values are given in Table 2 below.

Table 2:   Descriptive statistics of DCF values and LPV values

	Statistics	DCF Values	LPV Values
1	Mean	221.74	213.98
2	Median	187.40	173.30
3	Maximum Value	506.60	489.60
4	Minimum Value	105.40	102.90
5	Standard Deviation	134.81	130.75

Looking at the descriptive statistics in Table 2 above, it can be seen there are indications that the two sets of plantations values have similar statistical characteristics.

4.3 Hypothesis Testing: Parametric Tests

To test whether there is any significant difference between the DCF and LPV, we carry out the statistical F-test for Equality of Variances and the t-test for Equality of Means.

4.3.1. F-Test for Equality of Variances
The first step is to test the equality of the variances of the two sets of values to see whether they are equal.

The hypotheses are:

H_0: $\sigma2$ *DCF* = $\sigma2$ *LPV*

H_1: $\sigma2$ *DCF* $\neq$ $\sigma2$ *LPV*

where:

$\sigma2DCF$ = variance of DCF values

$\sigma2LPV$ = variance of LPV values

The F-test result for the equality of variances between the two sets of values is shown below.

Table 3: F-Test for Equality of Variances

Method	d.f.	Value	Probability
F-test	(6,6)	1.06	0.94

The F-test result gives a F-statistic of 1.06 with a probability of 0.94, indicating clearly that we cannot reject the null hypothesis, H_0, at a significant level of 5% ($\alpha = 0.05$), meaning that the variances of the two variables are statistically equal.

4.3.2. T-Test for Equality of Means
The t-test is then conducted to test for the equality of the means of both sets of values. The hypotheses are:

H_0: $\mu DCF = \mu LPV$

H_1: $\mu DCF \neq \mu LPV$

where

μDCF = mean of DCF values

μLPV = mean of LPV values

The t-test result for the equality of means between the two sets of values is shown in Table 4 below.

Table 4: Test for Equality of Means

Method	d.f.	Value	Probability
t-Test	(6,6)	0.11	0.99

This t-test result indicates a t-statistic of 0.11, with a probability of 0.92, thus supported the null hypothesis, H_0, at a significance level of 5%. Therefore, we can conclude that statistically, there is no difference between the mean values of the two sets of values.

4.4. Hypotheses Testing: Non-Parametric Tests

Given that the sample size is small (n = 7), two non-parametric tests were conducted: the Kendall Rank Correlation Coefficient test and the Spearman Rank-order Correlation Coefficient test. The hypotheses put forward are:
H_0: There is no association between the DCF values and the LPV values
H_1: There is association between the DCF values and the LPV values
The correlation coefficients of the Kendall test at 0.905, and the Spearman test at 0.964 are both close to 1, indicating clearly that there is a strong positive relationship between the two sets of values. The significance tests of both tests give the probability value for the Kendall test of 0.04, and the probability value for the Spearman test of 0.00, indicating that we can reject the null hypothesis, H0.

Therefore, we can conclude that statistically, there is a strong positive association between the DCF values and the LPV values.

Table 5: Results of Kendall and Spearman Tests

Tests	N	Correlation Coefficient	Probability
Kendall Test (r)	7	0.905	0.04
Spearman Test (ρ)	7	0.964	0.00

In particular, it is also worth noting that the Spearman test can be used even when the variables are not normally distributed, because the Spearman test does not need to make any assumption about the distribution of the data. Therefore, the parametric F-test and t-test were both consistent with the non-parametric Kendall test and Spearman test, indicating that the DCF values and the LPV values, derived using two different methodologies of valuation, are not significantly different.

5. Discussions and Conclusion

The findings of the study will be of practical use to the practitioners in the oil palm industry who may not have the luxury of time or required skills to conduct such studies. It may also be useful to other industries, provided the data required are available and reliable. The study will also be useful to the banking industry. In making loans, credit risk assessment of loan processing is of vital importance, and banking has evolved from a rather qualitative risk assessment in the past to a more quantitative approach currently (Van Gestel & Baesens, 2009). The genuine value of a property helps the lender to come at a fair judgment on the term of contract with the borrower (Adetiloye& Eke, 2014). Each financial institution needs to hold in place and apply, and the minimum criteria, it should use, to ensure that real estate appraisals conducted in support of real estate-related financial transactions are prudent and appropriate (Bank of Jamaica, 2005). The study hopes to serve as a "mirror of reflection" for the banks to compare the value obtained from this DCF business valuation process compared to the value given by the LPV.

While valuations are generally performed by skilled professionals, anyone involved in a real transaction can benefit from gaining a basic understanding of the different methods of real estate valuation. The DCF method "has regard to the market participants' investment behaviour and thus is able to encapsulate the economics of the investment decisions made; particularly by institutional investors." (Kishore, 1996, 63).The NPV maximizing model has a respectable ancestry and is considered by most scholars as a theoretically sound decision model. (Magni, 2008). It is hoped that this study can provide the initiative for more academic research into the related area of finance and valuation. The study can provide a good example for the development of further studies in this area.

In spite of the limitations of this study, the researcher believes that the findings of this dissertation will be useful to the researcher's employer Bank, in particular, and also to the banking industry, at large, for decision purposes, especially in making in terms of processing and approving application for property loans. A proposal can be made to the Bank's management to consider a change in its lending policy for DCF business valuations to be carried out in the future for all cases where data are available to generate such project cash-flows. This will give more reliability and creditability to the Bank's credit risk assessment in its loan processing procedure. It is recommended that further studies be conducted for assets in other industries as well. For future studies, the sample size should be larger so that a more meaningful statistical analysis can be established.

The results of the study give support for the DCF Method for valuation for the oil palm plantations. This finding is important because it is of tremendous benefit to both practitioners, especially, those in the banking industry, and the academia to have a financial business valuation model that can be used to enhance the loan credit evaluation process. The DCF method should not be judged purely on the basis of whether or not the explicit cash flow assumptions can be ultimately

realized but rather on the extent of support for the assumptions at the time they were made (IVPB, 2011). A review of how the oil palm plantations have evolved is required to ensure that a standard of responsible palm oil production is followed. Global interest in sustainable agriculture thinks that investing in oil palm cultivation is a long term commitment, as growth of the oil palm industry gas led to a significant social phenomenon in terms of rural communities. Rural communities are relying on plantations as a source or employment and income. It is pertinent to note that the balance between economic needs and preservation of the environment has been shifted due to oil palm cultivation having long advocated sustainable farming practices in Malaysia. A balance between the need for agricultural development and preservation of forest areas is reflected through the Malaysia's land use pattern (Khatun, Moniruzzaman & Yaakob, 2017).

In summing up, it is hoped that this research study can be taken as the initiative and the base for further research using the DCF on the financial valuation on the oil palm plantation industry and other industries so that a body of knowledge can eventually be built up for a more comprehensive discussion on the DCF methodology of valuation. Therefore, in theory at least, the DCF method is arguably the most robust and sound valuation method. It applies forecast of future cash flows, it is forward-looking, and it depends more future expectations rather than on past historical results. In addition, since it is focused on cash flow generation, it is less affected by changing accounting practices.

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