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The Fair Value of Employee Stock Options

Nestlé's Case Study

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ABSTRACT

THE FAIR VALUE OF EMPLOYEE STOCK OPTIONS – NESTLÉ'S CASE STUDY

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The issuance of IFRS 2 – *Share-based payment*, in 2004, raised several criticisms, mostly related with one specific type of share-based payment transaction – employee stock options (ESO). The mandatory recognition and disclosure of its fair value impacted not only profitability, but also a corporate governance related issue – executives' remuneration. Given the specificities of this particular type of call options, entities are faced with some difficulties in applying option pricing models to its valuation, but are also faced with opportunities to exercise managerial discretion over the model inputs. This thesis analyses and comments IFRS 2 guidelines in detail, supported by existing literature. It also applies the guidelines provided by this standard to a specific case study – Nestlé's employee stock options granted in 2011 - to truly understand the difficulties and opportunities that an entity faces when estimating fair value of ESO. After providing 28 valid alternative valuations for the same ESO grant, we conclude that, in 2011, Nestlé apparently understated the amount expensed with regard to the ESO granted, possibly due to opportunistic motivations to reduce the perceived executives' remuneration and to increase the perceived entity's profitability. To finalise, we provide recommendations on additional disclosures, which would improve the transparency and quality of the information provided by the financial statements.

INDEX

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I. INTRODUCTION

Fair Value Accounting has become a topic of increased relevance in recent years. Since its first introduction in the International Accounting Standards (IAS, or IFRS – International Financial Reporting Standards since 2003) in 1982, the use of fair value as a measurement method has increased significantly.

In 2004, fair value measurement reached employee stock option grants, a form of compensation that typically features in executives' remuneration packages. It was one of the most controversial topics covered by the IASB (International Accounting Standards Board), in IFRS 2 – *Share-based Payment*. This standard and the corresponding under U.S. GAAP[1], SFAS[2] 123 R, mandate all share-based payment, including employee share options, to be accounted for at its fair value. The need to account for employee share options (ESO) emerged from the quest for accountability of the remuneration packages of executives, where this remuneration feature was increasingly used, reaching in 2001 40% of the total remuneration package of a CEO from an S&P 1500 firm, according to a study conducted by Lord and Saito (2010). Already in 1996, Huddart and Lang (1996) alerted for the fact that the financial statements that did not recognise employee share options at its fair value were omitting a component of compensation from the net income computation, thus not being a faithful representation of the entity's financial position.

Fair value measurement of employee stock options presents several difficulties. First, the value of the employee stock options must reflect the services provided to the entity by the employee who receives this share-based payment. However, like IFRS 2 mentions, there is no way of measuring reliably the services provided by the employee in question. The standard mandates, then, that the services are measured with reference to the equity instruments granted to the employee – the stock options, which differ from common stock call options due to their specificities, in particular the non-transferability of the majority of these option grants, the existence of vesting conditions and its long maturity. Since employee stock options are not traded, there is an inability to estimate fair value of the instruments according to their market-value, the most reliable source. The entities are left with the need to estimate the value according to option pricing models, which unfortunately do not fully incorporate the specificities of employee stock options.

All these restrictions in the fair value measurement of ESO raise two main criticisms that are shared with the criticism against fair value measurement in general, in the absence of market values: the reliability of fair value estimations through modelling is

[1] GAAP – Generally Accepted Accounting Principles
[2] SFAS – Statement of Financial Accounting Standard

questionable and the entities are left with too much power to exercise discretion over the model inputs.

The goal of this dissertation is to analyse in detail the application of IFRS 2 to the measurement of employee share options, in order to understand if the criticisms raised against fair value accounting are sound, and to provide recommendations for both entities and standard setters to improve the quality and transparency of the information reported. After having deeply analysed the standard, we will go further and apply the guidelines by using Nestlé's options granted in 2011 under the Management Stock Option Plan as a case study. During this analysis, we will have the opportunity to understand what are the problems that entities are faced with when estimating fair value through the Black and Scholes formula, and to appreciate to what extent firms can exercise managerial discretion over the inputs and still "follow the rules".

After the analysis, we conclude that measuring employee stock options according to its fair value is not as accurate as would be desirable, but since we recognise that, as any other form of compensation, they should be expensed, fair value is the best option available.

In our case study, we were are able to provide 28 valid alternative fair value measurements of the same employee stock option grant, proving that, although we believe fair value is the best measurement option available, the Black and Scholes formula is not able to fully incorporate the specificities' of ESO and that the use of fair value leaves room for the companies to understate or overestimate the amount to be expensed by manipulating the model inputs. We believe that in 2011 Nestlé exercised an opportunistic behaviour over the model inputs and underestimated the expense recognised with regard to the ESO granted, probably due to a will to improve the profitability perceived by investors and to reduce the perceived executive compensation, typically considered excessive. This interpretation is in line with the motivations for opportunistic behaviour referred by Aboody et al. (2006) and Hodder et al. (2006).

The paper is organised as follows. Section II presents the literature background on the fair value concept. Section III focuses on understanding the controversy around IFRS 2, on explaining what makes employee stock options different from plain-vanilla call options and on explaining and commenting how IFRS 2 mandates that these instruments are valued. Section IV is the case study itself, it starts by providing an overview of Nestlé and its employee stock option plan, followed by a deep analysis of the assumptions behind the valuation of these instruments, and ends with an analysis of the results achieved with our alternative valuations. Finally, in section V, the main conclusions and the managerial implications of our analysis are presented.

II. LITERATURE REVIEW

To support this dissertation, it is essential to start by analysing its basis – Fair Value accounting under the International Financial Reporting Standard (IFRS). For this, we will look at published documents (e.g.: papers, articles, books and surveys) and extract insights to be able to: clarify the definition of fair value; give guidelines about its measurement; make an analysis of the arguments given in favour and against this measurement concept; and also evaluate the perceived impact of this measurement concept in the recent financial crisis.

At a final stage in this section, an overview of IFRS 2 – *Share-based payment* will be made, since it is the standard that covers the specific topic of this dissertation – Employee-share options.

II. a) The need for IFRS and the emergence of Fair Value

One of IFRS Foundation's main objectives is "to develop a single set of high quality, understandable, enforceable and globally accepted international financial reporting standards (IFRSs) through its standard-setting body, the International Accounting Standards Board (IASB);"[3]

"Accounting measurement is relevant only because we live in an imperfect world where markets are not always fully liquid, firms' decision makers may have private information that cannot be readily disclosed to outsiders, and decision makers' incentives may be distorted." (Sapra, 2009)

The lack of transparency that exists in this imperfect world is one of the issues that the IASB and the FASB[4] (Financial Accounting Standards Board) have tried to address over the years. The accounting standard setters develop and improve the standards and one of the goals they have in mind is to increase the transparency of the entities disclosures. Another objective of the IASB and the FASB is "to identify the measurement concepts which provide the most decision-useful information to the recipients of financial accounting information"[5]. The introduction and the increased use of Fair Value as a measurement criterion is one of the actions taken to achieve both objectives.

[3] IFRS Foundation website
[4] The IASB is the body that publishes the IFRS, for an international context, whereas the FASB has the same duties but in the U.S., publishing the SFAS.
[5] IFRS Foundation Website

II. b) IFRS 13 – The Unification of Fair Value

In June 2011, IFRS 13 - *Fair Value Measurement* was issued by the IASB, although it will only be effective beginning on or after 1 January 2013. The issuance of this standard constitutes a way for companies to have a more comprehensive and cohesive interpretation of the broad concept of fair value and its several applications. Additionally, this standard is fully converged with the respective one under US GAAP - SFAS 157.

In IFRS 13, an underlying conceptual framework of fair value is created, where the main steps for establishing the fair value amount are defined. Within this framework, the valuation techniques and the fair value hierarchy are explained and clarified.

This standard does not extend the use of fair value measurements and it is applicable whenever another IFRS requires or permits the use or disclosure of fair value measurements. However, the scope of IFRS 13 considers only the use of fair value if:

- Each use of fair value in IFRSs is consistent with an exit price notion; and
- Each IFRS's measurement guidance is consistent with the one being developed in the fair value measurement project.

As KPMG (2011) concludes, this eliminates some transactions from the scope of IFRS 13, being one of them the most relevant type of transactions for this dissertation: share-based payment transactions that are within the scope of IFRS 2 - *Share-based Payment*.

II. c) Definition of Fair Value in IFRS

According to Cairns (2006), the first time the term "fair value" was used by the IASC (International Accounting Standards Committee, replaced by the IASB in 2001) was in IAS 16 *Accounting for Property, Plant and Equipment* issued in March, 1982, where it was defined as:

"The amount for which an asset could be exchanged between a knowledgeable, willing buyer and a knowledgeable, willing seller in an arm's length transaction." (International Accounting Standard (IAS) 16 [1982].6)

Throughout the standards issued after 1982, whenever fair value measurement was mentioned, it was defined and explained, sometimes with slight differences when compared to the first definition. The fair value concept did not change significantly throughout time, and its use under the accounting rules became increasingly common. With the issuance of IFRS 13, the definition of fair value, whenever this IFRS applies, is the following:

"The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date."

Although this definition is focused on assets and liabilities, IFRS also requires the application of fair value to certain equity instruments.

We will now analyse in more detail this definition:

"Price to be received to sell an asset or paid to transfer a liability":

Since it refers to the price to be "received", it is an exit price. The use of an exit price is justified by IASB as being always a relevant definition, regardless of the intentions of the entity to use or to sell the associated asset. This logic is explained by the FASB and recalled by Catty (2012) – an exit price reflects the expectations of future cash inflows and outflows associated with the item. An asset generates cash inflows and outflows regardless if the company uses it or sells it. A similar reasoning can be made regarding liabilities – the exit price reflects the expectation of cash outflows if the entity intends to fulfil the liability over time, but also reflects the value of the liability if the entity transfers it to another party.

"Orderly transaction"

Like it is stated by Mackenzie et al. (2012), "an orderly transaction is a transaction that assumes exposure to the market for a period before the measurement date to allow for marketing activities that are usual and customary for transactions involving such assets and liabilities; it is not a forced transaction (e.g. a forced liquidation or distress sale.)"

If the transaction is not orderly, there is not enough competitive tension and this may lead to potential buyers reducing the price that they are willing to pay for the asset.

"Market participants"

The market participants referred to in the definition of fair value are participants that buy and sell in the particular market involved, and it is assumed that these participants would behave in their best economic interest. As highlighted by Mackenzie et al. (2012), there are four main features that these market participants must have:

- Independence of the relevant entity;
- Knowledge – they must have sufficient information, as much as the reporting entity has, about the item and potential sale;
- Financial ability to enter a transaction for the item; and
- Willingness to enter the transaction, i.e., they must be motivated, but never forced or compelled to enter the deal.

When the entity cannot identify a potential profile of a buyer, as it happens in many intangible assets, an entity should construct a hypothetical market for the asset in which the item could theoretically be sold.

After a detailed analysis of the definition of fair value, it is relevant to clarify that fair value is not the same as value in use. As it is denoted by Hitz (2007), fair value measurement differs from value in use since it does not include entity-specific competitive advantages, such as private skills or private information.

II. d) Valuation Techniques

There are three valuation techniques that are accepted to measure fair value – market, cost or income approach – which are highlighted in IFRS 13. The only guideline given by the standards when it comes to choosing which technique to apply to measure the fair value is when active markets exist, in which the standards mandate that actual prices should be used (market approach). Otherwise, there is no prioritisation of which of the three techniques should be used. The choice of the technique is commonly constrained by the availability of inputs and their relative reliability. Thus all valuation techniques should be considered and the one that appears more appropriate should be applied. Like it is stated by Catty (2012), in some occasions, it may be applicable to use multiple techniques. Then, the management should weigh the several results and create a range of possible values, later identifying the fair value as the most representative point within that band, according to the specific circumstances.

Following one of the general features of IFRS, the entity must ensure consistency of presentation of financial statements. Like it stated in IAS 1.45, "an entity shall retain the presentation and classification of items in the financial statements from one period to the next". This is also valid for the choice of valuation technique - it should be maintained from period to period and consistent throughout the type of assets, unless any change implies that another technique is more appropriate. Any revisions of the fair value resulting from a change of valuation technique or its application are considered changes in accounting estimates, which will affect the reported amounts in the current and future periods.

Below, we can find a detailed description of each valuation technique, according to Catty, 2012:

***i) Market-approach*:** this approach uses information (such as prices) generated by transactions of assets and liabilities or a group of assets and liabilities which are identical or comparable to the one being valued.

ii) Cost-approach: this approach reflects the principle of alternatives, by reflecting the amount that would be required to duplicate, create or replace the asset for one that provided the same function and had the same utility. It is mostly applicable to the valuation of physical assets and some intangible assets, such as computer software.

iii) Income-approach: this technique is based on the principle of future benefits. Thus, it converts futures amounts into a single amount, by using models such as the discounted cash flows. It is the most commonly used since frequently there is not enough available information for a market-based valuation, and the cost-approach is not relevant to some asset categories such as the financial assets.

II. e) Fair Value Hierarchy

When measuring fair value, the entities use inputs, which are, in this context, the assumptions, the underlying data and the risk assessments used and made by the market participants. The inputs vary in terms of objectivity and the IASB established a three-tier hierarchy to classify the inputs, which is based on the extent to which these inputs are based on observable data. The IFRS requires the firms to maximise the use of level 1 inputs – relevant and observable inputs.

The three defined levels are, in order of reliability:

i) Level 1: Quoted prices that are not subject to any adjustment and that are observable, at the measurement date, in active markets for identical items.

ii) Level 2: Quoted prices for the item (other than those included in level 1) that can be directly or indirectly observable for substantially the full term. These inputs are quoted prices for similar items traded in active markets; or quoted prices for identical or similar assets or liabilities in inactive markets; or even inputs that are derived from observable market inputs.

iii) Level 3: Unobservable inputs that reflect the entity's judgment of the assumptions made by market participants when valuing an identical item. Level 3 inputs may include a reporting entity's own data and judgment. The use of accepted pricing methods for financial instruments and of a present value approach for other items is included in this level. Since it is the more subjective level of inputs, certain disclosures are required only for level 3 inputs.

II. f) Fair Value vs. Historical Cost

To be able to compare both methods of measurement, it is relevant to recall the definition of historical cost. Historical cost, as the name indicates, measures the items on the balance sheet by their cost. For example, an asset is recorded on the balance sheet with a value based on its nominal or original cost when it was acquired by the company. The fair value and the historical cost are the most common measurement methods and the situations under which they should be used are dictated in the IFRS.

After analysing the definitions of both fair value and historical cost, it is important to interpret the impact of using each of these measurements when analysing the financial statements. The table below summarises the "concepts behind fair value accounting and historical cost accounting", according to the view of Penman, 2007, by looking at the two extremes: all items valued at fair value *versus* all items valued at historical cost.

Table 1: Fair Value Accounting vs. Historical Cost Accounting

Fair Value Accounting	Historical Cost Accounting
The primary vehicle for conveying information about value to shareholders is the balance sheet.	The primary vehicle for conveying information about value to shareholders is the income statement.
Volatility in earnings is informative for value at risk, since unexpected earnings (a shock to value) report on the risk of the equity investment.	Earnings do not report shock to value, but shocks to trading in input and output markets.
The book value of equity reports the value of equity (i.e. the Price-to-book ratio equals 1,0).	The Price-to-book ratio does not typically equal 1,0.
The Price-to-Earnings Ratio (PER) is "Price/Shock-to-Value", since it represents a realisation of value at risk.	The PER takes current earnings as a base and multiplies it according to the forecast of future earnings.
Looking at the income, it is possible to evaluate the management in their task of adding value for shareholders.	Earnings measure the value creation by managers in arbitraging input and output markets (i.e. purchasing an input, transforming it according to the business model, and selling the consequent output over cost)

II. g) Pros and Cons of Fair Value

As referred previously, the increased use of this measurement concept is driven by the belief that it will improve the reporting quality of financial accounts and that the financial statements will become more transparent, meaningful and comparable. However, although the benefits of fair value are theoretically sound, its application and implementation, in practice, give rise to some doubts about the benefits that it generates. Thus, this sub-section will focus on discussing the advantages and disadvantages of fair value, in order to understand the arguments that are present by both proponents and opponents.

Penman (2007) enumerates several arguments that are usually present as the "pros" of fair value. These arguments are:

- Fair values reflect more up to date information, since historical prices become irrelevant in assessing an entity's current financial position with the passage of time.
- Fair values reflect true economic substance and fair value accounting reports economic income. The changes in balance sheet fair values yields income, reflecting the change in wealth.
- The information provided by fair value is more useful for investors, since they are concerned with value, not cost.
- Since fair value is market-based, it is not affected by entity's specific factors, so it represents an unbiased measure, consistent across entities and from period to period.

However, Penman (2007) and other authors question the validity of some of these arguments. We will now discuss the issues that are raised against fair value.

According to Hitz (2007), measurement perspective represents a traditional view on the information objective of financial reporting, and its notion is that "accounting should directly measure and report the basic information required by investors, which is the value of the firm, or at least a fraction of it". However, as the same author concludes, fair value measurement does not always reflect the full value of an item. Actually, it typically undervalues the firm because market values do not incorporate competitive advantages that result from specific intangible assets.

Another issue that is raised by the use of market prices is related with the efficiency of the markets (Penman, 2007; Sapra 2009). When the prices are inefficient, for example in market bubbles, these inefficiencies are brought to the balance sheet and the

associated gains are reflected in the income statement (Penman, 2007). This may not be a relevant problem for short-term holdings, but when it comes to long-term holdings, for example associated with pension funds, it may create false appearances that in the future will result in losses and in artificial volatility.

When there are no active markets and entities rely on valuation models, reliability concerns are raised. According to Hitz (2007) there is no sound theory for generalising the use of fair value to non-financial items such as intangibles and property, plant and equipment. In these situations, fair value becomes a "hypothetical market price". These hypothetical market prices may also give rise to the previously referred artificial volatility.

The issue of mismatching is referred by several authors (Hitz, 2007; Penman, 2007) as a criticism of fair value income (recognition of fair value gains and losses). Mismatching occurs when an asset is valued at fair value but the associated liability is not (or vice-versa). This leads to the recognition of a gain in the income statement, without reporting offsetting losses (or vice-versa). As a result, there is excess volatility in earnings.

However, those in favour of fair value income stress that these gains and losses reflect real economic volatility (Hitz, 2007). Additionally, they defend that the realisation of gains and losses based on objective market values serves as a way of reducing earnings management.

The matter of earnings management and managerial opportunism is also typically referred as a criticism to the use of fair value. Particularly when there are no level 1 inputs, firms have some "room" available to determine the fair value, and by changing some assumptions of the valuations, they are able to control, to some extent, the gains or losses that are recognised. This matter is discussed by Enria et al. (2004) when looking at the implementation of Accounting Standards regarding pension funds.

When measuring at fair value is an option, managers may also take into consideration the impact on earnings in their decision of which measurement method to use. In Avallone and Quagli's paper (2010), this is one of the issues analysed, by looking at a sample of European real estate firms and their decision of whether or not to use fair value as a measurement method for their investment properties, under IAS 40. The authors conclude that the choice between methods is actually influenced by the impact on earnings.

After looking to all these aspects regarding fair value, it is important to consider the opinion of the users of financial accounting information regarding the measurement concepts. A joint research project (Gassen and Schwedler, 2008), based on an online

survey, questioned a group of users - professional investors and their advisors - about their opinions concerning the competing financial accounting measurement concepts[6].

The main conclusions regarding the fair value "debate" were:

- This group is familiar with the two more common measurement concepts: historical cost and fair value. Other concepts are less well known, such as value in use.
- In general, investors favour the consistent application of fair value accounting for all items. However, when asked more specifically about the issue in terms of the types of assets and liabilities, this opinion does not hold.
    - Mark-to-market fair value (with level 1 inputs) is considered to be the most decision-useful measurement concept for liquid and non-operating assets.
    - No significant difference in decision-usefulness is regarded between historical cost and market-based fair value, when applied for non-liquid and operating assets.
    - Mark-to-model fair values is only regarded as more decision-useful than historical cost for financial assets. For the remaining classes of assets and liabilities, mark-to-model fair values are regarded as significantly less decision-useful than historical cost measures and market-based fair values.

After testing, the authors conclude that the sample is representative of "European professional investors and their advisors who have an interest in financial accounting matters".

These conclusions on the opinions of investors somehow reflect the main issue of the discussed pros and cons of fair value – the questionable reliability and usefulness of the fair values that are not based in observable market prices.

II. h) Fair Value in the Recent Crisis

Several authors, such as Mackenzie et al. (2012), refer that the expanding use of fair value for accounting measurements raised several critical commentaries, and during the recent economic turmoil in credit market this debate has increased even more, since several have referred the increased mandatory use of fair value in financial reporting as a factor that exacerbated the turmoil. The chairman of Forbes Media, Steve Forbes, even

[6] The online survey was based on a sample of 242 valid observations and the respondents are financial analysts, fund managers, institutional investors and rating experts from different countries. 10 countries had more than 10 respondents: Sweden (58), Germany, (43), Switzerland (41), Italy (20), Norway (12), the U.K. (12) and Spain (11).

stated that he believes fair value accounting was the "principal reason" for the meltdown of the U.S. financial system, according to Pozen (2009). According to the same author, the opponents of fair value, including many bankers and politicians, argue that the use of "mark-to-market" accounting led to much insolvency, since it pushed underperforming assets' prices down. This forced the banks to sell their assets at low prices, pushing the values to an even lower level.

On the other hand, there are still those which defend fair value accounting. Poznen (2009) mentions that in *Texas* magazine, an accounting professor at the University of Texas, Lisa Koonce, wrote: "This is simply a case of blaming the messenger. Fair value accounting is not the cause of the current crisis. Rather, it communicated the effects of such bad decisions as granting subprime loans and writing credit default swaps… The alternative, keeping those loans on the books at their original amount, is akin to ignoring reality." This view is shared by others, including the investment advisory group of the FASB.

A detailed analysis of the impact of financial reporting by banks in the financial crisis was conducted by Barth and Landsman (2010) and concluded, as others previously did, that "fair value accounting played little or no role in the Financial Crisis". The same authors, however, mention that the transparency of information related to, and disclosed about, asset securitisations and derivatives was probably not enough for a proper assessment of the values and riskiness of the affected assets and liabilities from the investors. Additional measures to improve the disclosures of fair value related assets, particularly regarding banks, have been taken by the IASB and FASB since 2008 to provide the investors with the ability to correctly assess the risks related to the assets to which the banks are exposed to.

II. i) IFRS 2 - *Share-based Payment* – Overview[7]

Until the issuance of IFRS 2 in 2004, which became effective in January 2005, there was no guidance under IFRS on how to recognise and measure transactions that involved share-based payment, where employee share-based compensation is included. Given the increasing relevance of share-based payment transactions in several countries, the prior lack of guidance raised concerns.

A share-based payment transaction is, according to IFRS 2, a transaction in which the entity receives goods or services from the supplier of those goods or services

[7] This section is based on the version of *International Financial Reporting Standard 2 – Share-based Payment* that includes amendments resulting from IFRSs issued up to 31 December 2010, the version of IFRS 2 that was effective during the writing of this dissertation (February to May, 2012)

(including an employee) as a consideration for its equity instruments, or incurs in a liability with the supplier of goods or services of an amount that is based on the entity's equity instruments. Under the scope of this IFRS are items such as share appreciation rights, employee share purchase plans and the most relevant instrument for this dissertation – share option plans provided to employees.

The share-based payment accounting treatment depends on whether the transaction is settled by issuing equity, cash, or equity and cash:

- equity-settled share-based payment transactions, occur whenever an entity receives goods or services as a consideration for equity instruments of the entity (including shares or share options);
- cash-settled share-based payment transactions, is a transaction where the entity acquires goods or services and incurs in liabilities to the supplier of the goods or services for an amount that is based on the price of the entity's share or other equity instruments of the entity; and
- equity/cash –settled share-based transactions, occur when the entity (as the receiver of goods or services) or the supplier of goods and services has a choice of whether the transaction is settled in cash or by issuing equity.

Despite this distinction, the general rule is that all share-based payment transactions must be recognised at fair value and the recognition of an asset or expense is made when the goods or services are received. In IFRS 2, the definition of fair value is the following "the amount for which an asset could be exchanged, a liability settled, or an equity instrument granted could be exchanged, between knowledgeable, willing parties in an arm's length transaction". If a share-based payment is made to employees, the transaction must be measured according to the fair value of the equity instruments at the grant date, since the estimation of the fair value of the services provided by employees is typically not estimated with reliability.

The guidelines provided by IFRS 13 on how to measure fair value do not apply for IFRS 2. Actually, IFRS 2 provides an extremely detailed explanation on how to measure the most common type of share-based payment transaction – the equity-settled share-based payment transaction that is paid to employees, typically in the form of employee share options, the main subject of this dissertation that will be further discussed in the following chapters.

III. HOW TO CALCULATE THE FAIR VALUE OF EMPLOYEE SHARE OPTIONS?

Since 2005, the recognition of employee share options is mandatory under IFRS 2 – *Share-based payment*. Although the need for recognising this transaction in the financial statements is acknowledged by most users of financial information, the valuation of share-based payments has raised several criticisms.

This section will discuss the concept of employee stock options and the need for expensing; how they differ from common stock options and how they must be valued under IFRS.

All the analysis will set the grounds for our case in the next section – the detailed analysis and presentation of alternative fair value measurements for Nestlé's employee share options, according to its financial statements from the year of 2011.

III. a) Employee stock options and the need for expensing these instruments

Employee stock options (or employee share options) are call options issued by a company on its own stock, given to its employees as part of their remuneration (Hull, 2009), meaning that the employees will have the right to buy shares of the company at a predetermined price, under specific conditions, determined at the time of the issuance of the stock options. This type of share-based compensation is issued by public companies to its employees, typically executives, in order to align the incentives of management and those of shareholders, motivating the former to act in the best interests of the latter. As holders of stock options, the employees are more motivated to increase the share value, since they have a sense of ownership towards the company's shares, and since they will also benefit from an increase in share value.

With the increased demand for accountability of executive remuneration packages, the need to expense the fair value of stock options emerged. FASB was the first to issue, in 1995, a standard (SFAS 123) that mandated the disclosure of the option value, but the expense of the fair value of the ESO was voluntary. In 2004, both the IASB and the FASB issued standards that mandated the expense of the fair value of share-based compensation, which include shares or rights to obtain shares. However, this change in the accounting rules introduced by IFRS 2 – *Share-based Payment* and by SFAS 123 (R) – *Share-based Payment* raised controversies.

There were those that defended that ESO should not be expensed because they do not actually cost money to the company and that if these options are converted into shares, the issuance of shares is not a cash outflow, as mentioned in Henderson, 2011.

Actually, when exercised, share options raise money for the company since the holder of the option – in this case, the employee – must pay the predefined exercise price. It is also defended by some that the impact this compensation has on the results is already reflected when diluted Earnings per Share are calculated (if any of the options are in-the-money, these options have dilutive effect since companies will have to issue shares, increasing the number of shares outstanding).

Conversely, the proponents of expensing ESO argued that, as any other form of compensation, they should be expensed, like Huddart and Lang (1996) highlight. This is particularly relevant if we consider that ESO represent a significant percentage of total executive compensation. Among the S&P 1500 firms, the use of this compensation form reached its peak in 2001, representing 40% of the total CEO compensation (Lord and Saito, 2010). According to the same source, since then, with the burst of the dot.com bubble, the more strict Corporate Governance guidelines implemented by the Sarbon-Oxley and the introduction of the SFAS 123 (R), its use is in decline and accounted in 2007 for "only" 20% of total CEO remuneration.

Another reason to mandate the expensing of employee share options arose by the will to reduce the number of options granted. Several companies' scandals, such as the Enron case, were partially caused by a will to inflate the results and by the fact that, similarly to shareholders or potential shareholders, managers were (too) motivated to increase the share price, since they would also benefit from it. Through the expensing of ESO, companies would probably be less generous with the options granted (in fact, after the standard's implementation there is evidence suggesting that this method of compensation became less popular, as stated by Hull, 2009) and management's incentive to "boost" the income would be reduced. Additionally, although the issuance of shares that occurs at the exercise date is not a cash outflow, it is a cost for the company (the cost associated with the transaction established between the company and its employees), therefore it should be reflected in the Income Statement.

An additional criticism raised against the share-based payment standards is related with the calculation of the option value, since the standards set the mandatory disclosure of the fair value of the options, as opposed to their intrinsic value. Since virtually all the employee share options cannot be traded, there is always a need to calculate the fair value of these instruments through the use of models. IFRS 2 allows the disclosure of the intrinsic value instead of the fair value only in extremely rare cases where the calculation of the fair value is not reliable.

An option only has intrinsic value when it is "in-the-money", since its intrinsic value is the amount by which the current share price (market value) exceeds the strike

price. The possibility of recording the ESO at their intrinsic value was previously allowed by the standards until 2004 and it was appealing for the companies, since most ESO are granted with an exercise price equal to the current market price ("at-the-money" option), hence having no intrinsic value when granted.

The estimation of fair value requires the use of valuation models, given the inability to obtain a similar instrument elsewhere. The inputs of these models rely on numerous assumptions and, therefore, can produce a range of possible values instead of a single definite value. Although these values are not 100% reliable, proponents of fair value argue that it is still better to have an estimated value than having no value at all.

III. b) Factors that influence the option value

A typical call option on a share gives its holder the option, but not the obligation, to buy the share at a predetermined price at a certain date (European Option) or from issuance until that certain date (American Option). The holder will only have the incentive to exercise its right if the exercise price is lower than the current market price, so that he/she is able to acquire a share by an amount lower than its current value. Typically, these options can be sold to other individuals and their value is dependent on several factors. These factors and the effects of a change in one of them, with all others remaining constant, are analysed below[8]:

- Exercise Price/Strike Price (X) – It is the price at which the option-holder has the right to buy the share. The lower the strike price, the higher the value of the option, since it increases the payoff of the option (the difference between the current market price and the strike price).
- Current Market Price (S_0) – The higher the market price, the higher the value of the option.
- Volatility of the stock price (σ) – Volatility reflects the uncertainty about the price movements of the stock in the future. Thus, if volatility increases, the chances of the stock performing very well increases (i.e. its value increases), as well as the chances of performing badly. For a call-option holder, the benefits of a price increase are much more than the costs of a price decrease, since, at most, the holder loses the price paid for the option.
- Amount of future dividends – Dividends reduce the stock price on the ex-dividend date, hence reducing the value of a call option.

[8] Insights extracted from *Options, Futures and Other Derivatives,* 7th Edition, Hull (2009)

- Risk-free interest rate (*r*) – An increase in interest rates leads to an increase in the call option value. The increase in the interest rates tends to be reflected by an increase in the return required by investors on the stock. Plus, the present value of future cash flows received by the holder of the option decreases. The combined impact of these effects increases the value of a call option (Hull, 2009).
- Time to expiration (*T*) – For an American Option, the greater the time to expiration, the greater the value, because its owner has more exercise opportunities available when compared to the owner of a shorter time to maturity option. The effects of time to expiration in European Options are not necessarily the same. Usually European options are more valuable, the higher the time to expiration. However, specific events may change this. For example if a company intends to pay a dividend at time N, the value of the option at time N+1 will be lower than the value of the option at N-1, all else being equal.

III. c) Specificities of employee stock options

After looking at the main characteristics of a call option, it is necessary to understand what makes employee stock options different from "plain-vanilla" options. Below we will discuss the main specificities of this share-based payment.

i) Vesting conditions

The IASB defines vesting conditions in IFRS 2 as:

"The conditions that determine whether the entity receives the services that entitle the counterparty to receive cash, other assets or equity instruments of the entity, under a share-based payment arrangement. Vesting conditions are either service conditions or performance conditions. Service conditions require the counterparty to complete a specified period of service. Performance conditions require the counterparty to complete a specified period of service and specified performance targets to be met (such as a specified increase in the entity's profit over a specified period of time). A performance condition might include a market condition" [IFRS 2.A]

A market condition is a condition that relates to the company stock price, for example achieving a determined price or a determined return on the stock (IFRS 2.A).

The vesting conditions are associated to a vesting period, during which these conditions must be satisfied, which typically lasts several years. It is only after this period and after having satisfied the conditions that the employees become entitled to the option. As a result, although the options are granted at a certain date, it is only after the vesting period that the holders have the possibility to exercise their right to purchase the shares until its expiration (assuming that the options are American, as the majority of ESO are).

If they are not met within the predefined period, the employees lose the option to buy shares. In these situations, the options are forfeited.

ii) Continued employment requirement

A typical feature of employee share options is that there is a "continued employment requirement" (Ernst & Young, 2012). If the options have already vested when the holder terminates his/her employment for the entity, in principle the employee will be forced to exercise them within a short period of time, or even immediately. This eliminates the time value[9] component of the option, which lowers its value. If the employees terminate their employment before the options have vested, typically these ESO are lost.

iii) Non-transferability and limited ability to hedge option values

Most employee stock options cannot be traded, whereas ordinary share options can. Additionally, option holders can eliminate their exposure by taking a *short position* in a contract with the same terms that eliminates the current position. ESO's holders are prohibited to trade these instruments and typically they cannot find similar contracts "in the markets" in which they could take a *short position*, given the specificities of these sort of contracts and the long time to maturity when compared to call options commonly traded in exchanges or OTCs[10]. This limits the ability of the employee to use an ESO to satisfy any liquidity need by any mean other than by exercising its right.

Employees usually have limited ability to trade shares of the entity to which they work and own ESO. To hedge the exposure to the employee share option, a possibility could be to short-sell the shares of the entity, but employees may not be allowed to do this. Even if the employees were allowed to trade shares of the firm, it would be negatively perceived by the market because it would be as if the employees were betting on a decrease in the share price.

The inability to sell their ESOs and to short-sell the underlying shares is pointed out by Huddart (1994) as a suggestion that the employees are entirely exposed to the risk of these compensation instruments. This two features of ESO lead to an early exercise of the option, because, in most situations, it is the only way the holders have to eliminate their exposure and to monetise value. The early exercise of the option leads to a lower option value, given that it loses its time value.

Empirical studies, such as Hemmer et al. (1994) and Huddart and Lang (1996), confirm that ESO tend to be exercised early. Hemmer et al. (1994) suggest that the

[9] Time value is the value of an option that arises from the time left to maturity and is affected by the interest rate, the volatility and the dividend yield of the underlying share.
[10] Over-the-Counter

likelihood of early exercise is higher for options with higher volatility. Huddart and Lang (1996) suggest that the exercise is spread over time and that it is difficult to predict exercise behaviour by looking at comparable firms.

iv) Periods during which exercise is restricted

Although employee stock options can be exercised any time from vesting date until expiration of the option, this type of stock options may be subject to "blackout" periods. During these periods, the holders cannot exercise their options. This is a common particularity of an ESO contract, for different purposes such as to prevent insider trading.

v) Dilution effects

In a typical call option arrangement with a share as the underlying asset, upon exercise of the option, the writer of the option (the one with the *short position*) delivers the share to the option holder. The writer must own the share, for example by having bought it in the market.

In an ESO arrangement, the writer of the option is the entity itself, therefore when the employee exercise the rights, the entity must issue new shares (or use treasury shares or shares previously repurchased). This has an incremental effect on the number of shares outstanding, having a dilutive effect for the shareholders.

Additionally, the shares are issued at the exercise price and not the current market price. This "puts pressure" in the share price, possibly causing a decrease in its value. If the share price actually decreases, the employee who exercises the option makes a smaller gain than if he owned a similar traded option.

However, it is defended by some that the market anticipates this dilution effect so it is already reflected in the share price, avoiding the need to adjust the ESO valuation to incorporate it.

After considering all these factors, we can understand why the valuation of ESO must differ from the valuation of "plain-vanilla" call options. The main reason is that the former have several factors that tend to reduce their value when compared to the latter. Ikäheimo et al. (2006) used a unique data set of ESO[11] to prove that this particular kind of call options have a lower value than their valuation under a traditional option pricing model (the Black and Scholes). Their research concluded that the value of the options in their sample was 14,8% lower than the value provided by this model.

[11] In Finland, the ESOs can be traded at the Helsinki Stock Exchange. This allowed the researchers to have access to the market valuation of the options and compare it to their Black and Scholes' value.

This proven difference enforces the need for adjusting the option pricing models to incorporate in the estimation of the fair value of employee stock options their particularities. The guidelines of IFRS 2 on how to do so are discussed in the sub-section *III. e) How does IFRS 2 account for employee share options and its specificities?*

III. d) Option-pricing models

Given that there are virtually no traded options that mirror the terms included in a share option granted to employees, IFRS 2 requires the fair value of the options to be estimated using an option pricing-model. According to IFRS 2.B5, "the entity shall consider the factors that knowledgeable willing market participants would consider in selecting the option pricing models to apply".

The IASB does not require the use of a specific pricing-model. The only guideline given is that the model must take into account the factors referred in III. b), as all recognised option-pricing models do. In IFRS 2, both the Black-Scholes-Merton (BSM) and the binomial model are referred to as examples of acceptable models.

We will, therefore, focus on the two most common option-pricing methodologies used:

- the Black-Scholes-Merton formula; and
- the binomial model (included in the general Lattice models).

i) Black-Scholes-Merton

The Black-Scholes-Merton formula is commonly used to assess the value of traded options. This model is computed for a European call option, although the majority of ESO are American options. American options on dividend-paying shares generally have a greater value than European options on the same share, since the holder of the option can decide the timing of exercise.

BSM is a "closed-model", since it produces a single valuation at one point in time from an equation, with no ability to change some assumptions during the life of the option. The original model developed by Black and Scholes was not suitable for a dividend paying share, but, with Merton, adjustments were made to the model and the one presented in Exhibit 1 considers a constant dividend yield throughout the life of the option.

Although the application of the formula is quite easy, it is difficult to incorporate some specificities of employee share options in the calculations. Volatility, interest rates, dividend yield and share price are assumed as constant throughout the life of the option, which is less appropriate for a long-term option, such as an ESO, than for short-term options. Another issue is the fact that the formula assumes a fixed maturity date and, as

previously discussed, ESO tend to be exercised before the maturity of the option. Thus, the *T* factor does not adequately describe exercise behaviour. The fixed exercise date of the formula also precludes the possibility of incorporating the blackout periods on the value computation. Last but not least, the BSM also does not allow for the consideration of vesting conditions.

This model presents several limitations at a first glance, but it can actually be adjusted to incorporate expected early exercise (as further explained in III. e)). Although it cannot incorporate changes in the parameters throughout the life of the option or incorporate blackout periods, the prediction of these factors is of extreme difficulty and is typically not done. In the end, most companies do not have enough information to be able to benefit from the use more complex models, therefore ending up using the BSM.

ii) Binomial model

The binomial model is one of the Lattice models, which value financial instruments through a flexible and iterative approach. According to Ernst & Young (2012), "a binomial model produces an estimated fair value based on the assumed changes in prices of a financial instrument over successive periods of time". The model assumes that at least two price movements are possible in each time period.

The underlying concepts of the binomial model and the BSM model are the same, but the main difference is that the binomial model is more flexible because it can use dynamic assumptions, such as the volatility, dividend yield and interest rates, which can be adjusted throughout time. Further details can be included in the lattice models so that it is more suitable to value an employee stock option, such as the likelihood of early exercise increasing with the increase in the option intrinsic value.

Another issue that the binomial model can incorporate is the existence of market conditions, such as a requirement that the option can only be exercised if the price of the underlying shares reaches a certain quote. This is a feature that generally cannot be computed into the BSM model.

The binomial model is implemented by the construction of a "tree" where the branches represent alternative future share price movements. Each branch represents a time period. The probability of the underlying share going up or down by a certain amount is computed, taking into consideration the same inputs as the BSM model.

The ability to depict a significant number of possible future share prices over the life of the option is one of the advantages of a Lattice model. Additionally, a significant advantage of the model is that it is suitable for the "American" feature of ESO.

Although these models can incorporate the specificities of employee share options, typically the entities lack the necessary data and forecasts to be able to profit from its advantages. For example, the fact that the inputs can be adjusted throughout time is a benefit of the model, but commonly, at the grant date, firms cannot predict the evolution of the inputs during the period until maturity.

III. e) How does IFRS 2 account for employee share options and its specificities?

After understanding how the fair value of employee share options can be determined, it is essential to know what are the requirements established by IFRS 2 and how this standard suggests that the pricing models be adjusted in order to accommodate the specificities of ESO.

i) General guidelines

Employee stock options are equity settled share-based payment transactions, as discussed in II. i). According to IFRS 2, the entity must recognise this type of transaction as the services are received by recognising an expense and the corresponding increase in equity (IFRS 2.7-8). The recognition of an expense, instead of an asset, occurs because the type of service provided by employees does not qualify as an asset.

The fair value of the services provided by employees should be measured at the grant date[12] by reference to the fair value of the equity instruments granted, given the difficulties to measure accurately the value of the services received (IFRS 2.11-12).

Most share options granted are subject to vesting conditions and to a related vesting period. Whenever this period exists, an entity must account for the services rendered during the vesting period, for example "If an employee is granted share options conditional upon completing three years' service, then the entity shall presume that the services to be rendered by the employee as consideration for the share options will be received in the future, over that three-year vesting period" [IFRS 2.15.a)].

If the vesting condition is a performance condition and there is no specified period of completion of that condition, the entity must, at the grant date, estimate an expected vesting period, based on the most likely outcome of the performance condition (IFRS 2.15.b)).

[12] Grant date – "The date at which the entity and another party (including an employee) agree to a share-based payment arrangement, being when the entity and the counterparty have a shared understanding of the terms and conditions of the arrangement. At grant date the entity confers on the counterparty the right to cash, other assets, or equity instruments of the entity, provided the specified vesting conditions are met. " [IFRS 2.A]

When there are neither vesting conditions, nor vesting period, the entity must recognise the full amount of the expense at the grant date (IFRS 2.14), although this is typically not the case for employee share options.

Whenever the fair value of the equity instruments granted can be measured reliably, the entity must use a valuation technique that is "consistent with generally accepted valuation methodologies for pricing financial instruments, and shall incorporate all factors and assumptions that knowledgeable, willing market participants would consider in setting the price" [IFRS 2.17], as previously mentioned. The entity must disclose the model used, the inputs and the assumptions made to measure the fair value of the ESO.

Between the grant and the vesting date, i.e. during the expense allocation period, the entity can adjust the annual amount expense to reflect changes in forfeiture behaviour. On the vesting date, the amount of ESO estimated to be outstanding must be revised to reflect the number of ESO that actually vested (IFRS 2.20).

However, after the vesting date the entity must not make any subsequent adjustment to the amount considered as the fair value (IFRS 2.23) or to the associated expense, except if the terms under which the ESO were granted are modified. If so, the entity must recognise these changes in case they lead to an increase of the total fair value of the transaction or are beneficial to the employee (IFRS B.42). Otherwise, i.e. if the modification reduces the total fair value, the entity must account for the services provided by the employees as if the modification had not occurred (IFRS B.44).

These are the general rules that apply to the measurement and recognition of ESO. Now, we will discuss how IFRS 2 allows the incorporation of the specificities of this remuneration method on the calculation of the amount to be expensed by the entities, by looking at the features that were previously discussed and for which this standard provides guidelines.

ii) Vesting conditions

IFRS 2 states that vesting conditions, other than market conditions, should not be considered directly when measuring the fair value of a share option. The consideration of the vesting conditions should be made when calculating the total amount to be expensed, through the adjustment of the number of equity instruments included in the measurement of the transaction. This implies that the amount recognised (representing the goods or services received) must reflect the equity instruments that will eventually vest.

The estimation of the number of equity instruments should be "the best estimate" and it should be revised whenever subsequent information indicates that the number is different from the previous estimate (IFRS 2.20).

Usually, entities estimate a forfeiture probability (probability of the share options not vesting) based on the observation of previous share options issues of the same company under similar conditions. With this rate, the cumulative amount to be expensed is:

fair value of one ESO x (1- forfeiture rate) x number of ESO granted

(in a simplistic situation where all ESO contracts were similar and, thus, were priced at the same amount).

If the vesting conditions are market-based, they should be considered when estimating the fair value of the share option (IFRS 2.21). However, IFRS 2 does not provide any specific guidelines on how to account for these conditions. It may require more sophisticated models, for example the use of the binomial model where a minimum return on the share is required for exercisability (as discussed in III. e)).

iii) Blackout periods

If the model used considers that the option can be exercised at any time during its life, the blackout periods must be taken into account. Otherwise, no adjustment is required. (IFRS 2.B8)

Comments:

Although IFRS 2 suggest that this should be taken into account, there are no guidelines on how to do it. A possible way to do it when using the binomial model is to consider some dates as moments when the option cannot be exercised (even if it is in-the-money). However, not only is it difficult to incorporate such detail in the computation of the fair value, but also there are several situations that can lead to blackout periods that cannot be predicted at the grant date (for example an acquisition announcement that was not planned at the grant date).

iv) Specific inputs to ESO pricing models

- ***Expected early exercise (IFRS 2.B16-B.21)***

  The issue of early exercise was already discussed in previous sections. IFRS 2 adds other possibilities for this phenomenon: lack of wealth diversification and risk aversion.

  The way of taking this factor into account depends on the model used. In the BSM Model, the input "time to maturity" can be replaced by an expected life of the option (period between grant date and the expected exercise date of the option).

Early exercise can also be factored into the more flexible models, such as the binomial.

When estimating the expected life of the option, the entities must consider factors such as:

- the length of the vesting period, since the options are only exercisable after this period ends;
- similar options exercise patterns;
- the price of the underlying shares;
- the employee's seniority level within the organisation;
- expected volatility of the underlying shares, since employees tend to exercise their right earlier when shares are more volatile;

Comments:

The employee's level within the organisation is believed to affect the exercise behaviour due to factors like liquidity needs and risk aversion (employees are expected to have lower liquidity needs and be less risk averse, the higher their level within the organisation, according to Huddart and Lang, 1996). An additional factor that is pointed out by these authors is that high-level employees' actions have more visibility, which "may limit their willingness to exercise options early for perceived loyalty issues".

The existence of a particular contractual term also affects the expected life, and we believe it should be considered when estimating this input. For example, most ESO contracts include a term stating that the options expire in the case of major changes in corporate structure, such as a merger. The expectations about such events condition the expected life of the option.

Although the replacement of the input "time to maturity" by "expected life of the option" is an improvement, it still lacks reliability since empirical studies (Huddart and Lang, 1996) suggest that the early exercise is not condensed in a specific period and that it is difficult to extrapolate the mean exercise time from past grants.

- ***Expected volatility***

  When calculating the expected volatility of the return on the underlying share, it is important to consider (IFRS 2. B25):

  - Implied volatility from traded share options on the entity's shares (or from other traded instruments such as convertible debt);
  - Historical volatility - It is usually measured for the same period as the expected life of the option (for example, if an ESO has 5 years of expected

life, volatility will be measured based on the evolution of the share price over the last 5 years).

- The length of time an entity's shares have been publicly traded – Recently listed entities might have a high historical volatility compared to peer companies that have been listed longer.
- Mean-reverting-tendency – There is a tendency of volatility to revert to its long term average, which may be an indication that expected future volatility is not in line with past volatility.
- Appropriate and regular intervals for price observations – There should be consistency in the measurement of price observations, from period to period.

Comments:

Implied volatility reflects market expectations for future volatility, since it is extracted from traded share options. The difficulty of using the implied volatility as the expected volatility is that traded share options are typically short term and, thus, reflect a much shorter period than ESO.

Using solely historical volatility is assuming that the past behaviour reflects the future share behaviour, which is not necessarily true, especially in situations where there were significant changes in the entity's business and context.

Although all the factors mentioned above are helpful and must be considered when estimating expected volatility of the shares, unfortunately there is no single right way to do it. Taking all of them into consideration will probably create a range of possible results, giving managers the ability to choose one justifiable value, which may or not be used to favour them.

- ***Expected dividends*** *(IFRS 2.B31-36)*

  This should be factored into the option pricing model if the employees are not entitled to receive the dividends on the share options before the exercise, which is the most common situation. As previously discussed, the dividends reduce the value of the share option by the present value of the expected dividends at the grant date. The introduction of this factor can be made either through an expected dividend yield (dividend as percentage of share price) or through expected dividend payments. When using the latter, the entity must look at its historical patterns to estimate the dividend amount, when available (for example, some companies may be newly listed).

Comments:

An issue that is not referred to by the IASB in this standard is the fact that disclosing the expected dividend yield/amount for a period as long as the one in a share option contract (may reach 10 years, or even more) is disclosing more information to investors than entities usually do or may be entitled to do. The release of long term expectations on dividends may be seen as guidance and may create expectations on investors and raise concerns on the release of sensitive information.

- ***Risk-free interest rate*** *(IFRS 2.B37)*

  The risk-free rate that must be used in the calculation of the Fair Value of an ESO is the implied yield currently available on the zero-coupon government issues of the country in whose currency the exercise price of the share option is expressed. The remaining term of this coupon issues must be equal to the expected life of the option under valuation. If such government issues do not exist, are not representative or are not typically considered by market participants, an appropriate substitute should be considered.

v) Capital structure effects

The dilutive effect of ESO on the capital structure is highlighted by IFRS 2.B41 as a factor to be considered when estimating the fair value at grant date. The significance of this effect depends on numerous factors (including the number of new shares issued upon exercise *versus* the current number of shares outstanding). The standard indicates that the entity must evaluate if the effect is significant and, if so, adapt option pricing models to take into account this potential dilutive effect.

IV. CASE STUDY

IV. a) The Company – Nestlé

Nestlé is a leading Swiss-based company operating in the Nutrition, Health and Wellness sectors, offering a wide range of products dispersed in several geographies. The company's mission is "Good Food, Good Life"[13] and its objectives are "to be recognized as the world leader in Nutrition, Health and Wellness, trusted by all its stakeholders, and to be the reference for financial performance in its industry"[11].

The company has a product portfolio ranging from baby food (with brands like Cerelac and Nestum), to cereals (Chocapic, Estrelitas), coffee (Nescafé, Nespresso) and even Pet Care (Friskies, Purina). For more details on the brand portfolio, please refer to Exhibit 2. Among these brands, there are global ones, but also local ones, adapted to the culture and tastes of a specific geography. For this local knowledge and proximity to consumers and suppliers, the company has established itself in almost every country in the world. In 2011, its sales were geographically divided in three main areas: 24% in Asia, Oceania and Africa, 31% in Europe and 45% in the Americas.

Nestlé S.A. has publicly traded shares, listed on the SIX Swiss Exchange, and the historical price evolution can be observed in Exhibit 3. In 2011, Nestlé recorded consolidated sales of CHF 83.642 million, 10,1% less than in the previous year. Trading Operating Profit reached CHF 12.538 million (-15,5%) and Net Income amounted to CHF 9.804 million (-72,3%). In the table below, we can see the evolution of the main financial indicators.

Table 2: Financial Indicators of Nestlé S.A.

	2011	2010	2009	2008	2007	2006	2005	2004
Sales (in millions of CHF)	83.642	93.015	107.618	109.908	107.552	98.458	91.075	84.690
Trading Oper. profit (in millions of CHF)	12.538	14.832	15.699	15.676	15.024	13.302	11.720	10.760
Net Income (in millions of CHF)	9.804	35.384	11.793	19.051	11.382	9.849	8.518	7.031
Basic EPS (in CHF)	2,97	10,16	2,92	4,87	2,78	2,37	2,06	1,70
DPS (in CHF)	1,85	1,60	1,40	1,22	1,04	0,90	0,80	0,72
DPR (%)	62,3%	15,7%	47,9%	25,1%	37,4%	38,0%	38,9%	42,4%

Notes:
- EPS - Earnings *per* Share; DPS - Dividends *per* Share; DPR - Dividend Payout Ratio;
- Effective 30 June 2008 the company made a 1-for-10 stock split. For comparative analysis, the values were adjusted to reflect the stock split.

Sources: Consolidated Financial Statements of the Nestlé Group (2011 to 2004) and Bloomberg

[13] Extracted from Nestlé's corporate website (www.nestle.com), "About us" tab, visited in April 30, 2012

EBITDA has remained in the CHF 10.760-15.699 million range during the period in analysis (2004-2011). The Net Income figure presents higher volatility, mostly due to extraordinary items arising from Nestlé's divestitures in some businesses, for example the sale of Alcon to Novartis in 2010[14].

IV. b) Employee stock options in Nestlé

Nestlé selects some groups of employees as eligible to receive equity compensation plans, as a long-term incentive. The firm has four different plans:

- Management Stock Option Plan (MSOP) for members of the Executive Board (14 members as of 31 December 2011;
- Performance Share Unit Plan (PSUP) also for members of the Executive Board;
- Restricted Stock Unit Plans (RSUP) for members of Group Management; and
- Share Appreciation Rights (SAR) for members of Group Management, as well.

Depending on the way they are settled, these plans can be either accounted for as equity-settled (by remittance of Nestlé S.A. shares) or as cash-settled share-based payment transactions (by the payment of an equivalent amount in cash).

We will focus our attention in the MSOP, since it is the one that entitles the employees covered by this plan with employee share options. Once a year, it provides the awarded members of the Executive Board non-tradable options on Nestlé S.A. shares, giving them the right to purchase, at the exercise price, one Nestlé S.A. share for each option owned.

The vesting period of the stock options is of three years after the grant date. Upon vesting, the options can be exercised for a period of four years, from the vesting date until the expiration date.

In 2011, the total amount expensed under this plan (under continuing operations) was of CHF 9 million, an amount similar to the one registered in 2010. If we look at the overall cost of CHF 179 million registered in 2011 as share-based payment costs (both equity and cash settled transactions), we can conclude that this is not the most common form of rewarding the employees through share-based transactions, representing only 5% of the total cost. In Exhibit 4, we can find the cost of these transactions with more details.

However, the amounts are certainly relevant for the Board's executives that receive the compensation. In 2011 alone, Paul Bulcke, CEO of Nestlé, received 361 thousand stock options, valued at CHF 1 999 940, representing more than 20% of his total annual compensation. A total of 3,5 million stock options were held by Executive Board members of Nestlé in 2011, from different yearly grants. Nestlé believes this is one of the ways of

[14] In 2010, Novartis exercised its call option to acquire the outstanding capital from Novartis that belonged to Nestlé.

"paying for performance" and to ensure "alignment with long-term company strategy and shareholder's interest".

The table below is provided by Nestlé in their Annual Report, disclosing the evolution of the ESO during 2011 and 2010, looking both at the weighted average exercise price and at the number of options.

Table 3: Management Stock Option Plan – Weighted average exercise price and the number of options

	2011	**2011**	**2010**	**2010**
	Weighted average exercise price (in CHF)	Number of options (millions of units)	Weighted average exercise price (in CHF)	Number of options (millions of units)
Outstanding at 1 January	42,16	8,3	35,37	15,4
Granted	52,58	1,4	53,29	1,6
Exercised	32,85	(1,8)	32,12	(8,7)
Forfeited	-	-	-	-
Outstanding at 31 December	**46,25**	**7,9**	**42,16**	**8,3**
Of which exercisable at 31 December	43,38	2,7	37,10	3,7

Source: Consolidated Financial Statements of the Nestlé Group 2011 – Note 11.2

Focusing on 2011, we can see that although 1,4 million of options were granted, the number of outstanding options decreased since the beginning of the year, due to the amount of options exercised (1,8 millions). A factor that pops-out is the inexistence of options forfeited in both periods (at least when rounded to millions of units).

Nestlé uses the Black-Scholes-Merton model to estimate the fair value of the options granted. At the grant date, 3 March 2011, the options granted had an estimated unit fair value of CHF 5,54. The inputs for the BSM formula considered by Nestlé can be accessed in the table below.

Table 4 - Management Stock Option Plan – Inputs for the BSM assumed by Nestlé

	2011	**2010**
Market price of Nestlé S.A. shares (at the grant date)	CHF 52,60	CHF 53,85
Exercise price	CHF 52,58	CHF 53,29
Expected volatility	18,42%	19,05%
Expected dividend yield	3,52%	2,97%
Risk-free interest rate	1,59%	1,54%
Grant date	03/03/2011	05/03/2010
Expiry date	02/03/2018	04/03/2017

Source: Consolidated Financial Statements of the Nestlé Group 2011 – Note 11.2

When issuing employee stock options for the MSOP, Nestlé S.A. defines the exercise price upon the average market price of its shares of the last ten trading days that precede the grant date. Just by looking at the exercise price of the options granted in both years, we can see that the share price close to the grant date in 2011 (3 March 2011) was slightly lower than the share price on the homologous period in 2010, suggesting that the price evolution from one year to the other was not significant. This can be confirmed by looking at Exhibit 3 – Nestlé S.A. share price evolution.

The company does not provide all the contractual information about the ESO, such as details on the existence of vesting conditions or blackout periods.

IV. c) ESO – alternative fair value estimations

After having analysed the company and its stock option plan in more detail, we believe this detailed data can be used to support our discussion regarding the measurement of the fair value of employee stock option. Nestlé's fair value estimations were done at the grant date (03.03.2011). To ensure comparability, our analysis will be made with reference to this same date.

In this case study, we will question Nestlé's assumptions and provide alternative pricings for the employee share options awarded under the MSOP plan, in 2011. As one of the main criticisms of fair value accounting is that in the absence of quoted prices, fair value measurement may be unreliable and subject to managerial discretion, our intention is to confirm whether the application of IFRS 2 may lead to numerous valid valuations for the same equity instruments and to analyse until what extent could Nestlé change its assumptions in order to reduce the recognised expense and to favour their executives.

The first fair value estimation conducted was the replication of the estimation done by Nestlé, for one ESO, according to the inputs used by Nestlé and previously presented in Table 4. Our estimation is of CHF5,84, whereas the value presented by Nestlé is of CHF5,54. Differences may arise from the input "expected life of the option", because although Nestlé states the grant date and the expiry date of the ESOs, it is not clear if the entity assumes that the expected life of the option corresponds to the full 7-year period. From now on, this will be considered the "base-case" - the value of one ESO under Nestlé's assumptions is of CHF5,84.

Before going further with our analysis it is important to highlight that no adjustment was made to reflect a possible dilution effect, since the 1,4 million ESO granted by Nestlé (which if exercised correspond to the same number of new shares) were almost insignificant (0,05%) when compared to the 3.196 million shares outstanding in 2011 (weighted average number of shares outstanding).

We will start by analysing each assumption separately to understand the impact of changing each input in the fair value estimations.

i) Risk-free rate

Nestlé considered a risk-free rate of 1,59% as an input for the calculation of the fair value of the ESO. According to IFRS 2, the advised reference is to consider the risk-free rate as the yield to maturity of the government zero-coupon bonds from Switzerland (since the currency of the exercise price of the options is the Swiss official currency: Swiss Francs - CHF). The figure considered by Nestlé is, in fact, in line with the yield of a Swiss Government bond with 7-year maturity as of the 3 March 2011 (1,544%)[15]. The bond issue considered is not a zero-coupon bond (there were no outstanding Swiss Government zero-coupon bonds), but we believe this is a valid approximation.

IFRS 2 suggests that the risk-free rate can also be considered with reference to another country's zero-coupon bonds, if the market participants typically determine the risk-free rate with reference to this other country. In Europe, most financial users consider the German bonds (Bunds) as representative of a risk-free investment. Nestlé could consider this rate (3,053%)[16] as the risk-free rate, which could be supported by the fact that 31% of their sales in 2011 were in Europe and the Bunds are considered as the reference of a European risk-free investment.

We believe it is more valid to consider the Swiss Government bonds as the reference for the risk-free rate because, although there are no zero-coupon bond issue by this Government, the underlying share of these options and their exercise price are quoted in Swiss Francs.

The table below presents the yield from Swiss Government bonds, with 4 to 7 year maturities. These values will be useful later, when we consider different expected life of the options and, thus, will have to adjust the associated risk-free rate.

Table 4 – Yield of Swiss Government Bonds with different maturities

Maturity (as of 03.03.2011)	Yield
4 years	1,112%
5 years	1,346%
6 years	1,457%
7 years	1,544%

Source: Bloomberg

[15] Data Source: Bloomberg. The yield presented was registered at 03.03.2011 for a Swiss Government bond issue with maturity in 08.01.2018.
[16] Data Source: Bloomberg. The yield presented was registered at 03.03.2011 for a German zero-coupon Government bond with maturity in 04.01.2018.

The estimation of the fair value of one employee share option of Nestlé granted in March is of CHF5,79, if we consider all inputs equal to the company's assumption, except the risk-free rate which we considered to be 1,544%. As expected, this value is only slightly lower (-0,8%) than the base-case (CHF5,84) given the small difference between the risk-free considered by Nestlé and our estimation of the same input.

ii) Expected volatility

When forecasting expected volatility, Nestlé based its estimation on historical volatility of the market price of its S.A. shares and made adjustments "for any expected changes to future volatility to publicly available information". The company did not provide any further information about the volatility estimation, such as the time frame under which it calculated the volatility or more details on the "expected changes" that led to the adjustments.

However, as we know, it is almost impossible to be accurate in these predictions. Future volatility does not necessarily reflect historical volatility; implied volatility reflects market expectations; and several factors and unknowns can "ruin" our estimation.

As alternatives, we present values for expected volatility based on:

- Historical annualised volatility of the return of Nestlé S.A. shares from a period of 7 years (equal to the expected life of the option considered by Nestlé) before the grant date. It was measured by looking at daily closing prices of the share. Although Nestlé also used historical volatility, the data that we are providing was not adjusted to any "expected changes". The value ascends to 19,21%, which compares with 18.42% assumed by Nestlé.

  When looking at the historical volatility calculated based on the average daily returns of the share during a period as long as the expected life of the option, we should consider on whether there were unusual events that could have affected the results. Overall, Nestlé is a diversified group, operating in a non-cyclical sector and its shares are liquid, which reduces the impact of environmental events in the shares volatility. However, the instability that has been felt in financial markets since the beginning of the crisis in 2008 can be considered has an unusual effect. This is a possible reason for the higher historical volatility observed in the last 4 years, when compared to the last 7 years (please refer to Exhibit 5).
- Implied volatility of an American call option with Nestlé S.A. share as underlying (18,78%) – This estimation is based on the value of the NESN SW 12/15 C52 and

was computed by Bloomberg[17] as of 10 May 2012. The measurement of the implied volatility presented several difficulties: there were no available traded options with a maturity as long as the expected life of the ESO or with the same strike, so the option with the longest maturity and the closest strike price was considered (18 December 2015 and CHF52, respectively); the estimation was done in May, 2012, instead of at the grant date, given the inability to do the calculation with reference to the grant date; the traded call option is not liquid, presenting a big difference from its bid and ask price[18] and few variations on the open interest. All these difficulties in the measurement question the validity of the estimation.

After having searched for alternatives for the forecast of expected volatility, we believe Nestlé made a valid choice when estimating this input with reference to the historical figures, given the lack of reliable alternatives available.

We estimated the fair value of an employee stock option of Nestlé granted in March, 2011 by replacing the expected volatility considered by the entity (18,42%) for our estimation of volatility (19,21%). The value achieved was of CHF6,18, representing an increase of 5,9% from the base-case. We can see that the value of this option is extremely sensitive for a change in the volatility input.

The estimations of the historical volatility of Nestlé for the different expected lives that will be considered further on are presented and commented in Exhibit 5.

iii) Expected dividends

The expected dividend yield assumed by Nestlé for this grant of options is in line with the dividend yield observed in 2012, of 3,5%, with reference to the results of 2011.

To estimate expected dividends, we will start by analysing the historical trends of two dividend measures, to identify which one of them guides Nestlé's annual dividend decision. For this we can see in the graph below the evolution of the Dividend *per* Share (DPS) and the Dividend Pay-out Ratio (DPR).

[17] For this computation, Bloomberg had to assume the remaining inputs of the option: dividends until expiration were assumed to be of CHF6,75 and a risk-free rate of 0,28%.
[18] The bid price was of CHF 6,35 and the ask price of CHF 7,61.

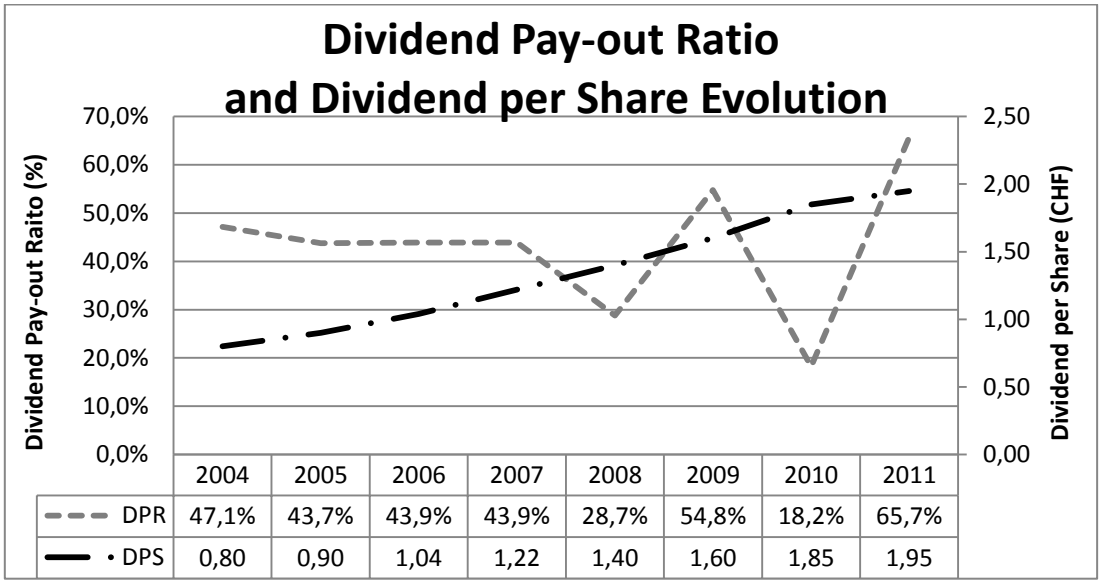


Figure 1: Comparison of the evolution of the Dividend Pay-out Ratio and the Dividend *per* Share

In Exhibit 6, we also look at the evolution of the dividend yield, since Nestlé established a dividend yield as an input for the estimation of the fair value of the ESOs granted in 2011[19]. Focusing on the Dividend per Share, we can see a clearly upward trend, which slowed down in 2011. Both the Dividend Pay-out Ratio and the dividend yield do not show a clear path. This suggests that the firm, when deciding the dividend amount to be paid to shareholders, focuses on increasing the DPS, instead of setting the amount based on a desired pay-out ratio or dividend yield.

Due to this, we will use a model that incorporates the present value of the DPS, instead of taking dividend yield as an input. A possible explanation for the fact that the entity uses a model that incorporates the dividend yield and not the present value of DPS is that the use of the former would create clear expectations on the investors, since Nestlé would have to disclose the exact amount that it intended to pay as dividends during the expected life of the option. If the firm provides a dividend yield, there are still expectations created about the dividend, but since the share price in the future is not known, it is less clear.

We will use the adapted version of the BSM that incorporates the present value of the dividends (formula in Exhibit 7) for three mains reasons. First, from the analysis of the trends previously observed, we believe Nestlé makes its dividends decision based on the DPS. Second, in general, entities do not focus on the dividend yield, since they do not control the share price - they focus on the DPS and/or on the DPR, since these are variables under their control, which do not depend on the market's appreciation of the

[19] The Dividend Payout Ratio was calculated based on the basic Earnings per Share. The dividend yield was calculated by considering the closing price on the last day of the year.

company. Third, we believe it makes more sense to forecast the DPS than to forecast the dividend yield, since we cannot forecast with reliability the future share price.

Since the analysis is conducted in 2012, the value of dividends that refers to 2011 (already announced: DPS of CHF1,95) will be considered as a given data. To forecast future dividends two scenarios will be considered: one that assumes an annual growth of 13,6% (the average annual growth of DPS from 2004 to 2011) and a "worst-case-scenario" that assumes an annual growth of 5,4% (the annual growth registered from 2010 to 2011). In Exhibit 8, the forecasts and the present value of dividends for the different expected lives considered are presented.

For the expected life considered by Nestlé (7 years), we forecast that the amount to be paid in dividends in an "average scenario" has a present value of CHF19,31 and the respective amount for a "worst-case scenario" is of CHF15,07, leading to a fair value estimation for one ESO of CHF6,29 (+7,7% than the base-case) and CHF7,13 (+22,2%), respectively.

iv) Expected life of the option

There is no available information on the average life of an ESO under the MSOP of Nestlé. However, for all the reasons previously discussed in chapter III. c), we believe that the majority of these options will be exercised before maturity, thus having an expected life shorter than the time to maturity of the option, in this case 7 years. The only certainty is that the expected life of the option will be longer than the vesting period (3 years) and shorter than the time to maturity (7 years).

A factor that we can consider is that although early exercise is expected, all the employees involved in this plan are high-level employees (executives), which are believed to exercise their rights not as early as lower-level employees (Huddart and Lang, 1996). Still, since empirical studies could not define a typical exercise behaviour, not even by looking at previous grants of the same company (Huddart and Lang, 1996), there is no guideline for estimating expected life in this case.

It could be advantageous to consider different sets of options within the total options granted. For example if a specific option-holder had an observable typical exercise behaviour, the expected life of the options held by him/her could be estimated with more reliability and could be different from the remaining options. However, there is not enough available information to differentiate between options from the same grant.

To provide alternative calculations of the fair value, we will consider three additional scenarios for the expected life of the options: 4 years, 5 years and 6 years. We do not consider the extreme situation of the expected life equalling the vesting period (3

years), because although some ESOs may be immediately exercised, the expected life should reflect the entire set of options granted and we do not believe all options will be exercised immediately after vesting.

It is important to recall that the remaining inputs (risk-free rate, expected volatility and expected dividends) are dependent on the expected life of the option and must be adjusted for the time frame considered by the expected life. So, we provide alternative valuations by changing the expected life of the option to 4, 5 and 6 years and we adjust both the risk-free rate and the expected volatility for the same time frame, according to the values previously discussed and presented in Table 4 and in Exhibit 5, respectively. Since Nestlé considered a dividend yield instead of forecasting the Dividend *per* Share, there is no necessity to adjust the expected dividend input.

The estimated fair value for one ESO with 4, 5 and 6 years maturity is, respectively, of CHF6,44 (+10% than the base-case), CHF6,38 (+9,3%) and CHF6,15 (5,41%). As previously discussed in III.b), the lower the time to expiration, the lower the option value. In this analysis this is not the case because although the risk free adjustment goes in the same direction (a lower time to expiration is associated to a lower risk-free rate, and thus a lower option value), the volatility adjustment increased the option value. This is due to the fact that historical volatility was higher in the last years close to the grant date, so when adjusting the expected volatility with reference to the historical volatility calculated (please refer to Exhibit 5), the value of the option increased. If we had considered the estimation done by Nestlé for the expected volatility (18,42%) for the different expected lives, the estimated fair value for one ESO with 4, 5 and 6 years maturity would have been, respectively, of CHF4,95 (-15,2% than the base-case), CHF5,34 (-8,4%) and CHF5,60 (-4,1%).

v) Additional Alternative Valuations

After having questioned the assumptions made by Nestlé to estimate the fair value of the ESOs granted in 2011 and having provided ten alternative valuations, it is possible to provide additional valuations by changing more than one assumption at a time, as presented in the table below.

Table 5: Additional Alternative Valuations

a) Expected life of 7 years, risk-free rate of 1,59% (as assumed by the company) and expected volatility of 19,21% (our historical estimate).

Expected dividends	FV of one ESO (in CHF)	% change from base case
Average growth scenario	6,73	+15,2%
"Worst-case" scenario	7,57	+29,7%

b) Expected life of 7 years and risk-free rate of 1,544% (yield of a 7Y Swiss-Government bond).

Expected dividends	FV of one ESO (in CHF) w/ company's estimate of σ (18,42%)	% change from base case	FV of one ESO (in CHF) w/ historical estimate of σ (19,21%)	% change from base case
Average growth scenario	6,26	+7,2%	6,70	+14,7%
"Worst-case" scenario	7,09	+21,6%	7,53	+29,1%

c) Expected life of 6 years and risk-free rate of 1,457% (yield of a 6Y Swiss-Government bond).

Expected dividends	FV of one ESO (in CHF) w/ company's estimate of σ (18,42%)	% change from base case	FV of one ESO (in CHF) w/ historical estimate of σ (19,98%)	% change from base case
Average growth scenario	5,99	+2,6%	6,79	+16,3%
"Worst-case" scenario	6,65	+14,0%	7,46	+27,8%

d) Expected life of 5 years and risk-free rate of 1,346% (yield of a 5Y Swiss-Government bond).

Expected dividends	FV of one ESO (in CHF) w/ company's estimate of σ (18,42%)	% change from base case	FV of one ESO (in CHF) w/ historical estimate of σ (21,05%)	% change from base case
Average growth scenario	5,68	-2,6%	6,92	+18,5%
"Worst-case" scenario	6,17	+5,6%	7,40	+26,8%

e) Expected life of 4 years and risk-free rate of 1,112% (yield of a 4Y Swiss-Government bond).

Expected dividends	FV of one ESO (in CHF) w/ company's estimate of σ (18,42%)	% change from base case	FV of one ESO (in CHF) w/ historical estimate of σ (22,51%)	% change from base case
Average growth scenario	5,25	-10,1%	6,96	+19,3%
"Worst-case" scenario	5,55	-4,9%	7,27	+24,5%

IV. d) Discussion

i) Analysis of main results

The first factor that we believe is striking is that by questioning the four controllable model inputs, we were able to provide 28 valid alternative valuations for the same employee share option. If we had considered the implied volatility as a valid estimation of the expected volatility and the German Bunds as a valid reference for the risk-free rate, the number of alternative values would have been even higher. This is in line with the main criticisms against fair value accounting – there is a significant degree of uncertainty when measuring fair value in the absence of quoted prices.

The provided alternative valuations are comprised in an interval from CHF4,95 to CHF7,57, with an average of CHF6,44 and a median of CHF6,41, representing a change from the base case from -15% to 30%. When considering the total number of ESOs granted in 2011 (1,4 millions), Nestlé could have registered an expense under their MSOP plan between CHF6,93 million and CHF10,6 million. In fact, Nestlé registered an expense under this plan of CHF9 million. However, only CHF 7,756 million[20] corresponded to the ESO granted in 20111 and the remaining amount was probably related with adjustments made to grants provided in previous years.

Now focusing on the results itself, it is remarkable that only 7 of the alternative valuations provided were lower than the base-case, as can be confirmed in the histogram below. When comparing with the fair value of one ESO provided by Nestlé (CHF5,54), only 3 valuations fall behind this value.

[20] Nestlé granted 1,4 million employee share options and valued each at CHF5,54, resulting on an expense of 7,756M.

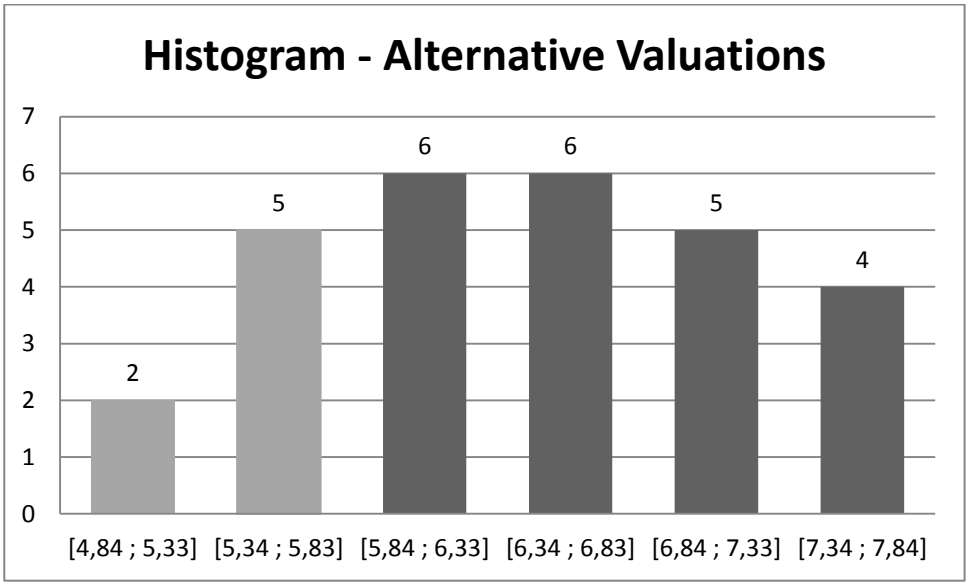


Figure 2: Histogram – Alternative Valuations

Being the valuation of employee stock options a clear occasion where managers can exercise some discretion over the inputs of the models, it seems that Nestlé used discretion to provide a lower fair value valuation. This is in line with common wisdom and empirical research (including Aboody et al., 2006) which suggest that managers have an opportunistic behaviour when selecting the model inputs towards reducing the value and, consequently, reporting a lower expense.

Hodder et al. (2006) suggest that the entities' use of discretion is driven by either opportunistic motivation or informational motivational. If opportunistic motivation prevails, firms tend to understate stock based compensation. Two possible incentives for opportunistic behaviour are highlighted by Aboody et al. (2006): firms understate fair value expense so that they improve perceived firm's profitability by investors; and it may be an executives' attempt to reduce the perceived compensation, which is typically considered excessive. On the other hand, firms which "overestimate ESO fair values appear to convey information about future operating risk" (Hodder et al., 2006). The latter researchers consider that when informational motivation prevails, managers reflect private information on their estimations, for example to "convey information about future volatility and/or dividends".

According to our analysis, Nestlé's behaviour is mostly driven by opportunistic motivation, since the firm understated its share-based compensation. However, Aboody et al. (2006) conclude that firms with a low magnitude of ESO when compared to the number of shares outstanding and with strong corporate governance have less incentive to incur in opportunistic behaviour, thus reducing the incentives to minimise share-based compensation expense. Since Nestlé's ESO represent only 0,05% of the total shares outstanding and it has a strong corporate governance, having been recognised in 2011 as

the Best Corporate Governance in Switzerland by the World Finance Magazine, we would expect the company to have less incentives to incur in this behaviour.

ii) Case Study Limitations

The main limitations of this case study arise from the lack of private information from Nestlé. Contrarily to what happens when Nestlé makes its fair value estimations, we only relied on public available information.

This limits our ability to incorporate relevant information such as expectations about future events that may affect the inputs. For example the fact that Nestlé S.A. is acquiring Pfizer's infant-nutrition unit (announced in April, 2012) or expectations about other potential acquisitions (or even divestitures) could have been reflected in inputs. Typically, such events increase share volatility and they may even lead to changes in the board structure, which could force some members to exercise their options earlier than expected, reducing the expected life of the option. This sort of events may also result in blackout periods, which, as previously discussed in section III. c) iv), reduce the value of the employee share options, although their incorporation in the valuation is particularly difficult.

However, our assumptions are in line with what is typically considered by analysts, such as the forecast of a dividend *per* share instead of forecasting the dividend yield. Additional considerations, including the use of an expected life of the option, to reflect early exercise, instead of its total time to maturity, are supported by academic literature. Therefore, we believe the alternative assumptions presented are sound and allow us to achieve a reliable measurement of the fair value of Nestlé's employee share options.

The choice of the Black-Scholes-Merton as the option pricing model may be also perceived as a limitation of our case study, since the Binomial model is considered more suitable to incorporate the specificities of ESO (discussed in section III. d)). However, given the lack of detailed information about the grant, we considered that the added value of using the Binomial would not compensate the increased complexity of the analysis. Using the BSM model is also a valid choice, since it is one of the models suggested by IFRS 2 and Nestlé also used it, allowing us to make a more direct value comparison.

The existence of a forfeiture rate, which would affect the total amount expensed by Nestlé, was also excluded from this analysis. With data from previous financial statements of Nestlé S.A., we were able to calculate an annual forfeiture rate[21], presented in Exhibit 9. Historically, the forfeiture rate in Nestlé was always under 2%, during the period in analysis, and the average rate was 0,54%. However, the data provided by the company

[21] Forfeiture rate = options forfeited/options outstanding

does not allow us to know to which grant do the forfeited options belong. Given the lack of detailed information to identify a clear trend in the forfeiture behaviour, the forfeiture was not considered in this analysis.

V. CONCLUSION

After having analysed in detail IFRS 2 – *Share-based Payment* and having applied its guidelines to a specific case (Nestlé's employee's stock option granted in 2011 under the MSOP plan) we recognise that the estimation of the fair value of employee stock options is a process that presents several difficulties and that, as other fair value estimations where market prices are unavailable, is not as accurate as desirable, leaving room for the managers to exercise discretion over the model inputs.

However, we also recognise that measuring this compensation form based on its fair value is the best option available. Given the characteristics of this share-based payment, the most common alternative to fair value measurement – historical cost – is not an option, as we cannot reliably quantify the services provided by the employees that give rise to this share-based payment.

The use of the intrinsic value as a measurement alternative is not desirable as well, since its use does not truly reflect the cost that this remuneration form represents to the company. In most cases, it would translate into a nil or marginal amount (as the strike price is usually in line with the market price at the time of the grant), hampering the expensing principle.

It is also important to bear in mind that whether or not to recognise employee stock options at its fair value is not only a matter of the reported expenses and its effect on the entities' earnings. The fair value amount recognised is particularly relevant for Corporate Governance matters, since employee stock options can be a significant portion of an Executive's remuneration package that are now truly reflected in the accounts.

Nestlé's case study allowed us to understand in detail the difficulties that the entities face when estimating ESO's fair value – option pricing models are not fully adapted for this specific type of call options, most inputs do not have a single right way of being calculated, and the specificities subjacent to these options provide additional difficulties.

In our analysis, we provided 28 alternative fair value estimations for the same ESO grant, and the results suggested that Nestlé exercised managerial discretion over the model inputs, understating the amount expensed. Possible reasons for this opportunistic behaviour are that Nestlé wanted to improve its perceived profitability and to reduce the perceived executives' remuneration. However, according to Aboody's et al. (2006) research, we would expect Nestlé to have less incentives to understate its ESO expense than other companies in which the corporate governance is weaker and where the amount

of stock options awarded has a higher magnitude when compared to the total amount of shares outstanding.

To conclude, fair value measurement of employee stock options presents pros and cons, as does the fair value measurement of other items. It allows investors and financial statements' users to have more valuable information, since it reflects the cost for the company of incurring in such share-based payment and also provides additional information about the executives' remuneration, an issue at which the world is looking more closely and that has Corporate Governance implications. However, since the fair value measurement of ESO does not rely on market-based figures' but on option pricing models, it is not as reliable as desirable and it leaves room for managers to exercise discretion over the amount expensed.

To reduce the power of the criticisms raised against IFRS 2 and in line with the IASB's objectives to improve transparency and quality of the information provided, we recommend that the entities provide additional disclosures:

- Consistent with the suggestions of Hodder et al. (2006), entities could explain in more detail the reported inputs, by reporting historical experience and industry benchmarks and by explaining why their estimations differ from these references;
- Currently, firms disclose the total number and the weighted average exercise price of options outstanding, cancelled and exercised each year, on an aggregated matter. If firms disclosed these numbers on a grant-by-grant basis, providing additional details on the time to maturity, it would allow the users of financial statements to make better estimations of the option costs. This is in line with suggestions made by Huddart and Lang (1996); and,
- Entities could disclose a range of values under which they believe the fair value of the ESO grant is comprised, by considering several valid inputs, and defend why they believe the reported value is the best estimation. This would provide the readers of financial statements with a more detailed analysis of the estimation and, thus, it would improve their ability to make valid judgements about the amount recognised.

APPENDIXES

Exhibit 1 – Black-Scholes-Merton formula

$$c = S_0 e^{-qT} N(d_1) - K e^{-rT} N(d_2)$$

Where:

$$d_1 = \frac{\ln(S_0/K) + \left(r - q + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

c = Theoretical value of a call option

S_0 = Price of the underlying share

N = Cumulative standard normal distribution

q = Dividend yield (continuously compounded)

K = Exercise/ Strike price

r = Risk-free rate (continuously compounded)

σ = Standard deviation of the return on the underlying share (annualised)

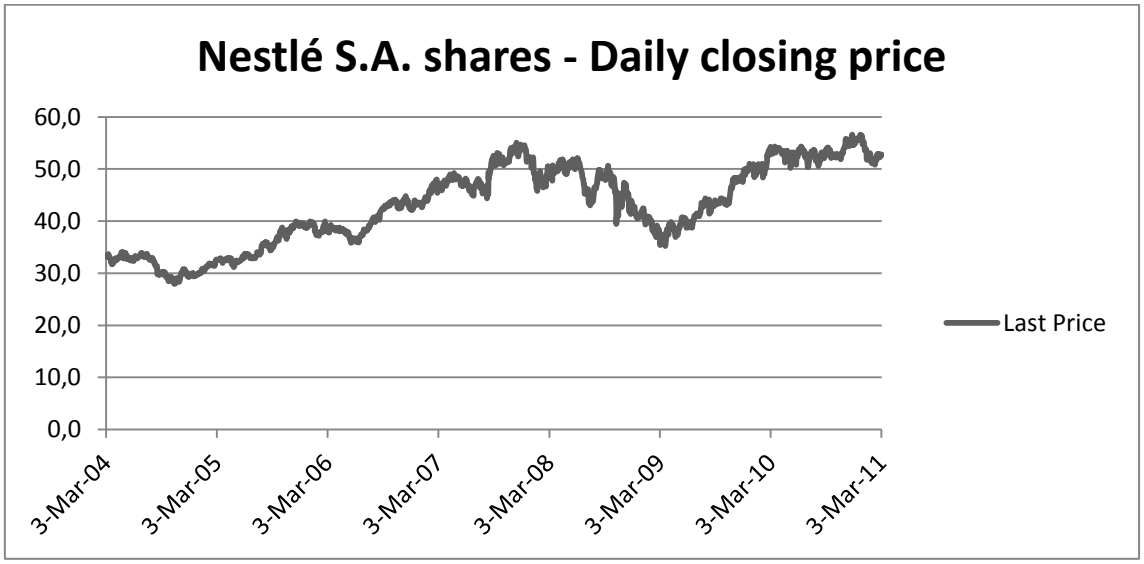
T = Time to expiration (in years)

Exhibit 2 – Nestlé's Brand Portfolio

Sector	Brand
Baby foods	Cereleac, Gerber, Gerber Graduates, NaturNes, Nestum
Bottled water	Nestlé Pure Life, Perrier, Poland Spring, S. Pellegrino
Cereals	Chocapic, Cini Minis, Cookie Crisp, Estrelitas, Fitness, Nesquik Cereal
Chocolate & confectionery	Aero, Butterfinger, Cailler, Crunch, Kit Kat, Orion, Smarties, Wonka
Coffee	Nescafé, Nescafé 3 in 1, Nescafé Cappuccino, Nescafé Classic, Nescafé Decaff, Nescafé Dolce Gusto, Nescafé Gold, Nespresso
Culinary, chilled and frozen food	Buitoni, Herta, Hot Pockets, Lean Cuisine, Maggi, Stouffer's, Thomy
Dairy	Carnation, Coffee-Mate, La Laitière, Nido
Drinks	Juicy Juice, Milo, Nesquik, Nestea
Food servisse	Chef, Chef-Mate, Lean Cuisine, Maggi, Milo, Minor's, Nescafé, Nestea, Sjora , Stouffer's
Healthcare nutrition	Boost, Nutren Junior, Peptamen, Resource
Ice cream	Extrême, Häagen-Dazs, Mövenpick; Nestlé Ice Cream
Petcare	Alpo, Bakers Complete, Beneful, Cat Chow, Chef Michael's Canine Creations, Dog Chow, Fancy Feast, Feliz, Friskies, Gourmet Purina, Purina ONE Pro Plan
Sports nutrition	PowerBar
Weigth management	Jenny Craig

Source: Nestlé's Corporate Website – "About Us"

Exhibit 3 – Evolution of Nestlé S.A. share price



Source: Bloomberg

Exhibit 4 – Equity Compensation Plans – Amount expensed

In Millions of CHF	2011	2010
RSUP – Restricted Stock Unit Plans	166	180
MSOP – Management Stock Option Plan	9	9
PSUP – Performance Share Unit Plan	8	5
SAR – Share Appreciation Rights	(4)	10
Total share-based payment from continuing operations	**179**	**204**

Source: Consolidated Financial Statements of the Nestlé Group 2011 – Note 11

Exhibit 5 – Expected Volatility

Expected life	4 years	5 years	6 years	7 years
Historical volatility	22,51%	21,05%	19,98%	19,21%

Notes:

- Historical volatility was measured by using daily closing prices of the underlying share. The observations were from the 4, 5, 6 and 7 years' period before the grant date (03.03.2011).

Exhibit 6 – Historical Dividend Yield

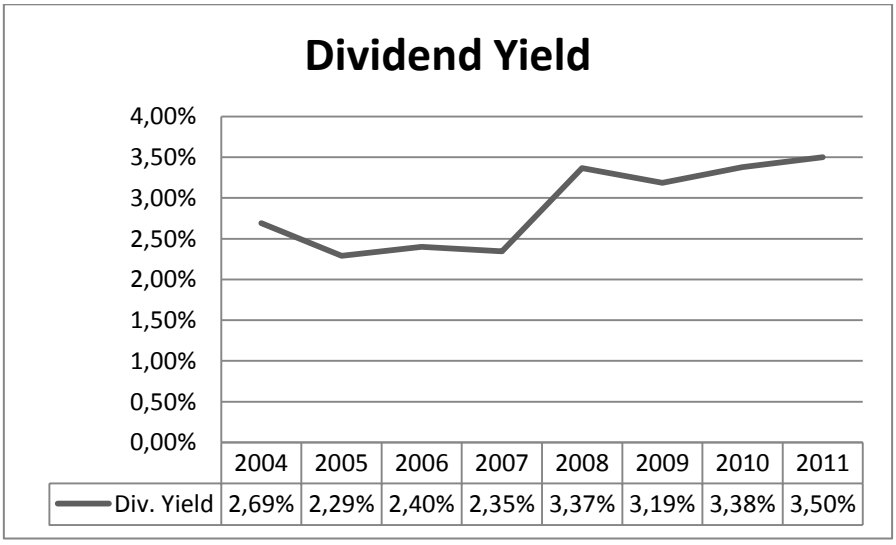


Exhibit 7 – BSM formula adjusted for the Present value of Dividends[22]

$$c = S^*N(d_1) - Ke^{-rT}N(d_2)$$

Where:

$$d_1 = \frac{\ln(S^*/K) + \left(r + \frac{(\sigma^*)^2}{2}\right)T}{\sigma^*\sqrt{T}}$$

$$d_2 = d_1 - \sigma^*\sqrt{T}$$

$S^* = S_0 - D$

c = Theoretical value of a call option

S_0 = Price of the Underlying option

D = Present value of expected dividends

N = Cumulative standard normal distribution

K = Exercise/ Strike price

r = Risk-free rate (continuously compounded)

σ = Standard deviation of the return on the underlying share (annualised)

$\sigma^* = \frac{S_0}{S^*}\sigma$

T = Time to expiration (in years)

[22] Source: CHRIS, N. A. (1997) Black-Scholes with Dividends. In *Black-Scholes and Beyond: Option Pricing Models.* McGraw-Hill

Exhibit 8 – Forecasted Dividends *per* Share

a) Average Scenario

	2011	2012	2013	2014	2015	2016	2017
Worst-case scenario	1,95	2,22	2,52	2,86	3,25	3,69	4,20
Sum of PV if maturity in 2015	9,27						
Sum of PV if maturity in 2016	12,25						
Sum of PV if maturity in 2017	15,59						
Sum of PV if maturity in 2018	19,31						

Note:
- Since the exercise date is assumed to be in March of N and the dividends are typically paid in April, the last dividend to be received by the option holder is the dividend that refers to the reporting year N-1.
- To calculate the Present value, we assumed the risk-free rates presented in Table 4, in line with the time frame considered. For example, when the maturity was assumed to be in 2015, the risk-free rate was the yield of a 4Y Swiss Government bond.

b) Worst-case Scenario

	2011	2012	2013	2014	2015	2016	2017
Worst-case scenario	1,95	2,06	2,17	2,28	2,41	2,54	2,67
Sum of PV if maturity in 2015	8,22						
Sum of PV if maturity in 2016	10,42						
Sum of PV if maturity in 2017	12,71						
Sum of PV if maturity in 2018	15,07						

Note:
- Since the exercise date is assumed to be in March of N and the dividends are typically paid in April, the last dividend to be received by the option holder is the dividend that refers to the reporting year N-1.
- To calculate the Present value, we assumed the risk-free rates presented in Table 4, in line with the time frame considered. For example, when the maturity was assumed to be in 2015, the risk-free rate was the yield of a 4Y Swiss Government bond.

Exhibit 9 – Historical analysis of option forfeited

	2011 a)	2010 a)	2009	2008	2007	2006	2005	2004	Avg
Options forfeited	0	0	10.000	285.930	0	11.000	76.343	109.733	
Options Outstanding	7.900.000	8.300.000	15.354.550	22.326.896	2.737.411	4.153.228	5.870.831	6.645.641	
Forfeiture rate	0,00%	0,00%	0,07%	1,28%	0,00%	0,26%	1,30%	1,65%	0,57%

a) In 2011 and 2010, the data on the number of options was rounded to millions.

b) The necessary corrections for stock splits were made.

Source: Consolidated Financial Statements of Nestlé Group (from the year 2005 to 2011) from the notes "Equity Compensation Plans" and "Share-Based Payments"

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