QAPITA

ABC PTE. LTD.

ESOP VALUATION REPORT

FAIR VALUE OF ESOPS GRANTED IN FY2021

Contents

SIGNED LETTER

15 April 2022

[NAME]
[DESIGNATION]
[COMPANY]
[ADDRESS]

Fair value of employee share options granted by ABC

Purpose and Scope

As per our engagement letter signed and dated 14 March 2022 we are pleased to enclose herein our valuation report on the fair value of employee share options granted by ABC ("Company") as at the respective grant dates in FY2021 in accordance with IFRS 2 - Share based Payment guidelines. In the ensuing report, we outline the background, methodologies and assumptions applied and the conclusion we have reached.

Date and Principal Methodology

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Summary of Findings

Based on our analysis, it is our opinion that the value of the ordinary shares of the Company on a minority, non-marketable interest basis as of the Valuation Date is:

S$X per ordinary share

We then applied the applied the Black Scholes Merton Model to arrive at the Fair Value (FV) of the Options as at each grant date. The total Fair Market Value (FMV) of the XXX stock options grant to the employees in the Financial Year 2021 is:

S$X

Important Notice

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For and on behalf of
Qapita Pte. Ltd.

CEO & Cofounder,

STANDARD TERMS AND CONDITIONS

STANDARD TERMS AND CONDITIONS

I. Governing Law

Qapita's engagement will be governed by and construed in accordance with the laws of The Republic of Singapore and any claims or disputes arising out of or in connection with our engagement shall be subject to the non-exclusive jurisdiction of the courts of The Republic of Singapore

II. Challenge from Court

In all matters that may be potentially challenged by a Court or others, we do not take any responsibility for the degree of reasonableness of contrary positions that others may choose to take, nor for the costs or fees that may be incurred in the defense of our recommendations against such challenge(s). Qapita will retain supporting work papers for your matter(s) and will be available to assist in active defense of our professional positions taken, at our prevailing rates and in addition direct actual expenses and according to our prevailing standard professional agreements at that time. Qapita and / or its personnel shall not be required to give testimony or attendance in court or to any government agency by reason of this report, and the valuer accepts no responsibility whatsoever to any other person.

III. Reliance

Unless stated otherwise in our engagement letter or in our reliance letter, this valuation report is strictly only for the use of the Recipient Party and for the explicitly stated purpose. No reliance may be made by any third party without our prior written consent. Parties should not solely rely on this valuation report, and this does not serve as a substitute for their due diligence.

IV. Reliance Period

Qapita does not assume any responsibility or accept any liability in connection with this Valuation Report after the Reliance period of three months from the date of the report. Should the Recipient Party become aware of any external or internal factors and such factors have not been disclosed to Qapita prior to the completion of the Valuation Report, then Qapita is not liable and does not accept any responsibility for effects of such undisclosed information on the valuation

V. Retention and Copies of Information

Qapita will be the sole owner of any documents, working papers, financial models and other files developed during our engagement. Qapita will need to retain this data or copies of files for a period of ten years from the date of the report.

VI. No Publication or Publicity

Qapita's Valuation Report may not be published in any document, statement, website, social media, circular or otherwise without the express written approval of Qapita. This includes, but is not limited to, the form and context of such intended publication

VII. Integrity of the Whole Report

This Valuation Report, including all supporting information, must be used, and understood it its entirety. This Valuation Report may not be used in conjunction with any other news, reports, valuations, or studies.

VIII. Non-Disclosure

The contents of this Valuation Report are confidential to Recipient Party and prepared for the specific purpose to which they have been prepared for. Qapita will share no responsibility for any third party who may use or rely on a part or whole of this Valuation Report.

IX. Local Legislations

Qapita has not made any effort to determine the possible effects of any current or future rules, regulations, statutes of local, provincial or national authorities including and not limited to sectoral regulations or environmental matters.

X. Specialized Expertise

Qapita does not express or intends to express views or opinions on matters that require specialized expertise or knowledge including taxation or legal matters beyond what may be customarily expected from valuers.

XI. Forecasts

Any financial or operational forecasts that may have been (if) included or used in this Valuation Report is based on information provided to Qapita. Qapita makes no warranty or representation on the correctness or the accuracy of such forecasts.

XII. Limited Scope

Qapita does not claim to have carried out all possible investigations or analyses in relation to the business of the Company. Qapita also assumes without verification the accuracy of all data provided to us by the Engaging Party / Company. Qapita is not responsible and is liable for any loss that may be caused directly or indirectly by a decision to not conduct further due diligence or investigation.

XIII. Valuation Methodology

Qapita uses generally accepted valuation methods. Our final valuation is an estimate and not a guarantee, and it is fully dependent upon the accuracy of the assumptions on business performance indicators, financial metrics, forecasts, and market conditions.

XIV. Extraneous Information

Our valuation considers information derived from or sourced from other publicly available sources or private databases. Qapita has not independently verified that information, nor adopted it as our own, or accepted its reliability. We have not independently verified market conditions and market

information. The Recipient Party (ies) accepts the risk that if any of the unverified information provided by others and referred to in the valuation is incorrect, then this may influence the valuation.

XV. Subsequent Events and Conditions

Our Valuation Report reflects prevailing conditions and facts as on the valuation date. We do not consider subsequent events and do not accept any obligation to update the report for subsequent events.

XVI. Periodic Review

The Valuation Report should be reviewed from time to time. Qapita does not give any warranty on the validity of this valuation report in the future.

XVII. Other Factors

If either the Engaging Party(ies) or the Recipient Party(ies) becomes aware of matters that may affect the valuation, then Qapita must be informed of such matters and reliance must not be placed on the Valuation Report under such circumstance.

XVIII. Independent Verification

Before undertaking any decision or financial transaction based on the Valuation Report, the Recipient Party(ies) should perform their own independent verification and due diligence as well as potential insurance to cover any potential risks or losses that may occur. Whilst we perform our analysis considering several factors, there are market conditions and risks which are changing all the time. By nature, for early stage companies in disruptive sectors, the market conditions change rapidly and have substantial impact on the business.

LIMITATION OF LIABILITY AND DISCLAIMER

This clause and disclaimer shall survive even after the termination of this engagement between the Company and Qapita for any reason.

Qapita reserves the right to include the Company in our client list, but we will maintain the confidentiality of all information shared with us, and the contents of our reports, subject to legal or administrative process or proceedings.

Our valuation is subject to the Standard Terms and Conditions attached at the beginning of this report. Our valuation report will be solely used by the Company or the Recipient party for the express purpose stated in this report and our conclusions are valid only for the valuation date (period) mentioned in this report.

Any liability for loss or damage for Qapita will be limited to what we may be expected to or ought to reasonably pay having regard to our responsibility for the same on the basis that all other consultants and specialists, where appointed, shall be deemed to have provided to the company. In all cases, our liability for any loss or damage arising out of the action or proceedings aforesaid shall, notwithstanding the preceding provisions, in any event be limited to a sum equal to our agreed remuneration for this engagement.

Qapita, shall, in no event shall be liable for consequential, special, incidental, or punitive loss, damage or expense (including without limitation, loss of profits, opportunity cost, etc.) despite its existence. For the avoidance of doubt our liability shall never exceed the amount calculated in accordance with the preceding paragraph.

The Company is required to indemnify and hold us and our personnel harmless from any claims, liabilities, costs and expenses (including, without limitation, attorney's fees and the time of our personnel involved) brought against, paid or incurred by us at a time and in any way based on the information made available in connection with our engagement except to the extent that any such losses, expenses, damages or liabilities are ultimately determined to be the result of gross negligence, misconduct, willful default or fraud of our engagement team in conducting its work.

Qapita and or its personnel will not be responsible for any decisions to purchase, sell or transfer any interest in the Company and that shall be the sole responsibility of the purchaser. This includes (and is not limited to) the price, terms, conditions, and preferences of the instruments of purchase. The selection of the price to be accepted requires consideration of factors beyond the information we will provide or have provided.

BUSINESS OVERVIEW

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Management Team[1]

ABC currently has over X employees and an experienced management team. The Company's key management personnel are:

Chief Executive Officer and Founder: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis faucibus magna in nunc volutpat, id posuere nulla hendrerit. Pellentesque tristique felis sed arcu maximus, at commodo nibh pulvinar. Suspendisse potenti.

Co-founder – APAC: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis faucibus magna in nunc volutpat, id posuere nulla hendrerit. Pellentesque tristique felis sed arcu maximus, at commodo nibh pulvinar. Suspendisse potenti.

General Manager EMEA: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis faucibus magna in nunc volutpat, id posuere nulla hendrerit. Pellentesque tristique felis sed arcu maximus, at commodo nibh pulvinar. Suspendisse potenti.

Senior Director – Technology: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis faucibus magna in nunc volutpat, id posuere nulla hendrerit. Pellentesque tristique felis sed arcu maximus, at commodo nibh pulvinar. Suspendisse potenti.

Senior Director – Products: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis faucibus magna in nunc volutpat, id posuere nulla hendrerit. Pellentesque tristique felis sed arcu maximus, at commodo nibh pulvinar. Suspendisse potenti.

[1] *Source:* Linkedin.

VALUATION THEORY

Valuation Approaches

To arrive at the FMV of a company's common stock, one must first value the equity and then allocate that value through the capital structure. As such, we have considered the three generally accepted valuation approaches:

- Market Approach
- Income Approach
- Asset-Based or Cost Approach

Market Approach

In each of these approaches, market multiples are applied to the Company's corresponding financial metrics.

i) Relevant market multiples from the Comparable Public Company Method are developed using metrics such as revenue and earnings before interest, taxes, depreciation, and amortization.

ii) The Comparable Company Transaction Method uses actual prices paid in merger and acquisition transactions for companies similar to the Company to determine an exit multiple.

iii) A version of the M&A Transaction Methodology, the OPM Backsolve method, derives the implied equity value for a company involving the company's own securities.

Income Approach

The Discounted Cash Flow ("DCF") Methodology assumes:

i) A business is worth today what it can generate in future cash to its owners.

ii) Cash received today is worth more than an equal amount of cash received in the future; and

iii) Future cash flows can be reasonably estimated.

The Income approach converts future cash flows to a single, current discounted amount. The cash flows used to compute the present value are the Free Cash Flows.

Free Cash Flows

Whereas dividends are the cash flows actually paid to stockholders, free cash flows are the cash flows *available* for distribution to capital contributors. There are two types of Free Cash Flows available to a company:

Free Cash Flow to the Firm (FCFF):

It is the cash flow available to the Company's suppliers of capital after all operating expenses (including taxes) have been paid and necessary

investments working capital (e.g., inventory) and fixed capital (e.g., equipment) have been made. FCFF is calculated using the following formula:

$$FCFF = Net\ Income + Net\ noncash\ charges + Interest\ Expense \times (1 - Tax\ Rate) - Capital\ Expenditures - Investments\ in\ Working\ Capital$$

Free Cash Flow to Equity (FCFE):

It is the cash flow available to the Company's common equity holders after all operating expenses, interest, and principal payments have been paid and necessary investments in working and fixed capital have been made. FCFE is calculated from FCFF using the following formula:

$$FCFE = Net\ Income - Interest\ Expense \times (1 - Tax\ Rate) + Net\ Borrowing$$

The fair-value measurement is estimated based on the value indicated by current market expectations about those future cash flow amounts. It is comprised of the sum of the present value of two components: discrete period projected cash flows and a residual or terminal value:

Discrete Period Projected Cash Flows:

In order to determine the future Free Cash Flows, we project the financials of a company for a foreseeable period. The financial for a given year are then used to calculate the Free Cash Flows for that year. The set of all the Free Cash Flows for the projected period are the 'Discrete Period Projected Cash Flows'.

Residual or Terminal Cash Flow:

It estimates the value of a company's expected free cash flows beyond the explicit forecast period, after a company has reached long-term sustainable growth and profitability levels. The residual cash flow is often calculated utilizing the Gordon Growth Model. Following is the formula to calculate the Terminal Value:

$$Terminal\ Value = \frac{FCF_T \times (1 + g)}{(k - g)}$$

where,

FCFT = Free Cash Flow for the final projected period T

g = Terminal Year Growth Rate

k = Discount Rate[2]

Note: The denominator is also known as the '*Capitalization Rate*'

[2] See the section on 'Discount Rates' below

Discount Rates

The DCF method converts these future cash flows to their "present value" using specific discount rate that factors in the time value of money and any measurable level of risks associated with the business. The Weighted Average Cost of Capital ("WACC") is the rate of return specific to the enterprise being valued that reflects the risk of investment in said enterprise. In general, the higher the WACC, the higher an investor's expected return would be for an investment in the enterprise.

The formula for WACC is defined as follows:

$$WACC = k_D \times (1 - TC) \times \left(\frac{D}{E+D}\right) + k_E \times \left(\frac{E}{E+D}\right)$$

Cost of debt (k_D) – The pre-tax cost of debt is the return required by lenders.
Income tax rate (TC) – The marginal corporate tax rate for an entity is used to calculate the after-tax cost of debt. The effective income tax for a firm is the federal income tax rate plus the effective state tax rate (adjusted for federal income tax deductibility) of the state in which the Company operates.
Capital Structure – The market value of Equity (E) and Debt (D) are used to weight the cost of equity and cost of debt in arriving at the overall WACC. Although the market value of common equity is commonly used in the calculation, the carrying value of debt is often used as a proxy for the market value of debt. Alternatively, we may directly use targeted capital structure of the Company as weights to determine the WACC.
Cost of equity capital (k_E) – This is the return required by shareholders. While there are several theories for determining k_E, Capital Asset Pricing Model ("CAPM") is simplest and widely used model to determine k_E. Qapita therefore computes an enterprise specific WACC using the Capital Asset Pricing Model ("CAPM"). It is calculated using the following formula:

$$k_E = rf + \beta\,(rm) + P + A$$

Risk-free rate (rf) – is the return on government securities with a term similar to that of the investment being evaluated.
Equity Risk Premium (ERP = rm) – is the additional rate of return over the risk-free rate that is expected by investors from investments with systematic risk equal to the "market" portfolio. The "market" portfolio may be thought of as a broadly diversified investment portfolio, often thought of as the return on an index such as the Standard and Poor's 500. It is also known as Market Risk Premium.

Relevered beta (β) – Relevered beta is a measure of the risk of an equity's stock relative to the risk of a diversified portfolio (the ERP). The re-levered beta is derived from the unlevered beta of the industry or the comparable public companies using targeted capital structure of the Company.

Size premium (P) – Research has shown that small enterprises have larger betas than large enterprises. An adjustment for size is included in the calculation of WACC because small stocks outperform large stocks, even after adjusting for the systematic risk (beta) of small stocks. This phenomenon is widely known as the size effect.

Alpha (A) – Alpha is an entity-specific risk premium that is commonly used in situations when the specific risk associated with the subject entity is not sufficiently captured by ERP, beta, and size premium. Some of the risks that alpha adjusts for include considerations such as management depth and expertise, product line diversification, geographic diversification, or projection risk in excess of market participant assumptions.

Value of the Firm:

After determining the Free Cash Flows, we sum the Present Value of individual Discrete Period Projected Cash Flows and Terminal Value using an appropriate Discount Rate to obtain the final value of the firm using the Income Method:

Enterprise Value:

It is obtained when the Free Cash Flow used is FCFF and it discounted using WACC.

Equity Value:

It is obtained when the Free Cash Flow used is FCFE and it discounted using Cost of Equity.

Asset Approach

Among the three valuation approaches discussed, IFRS considers the Asset Approach in most circumstances to be the weakest valuation method from a conceptual standpoint. Typically, this approach would only be used when valuing enterprises that:

- are in very early stages of development,
- have not raised any arms-length financing,
- or when there is a limited (or no) basis for application of the above two approaches.

This approach identifies the market value of the Company's significant tangible assets. The price at which a business entity changes hands can be influenced by the values of the assets employed in the business, net of its liabilities.

Value Allocation Theory

In summary, there are four generally accepted allocation methods available when determining the value of various classes of securities underlying a company's capital structure:

1. Current Value Method ("CVM")
2. Option Pricing Method ("OPM")
3. Probability-Weighted Expected Return Method ("PWERM")
4. Hybrid Method ("Hybrid Method")

Within each category, a variety of methodologies exists to assist in the estimation of value, as discussed in further detail herein.

CVM

CVM is based on an allocation theory that shareholders with senior stock rights would attempt to maximize the value of their holdings based solely on the senior interest's underlying liquidation preference, participation rights and conversion rights, as well as imminent liquidity event.

Qapita noted that the CVM is appropriate under 2 circumstances:

i) When an imminent liquidity event in the form of an acquisition or dissolution of the enterprise is assumed and/or the expectations about the future of the enterprise as a going concern are effectively immaterial; and
ii) When the enterprise is assumed to be at such an early stage of its development that:
   a) No material progress has been made on its business plan.
   b) No significant equity value has been created above the liquidation preference of the preferred stock; and
   c) There is no reasonable basis for estimating the timing and magnitude of any common equity value above the liquidation preference that might be created in the future.

OPM

The OPM relies on financial option theory to allocate the value among different classes of members' equity based upon a future option "claim" on value. Under the OPM, the values of the various classes of stock are estimated as the net value of a series of call options, representing the present value of the expected future returns to the shareholders.

Essentially, the equity claims of a shareholder class are equivalent to a call option on the stock's participation in the value of the subject company at or above the respective preferred shareholders' liquidation preferences. Thus, an equity class can be valued by estimating the value of its share in each of these call option rights.

The OPM involves estimating the value of the call options using the Black-Scholes option pricing model ("Black-Scholes")[3] or Cox, Ross, Rubinstein binomial option pricing model ("Lattice")[4] at a series of exercise prices that coincide with the liquidation and conversion preferences of the holders of preferred and common shareholders. The methodology assumes that a company's exit scenarios follow a lognormal distribution in terms of business equity value and probabilities.

Qapita also noted that the OPM might be used to determine the equity value of an entity by using "Backsolve" method ("Backsolve Method"). By considering the sale price of shares in a recent financing, the aggregate equity value (and, by implication, enterprise value) can be "back-solved" using an option pricing theory based model that gives consideration to the subject company's capitalization structure and rights of the preferred and common stock shareholders. This methodology is most applicable when a valuation is conducted close to the date of financing transaction, and when other methodologies cannot be utilized. In an OPM framework, the Backsolve Method for inferring the equity value implied by a recent financing transaction involves making assumptions for the time to liquidity, volatility, and risk free rate and then solving for the value of equity such that value for the most recent financing equals to the amount paid.

PWERM

Under the PWERM, the value of a company's particular equity class is estimated based on an analysis of future values for the entire enterprise assuming various future outcomes. Share value is based upon the probability weighted present value of these expected outcomes, as well as the rights of each class of preferred and common stock.

The PWERM is well suited for capturing potentially dramatic increases or decreases in value that may result from potential future events that are not log normally distributed. We noted that the application of the PWERM is reasonable under circumstances where there is a broad range of possible future outcomes for the enterprise noting that the likelihood of set

[3] Originally created in 1973, the Black-Scholes option pricing model attempts to calculate the price of an option by considering several key factors. Numerous assumptions underlie Black-Scholes including the log-normal distribution of returns.

[4] The binomial model was first proposed by Cox, Ross and Rubinstein in 1979, and essentially uses a "discrete-time" (lattice based) model of the varying price over time of underlying financial instrument.

outcomes and the resulting valuation indications are not assumed to be log normally distributed as under the OPM.

Qapita also noted that the PWERM might be used to determine the equity value of an entity given the contemplation of future values for the entire enterprise assuming various future outcomes.

Hybrid Method

The Hybrid Method is a cross between the PWERM and OPM. it is performed by first estimating the probability weighted value across multiple scenarios then using the OPM to estimate the allocation of value within one or more of those scenarios. The hybrid method can be a useful alternative to explicitly modeling all PWERM scenarios in situations when the company has transparency into one or more near term exits but is unsure about what will occur if the current plans fall through.

An advantage of this method is that it utilizes the conceptual framework of option pricing theory to model a continuous distribution of future outcomes and to capture the option like pay offs of the various share classes while also explicitly considering future scenarios and the discontinuities in outcome that early stage companies experience. A disadvantage is that these models require several assumptions and maybe overly complex. In addition, there may be many potential issues surrounding the integration of risk adjusted and risk-neutral modeling frameworks.

Discount for Lack of Marketability (DLOM)

The holder of a non-marketable investment is subject to the risk that the investment's value will decline before the investment can be sold to another investor in a private transaction. Conversely, the holder of an investment that is identical but for the fact that there exists an active public market is not subject to the same risk. Therefore, the holder of the non-marketable investment will have a higher required rate of return on the investment than the holder of the marketable investment. Consequently, the non-marketable investment will sell at a discount to the marketable investment.

When an equity value of an enterprise is derived, it directly or indirectly also captures its cash flows to the investors who in aggregate have control over the business. Therefore, the investor's securities and the enterprise as a whole is considered to be equally marketable. Any discount when compared to a fully liquid asset, is already embedded in its equity value; and no further discount rate is required at this level. However, same does not hold true for its minority investors. Minority investors may have a different principal exit market, are not

privy to the same level of information that is available to the senior securities and may not hedge their holdings. Because of these and other reasons, a DLOM is typically applied to the value allocated to the junior securities to determine their final equity value.

Qapita determined a DLOM as a necessary consideration in the analysis since the minority common stockholders of the Company, unlike the shareholders of the Comparable Public Companies, do not have access to an active public market for their securities. Further, the Company's common stockholders do not possess the rights to force the Company to register with the Securities and Exchange Commission in order to sell their shares. The lack of marketability of common stock may materially limit a shareholder's ability to liquidate the investment into cash without the risk of loss in value.

There are several qualitative and quantitative factors that goes into estimating the size of a marketability discount for a minority interest. These include for example:

- Prospects for liquidity: The greater the prospect, lesser would be the discount
- Number, extent and, terms of existing contractual or customary arrangements requiring the enterprise to purchase or sell its equity securities. Impact on the size and direction of any marketability adjustment will vary, depending on the nature of the arrangements
- restrictions on transferability of equity securities by the holder. The lesser the extent and duration of any such restrictions, the lower the discount would tend to be.
- pool of potential buyers. The larger the pool, the lower the discount would tend to be.
- risk or volatility. The lower the perceived risk of the securities or the lower the volatility of the value of the securities, the lower the discount would tend to be.
- size and timing of distributions. The greater the amount of dividends paid to the securities, the lower the discount would tend to be (typically not a factor for early-stage enterprises but possibly a factor for more mature enterprises).
- concentration of ownership. The higher the concentration of ownership (for example, among founders or one or two investors), the higher the discount would tend to be.

The models of DLOM typically fall into two broad categories of studies:

- Empirical Models
- Quantitative Models

Empirical Models

These empirical models are based on empirical capital market observations, rather than on theoretical economic principles. With respect to a DLOM, empirical observations show that, when investors consider alternative investments in either a freely treated security or a security whose marketability is limited, they will price the security with limited marketability

at a discount to its free trade counterpart. Market evidence of the DLOM can be found in two types of studies, among others:

Restricted-Stock Studies

Restricted Stock is the stock of a public company that is identical in all aspects to the freely traded stock of the company, except that it is restricted from trading on the open market for a certain period of time. The median discount observed in these studies ranges from 13 percent to 45 percent. The factors that appear to be most significantly correlated with observed discounts in restricted stock transactions are the underlying volatility of the stock, the restriction period of the stock in the transactions, and the size of the block being sold as a percentage of shares outstanding.

Following is a table of some of the restricted stock studies, their period and discount rates:

S. No.	Study	Period of Study	Mean
1	Securities and Exchange Commission[5]	1966-1969	25.80%
2	Gelman[6]	1968-1970	33.00%
3	Trout[7]	1968-1972	33.45%
4	Moroney[8]	1969-1972	35.40%
5	Barclay et al.[9]	1979-1997	18.70%
6	Hall and Polacek (FMV Opinions Study)[10]	1979-1992	23.00%
7	Hertzel and Smith[11]	1980-1987	20.14%
8	Management Planning Inc. (Update)[12]	1980-2009	15.90%
9	FMV Opinions, Inc.[13]	1980-2015	19.33%
10	Silber[14]	1981-1988	33.75%

[5] Discounts Involved in Purchases of Common Stock (1966-1969), Institutional Investor Study Report of the Securities and Exchange Commission, H.R. Do. No. 92-64, Part 5, 92nd Congress, 1st Session, 1971, 2444- 2456.
[6] Gelman, Milton, An Economist Financial Analyst's Approach to Valuing Stock of a Closely Held Company, Journal of Taxation, June 1972, 353-354.
[7] Trout, Robert R., Estimation of the Discount Associated with the Transfer of Restricted Securities, Taxes, June 1997, 381-384.
[8] Moroney, Robert E., Most Courts Overvalue Closely Held Stocks, Taxes, March 1993, 144-154.
[9] Barclay, Michael J., Clifford G. Holderness and Dennis P. Sheehan. "Private Placements and Managerial Entrenchment." Journal of Corporate Finance Vol. 13, 2007, pp. 461-484.
[10] Hall, Lance S., and Timothy C . Polacek, "Strategies for Obtaining the Largest Valuation Discounts," Estate Planning, January/February 1994. pp. 38-44.
[11] Michael Hertzel and Richard L. Smith, "Market Discounts and Shareholder Gains for Placing Equity Privately," The Journal of Finance (June 1993).
[12] Ezra Angrist, Harry Curtis, III, Daniel Kerrigan, (2011) Regression Analysis and Discounts for Lack of Marketability. Business Valuation Review: Spring 2011, Vol. 30, No. 1, pp. 36-48.
[13] "Determining Discounts for Lack of Marketability: A Companion Guide to the FMV Restricted Stock Study," Business Valuation Resources (2016), available at www.bvresources.com.
[14] Silber, William L., Discounts on Restricted Stock: The Impact of Illiquidity on Stock Prices, Financial Analysts Journal, July-August 1991, 60-64.

11	Johnson Study[15]	1991-1995	20.20%
12	Columbia Financial Advisors, Inc.[16]	1997-1998	13.00%
13	Pluris Valuation Advisors (LiquiStat)[17]	2005-2006	32.80%
14	SRR[18]	2005-2010	10.90%
15	Trugman Valuation Associates, Inc.[19]	2007-2010	16.60%
16	Maher[20]	1969-1973	35.40%

Pre-IPO Studies

Another set of empirical data that is used to estimate implied discounts for lack of marketability is the price a stock exhibited in private transactions prior to an IPO when compared to the publicly traded price subsequent to the public offering. Studies using this data have indicated an average downward adjustment of between 21 percent and 66 percent from 1980 to 2002.

Following is a table of some of the pre-IPO studies, their period and discount rates[21]:

S. No.	Study	Period of Study	Mean
1	Emory Studies	1997-2000	50.00%
2	Valuation Advisors Studies (period before IPO being 0 to 3 months)	1995-2012	21.50%
3	Willamette Management Associates Studies[22]	1998-2002	23.90%

Pre-IPO studies provide relevant evidence of the DLOM for privately owned securities. However, there are number of reasons why, we cannot rely just on pre-IPO studies: (1) Only successful IPOs are tracked in the study and therefore this data may reflect a sample bias. (2) The data may not accurately reflect the arm's-length prices. This is

[15] Johnson, Bruce, "Restricted Stock Discounts, 1991-95", Shannon Pratt's Business Valuation Update, Vol. 5, No. 3, March 1999, pp. 1-3. "Quantitative Support for Discounts for Lack of Marketability." Business Valuation Review, December 1999, pp. 152- 155.

[16] CFAI Study, Aschwald, Kathryn F., "Restricted Stock Discounts Decline as Result of 1-Year Holding Period – Studies After 1990 'No Longer Relevant' for Lack of Marketability Discounts", SHANNON PRATT'S BUSINESS VALUATION UPDATE, Vol. 6, No. 5, May 2000, pp. 1-5.

[17] Robak, Espen, "Discounts for Illiquid Shares and Warrants: The LiquiStat Database of Transactions on the Restricted Securities Trading Network," Pluris Valuation Advisors White Paper Draft (January 22, 2007), 22-32 (www.plurisvaluation.com).

[18] Aaron M. Stumpf, Robert L. Martinez, and Christopher T. Stallman (2011) The Stout Risius Ross Restricted Stock Study: A Recent Examination of Private Placement Transactions from September 2005 through May 2010. Business Valuation Review: Spring 2011, Vol. 30, No. 1, pp. 7-19.

[19] William Harris, "Trugman Valuation Advisors, Inc. (TVA), Restricted Stock Study," Business Valuation Review (Fall 2009): 128–139.

[20] Maher, Michael J., Discounts for Lack-of-marketability for Closely Held Business Interests, Taxes, September 1976, 562-71.

[21] "Measuring the Discount for Lack of Marketability for Noncontrolling, Nonmarketable Ownership Interests" by Nathan P. Novakhttp://www.willamette.com/insights_journal/16/winter_2016_5.pdf

[22] Pamela Garland and Ashley Reilly, "Update on the Willamette Management Associates Pre-IPO Discount for Lack of Marketability Study for the Period 1998 Through 2002," Insights (Spring 2004).

because much of the underlying "transaction" data is based on stock option grants rather than actual sales of stock. (3) Even the most recent studies are based on transactions and IPOs that are at least several years old. Therefore, reliance on these studies has diminished in current valuation practice.

Quantitative Models:

There are several quantitative models that are available to estimate the discount for lack of marketability for privately held securities. Factors that impact the size of the DLOM broadly fall into two categories: (1) factors that affect the duration of the holding period necessary to locate a buyer and negotiate a sale, and (2) factors that affect the degree of risk faced per unit of time during the holding period. Risk per unit of time, according to modern investment theory, is the volatility of an investment's total return (i.e., both dividends and capital appreciation), or the propensity for an investment's actual return to differ from its expected return. Factors that either increase the duration of the holding period or increase the expected volatility of an investment's total return result in higher DLOM. Following are few of the prominent quantitative methods to compute DLOM:

Chaffe Analysis[23]

In 1993, David Chaffe authored a DLOM option pricing study in which he related the cost to purchase a European put option to the DLOM. In Chaffe's estimation,

> *"If one holds restricted or non-marketable stock and purchases an option to sell those shares at the free market price, the holder has, in effect, purchased marketability for those shares. The price of that put is the discount for lack of marketability."*

In other words, by purchasing an at-the-money put option, the buyer guarantees a price at least equal to today's stock price, thus creating liquidity. Thus, it gives one a guard against the loss of owning the stock and hence this method is also called protective put method.

Chaffe relied on the Black Scholes Option Pricing Model for a put option to determine the cost or price of the put option and defined the DLOM as the cost of the put option divided by the market price.

[23] David B. Chaffe, "Option Pricing as a Proxy for Discount for Lack of Marketability in Private Company Valuations," Business Valuation Review 12 (December 1993): 182–88.

According to the Chaffee study, the appropriate DLOM for a privately held stock with a two-year required holding period and a volatility between 60 percent and 90 percent is between 28 percent and 41 percent. Therefore, this approach gives discounts comparable to those cited in restricted stock studies.

According to Chaffe, this approach should be considered the theoretical lower bound on an enterprise's DLOM. This is because it relies on a European put option pricing formula which does not consider early exercise.

As per the Chaffe approach, the following formula is used to compute the DLOM:

$$DLOM_{Chaff} = Xe^{-rT}\,N(-d_2) - Se^{-qT}N(-d_1)$$

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

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

where:
$DLOM_{Chaff}$ = Chaffe Protective Put Option DLOM
X = Strike Price
S = Equity Value of the Company
N(_) = Standard normal cumulative distribution function
q = continuously compounded dividend yield
T = Time to successful exit
σ = common stock volatility
r = risk-free rate as on the date of valuation for the period T
e = The mathematical constant = 2.718...

Longstaff Analysis[24]

In 1995, Francis Longstaff published an article in the Journal of Finance that describes an upper bound on the discount for lack of marketability. The approach relied on stock option pricing theory to estimate the DLOM for a privately held company, based on the price of a "look back" option. A "lookback" option differs from most other options in that the holder can look back at the end of the option's life and retroactively exercise the option at the highest stock price (for a put option) during the holding period. The Longstaff study assumes an investor has a single-security portfolio, "perfect market timing", and trading restrictions that prevent the security from being

[24] Longstaff, Frances A. "How Much Can Marketability Affect Security Values?" Journal of Finance 50 (December 1995): 1767–74.

sold at the optimal time. The value of marketability, based on these assumptions, is the payoff from an option on the maximum value of the security, where the strike price of the option is stochastic.

The Longstaff model only gives us the theoretical upper bound on an enterprise's DLOM. This is because an investor does not possess a perfect market timing ability. Thus, it should only be used as a guideline and not a proper estimate of a DLOM.

As per the Longstaff approach, the following formula is used to compute the DLOM:

$$DLOM_{Long} = \left(2 + \frac{\sigma^2 T}{2}\right) N\left(\frac{\sqrt{\sigma^2 T}}{2}\right) + \sqrt{\frac{\sigma^2 T}{2\pi}}\, e^{-\sigma^2 T/8} - 1$$

where:
$DLOM_{Long}$ = Longstaff Put Option DLOM
N(_) = Standard normal cumulative distribution function
T = Time to successful exit
σ = common stock volatility
e = The mathematical constant = 2.718...
π = The mathematical constant = 3.141...

Finnerty Analysis[25]

John Finnerty proposed a model that assumes the investor does not possess special market timing ability and would be equally likely to exercise the hypothetical liquid security at any given point of time. The value of marketability was modeled as the present value of cash flows, similar to an "average-strike" put option. An average-strike put option conveys the right to sell at the average price attained by the subject during the life of the option.

The Finnerty method addresses the issue of assuming perfect market timing in Longstaff's look-back option method and the issue of assuming protection on the downside while still realizing appreciation on the upside in the protective put method. Finnerty also performed a regression analysis to restricted stock studies, adjusting to remove other significant factors, such as the concentration of ownership and information effects, and found that after isolating the marketability-related factors, the discounts predicted by this method are consistent with the data. Finnerty

[25] Finnerty, John D. 2002. The Impact of Transfer Restrictions on Stock Prices."

presented an updated version of this model at the American Society of Appraisers' Advanced Business Valuation conference in October 2009.

As per the Finnerty approach, the following formula is used to compute the DLOM:

$$DLOM_{Fin} = Xe^{-qT}\left[N\left(\frac{v\sqrt{T}}{2}\right) - N\left(-\frac{v\sqrt{T}}{2}\right)\right]$$

$$v\sqrt{T} = \sqrt{\sigma^2 T + \ln\left(2\left(e^{\sigma^2 T} - \sigma^2 T - 1\right)\right) - 2\ln\left(e^{\sigma^2 T} - 1\right)}$$

where:
$DLOM_{Fin}$ = Finnerty Put Option DLOM
X = Value of the Company's equity
N(_) = Standard normal cumulative distribution function
q = continuously compounded dividend yield
T = Time to successful exit
σ = common stock volatility
r = risk-free rate as on the date of valuation for the period time period T
e = The mathematical constant = 2.718...

Quantitative Marketability Discount Model (QDRM)[26]

QMDM uses a discounted cash flow approach to calculate a discount. The model is based on five key assumptions; expected growth rate in the value of the subject company, expected dividends, expected growth in dividends, the required holding period of the investment and the subject interest. The model attempts to show the difference between the cash flows available to the marketable minority interests and nonmarketable interests.

Since the discounts arrived using this model depends highly on its inputs, there is no set range of values where it varies. The discounts estimated by QDRM increase approximately linearly with time.

Since the input values are highly subjective and because it is most appropriate for directly valuing a nonmarketable minority interest in an entity with a simple capital structure, its usage is still limited.

[26] Z. Christopher Mercer and Travis W. Harms, Business Valuation: An Integrated Theory, 2nd ed. (Hoboken, NJ: John Wiley & Sons, Inc., 2008).

Differential Put Option DLOM[27]

The differential put is a variant of the protective put that estimates the discount based on the difference between the protective put discount that would be estimated for the preferred stock and the protective put discount that would be estimated for the common stock. It is therefore an incremental discount for lack of marketability.
The method computes the volatility for each series of stock (Class Volatility) based on the preferred stock liquidation preferences. To calculate the class volatilities, the method uses the following formulas:

$$Class\ Volatility = \frac{Equity\ Volatility\ \times (Equity\ Value\ \times Class\ N(d1))}{Class\ Value}$$

where,

$$Class\ N(d1) = Sum\ (Incremental\ N(d1)\ Value\ by\ Breakpoint \times Class\ Allocation\ by\ Breakpoint$$

Using these individual class volatilities and the time to liquidity appropriate to each series of stock, we compute the Class DLOM using the Black-Scholes formula for Options. The time to liquidity, in the case of a preferred series is typically the time to the next financing round. In the case of a common stock, it is the time to the ultimate liquidity event. In case there is no visibility about the next financing round then, we generally consider the time to the liquidity for the preferred stock as well.

Finally, we arrive at the incremental DLOMs for each of the series using the below formula:

$$Incremental\ DLOM = 1 - \frac{(1 - Common\ DLOM)}{(1 - Preferred\ DLOM)}$$

Differential Put Options DLOM is typically utilized when there is a precedent transaction in the recent past. Though it could be applied in other situations as well, it is generally used with an OPM Backsolve approach to derive the Equity Value. This method is conceptually appealing because the discount is largest for early stage companies, in which the preferred stock liquidation preferences represent a high percentage of the equity value, and lowest for companies approaching an IPO, in which the preferred stock will be converted to common stock.

[27]Stillian Ghaidarov, "The Use of Protective Put Options in Quantifying Marketability Discounts Applicable to Common and Preferred Interests," Business Valuation Review 28, no. 2 (2009).

Conclusion on DLOM

As discussed above, there are several empirical studies that are available to provide us with the relevant discount. However, IFRS[28] guidelines provide rhat

> *Discounts from restricted stock studies can be used as a starting point for assessing the discount for the lack of liquidity. However, an investor must analyse the factors and the characteristics of the population of entities included in the restricted stock studies because these are matters that might have influenced the magnitude of the restricted stock discounts.*

Therefore, these should only act as a broad guideline in applying the discounts and should not be used solely.

Quantitative models on the other hand are based on theoretical models and take the subject company's (or it's comparable company's) key parameters as inputs. Therefore, these are more company specific discounts rates and hence are recommended.

Volatility

Volatility captures the fluctuation in the value of an asset. The more the volatility in an asset, more is the fluctuation in its value. The term volatility is therefore synonymous with risk. This is because there is greater uncertainty in the price of an asset. As a concept volatility is simple and intuitive. It measures the variability or dispersion about a central tendency. Mathematically, volatility refers to the standard deviation of the change in price of a financial security with a specific time horizon. It is often expressed in annualized terms.

Equity Volatility

The annualized volatility (σ_E) of a publicly listed company is derived from its stock price by the following formula:

$$\sigma_E = \frac{\sigma_{SD}}{\sqrt{P}}$$

where,

σ_{SD} – standard deviation of daily stock prices for a year

[28] IFRS Foundation, IFRS 13 Fair Value Measurements

P – time-period of returns in years. Because generally there are 252 trading days in a year and the time-period is generally a day, P is therefore 1/252 years. Hence,

$$\sigma_E = \sigma_{SD}\sqrt{252}$$

σ_E is also the Equity Volatility of a stock.

Asset Volatility

This volatility is a levered volatility. We use the following Merton's[29] formula to un-lever it to arrive at an Asset Volatility (σ_A) of the stock:

$$\sigma_A = \frac{\sigma_E}{N(d_1) * \left({}^{A}/_{E}\right)}$$

Moreover, the Black-Scholes formula gives us the following equation:

$$E = A \times N(d_1) - D \times e^{-rT} \times N(d_2)$$

where,

$$d_1 = \frac{\left(\ln\left(\frac{A}{D}\right) + \left(r - q + \frac{{\sigma_A}^2}{2}\right)T\right)}{\left(\sigma_A\sqrt{T}\right)}$$

And

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

D = Book Value of Debt (Strike Price)
A = firm's Asset Value
N(_) = Standard normal cumulative distribution function
q = continuously compounded dividend yield
T = Time to exit
σ = common stock volatility
r = risk-free rate as on the date of valuation for the period T
e = The mathematical constant = 2.718...
$N(d_1)$ – is the term from the Black-Scholes formula, and is also known as the call option's "delta"
E – firm's Equity Value

Solving the above two equation would fetch us the values of A and σ_A.

[29] Merton, R. (1974). On the pricing of corporate debt: the risk structure of interest rates. Journal of Finance 29(2), 449-470.

Re-levered Equity Volatility

Volatility is a basic input that goes into the Black-Scholes models (BSM). BSM in turn is a component of the Options Pricing Model (OPM). It is also used to calculate the DLOMs. Volatility (Equity Volatility to be precise) therefore plays a vital role in determining the allocations and the DLOMs.

We cannot however consider the Equity Volatilities of the comparable companies directly. This is because each company has a different leverage and because leverage increases the volatility of a company. Therefore, we need to:

i) remove the effect of leverage from the comparable company's Equity Volatilities. This is done by calculating the individual Asset Volatilities from the Equity Volatility of each of the companies as described above.
ii) use those individual Asset Volatilities to determine the Asset Volatility of the subject company. We should use some appropriate measure of central tendencies to determine the subject company's Asset Volatility.
iii) Arrive at re-levered Equity Volatility. We should use the subject company's capital structure to arrive at the Equity Volatility from its Asset Volatility using the two equations described in the section on 'Asset Volatility'.

Re-levered Equity Volatility for OPM

OPM allocates the Equity Value of a company into its individual securities. These can mainly be classified into Preferred class of securities and a Common class of securities. The payoffs to these classes are allocated only once the debt of the company is paid-off. Therefore, while computing the Equity Volatility of the subject company, we should use this debt to lever the Asset Volatility.

Re-levered Equity Volatility for DLOM

Since DLOM is used to determine the fair value of a minority stock therefore, we should use only the Equity Volatility of a common stock as an input in the computation of DLOM. The payoffs to the common class are allocated only once the debt and the liquidation preference of the preferred class of the company is paid-off. Therefore, while computing the Equity Volatility of the subject company, we should use the ordinary debt as well as the liquidation debt to lever the Asset Volatility. To compute the "liquidation debt", we use Class N(d1) of the common stock from the OPM allocation. This is used as a 'N(d1)' in the Merton's formula to arrive at the Re-levered Equity Volatility for DLOM.

VALUATION DETERMINATION

Equity Value Determination

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris, suscipit dignissim odio lacinia in. Suspendisse et sollicitudin velit, nec dapibus est. Praesent sodales massa vel ligula fringilla, eget lacinia lorem efficitur. Phasellus iaculis leo laoreet efficitur rhoncus. Nunc ante libero, vehicula eu quam non, tempor tincidunt metus. Integer eget nisl elementum, ullamcorper elit nec, venenatis lectus. Etiam condimentum massa risus, sed dictum orci congue id. Proin dignissim velit sit amet finibus egestas.

Quisque ornare viverra sapien eget congue. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia curae; Nullam eu porttitor odio. Duis sed venenatis massa. Praesent cursus vitae enim et congue. Pellentesque vitae orci faucibus, hendrerit tellus eu, facilisis ipsum. Sed eleifend nisl ac velit fringilla, nec viverra dui mattis. Phasellus dictum, nulla quis tristique feugiat, enim purus sodales leo, id finibus ligula arcu at ligula. Nunc dictum nibh pulvinar metus venenatis, sit amet commodo mauris rutrum. Maecenas eget lobortis lectus. Orci varius natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Vivamus dapibus leo sed nulla laoreet ornare. In et convallis ipsum.

Market Approach – Comparable Public Companies

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris, suscipit dignissim odio lacinia in. Suspendisse et sollicitudin velit, nec dapibus est. Praesent sodales massa vel ligula fringilla, eget lacinia lorem efficitur. Phasellus iaculis leo laoreet efficitur rhoncus. Nunc ante libero, vehicula eu quam non, tempor tincidunt metus. Integer eget nisl elementum, ullamcorper elit nec, venenatis lectus. Etiam condimentum massa risus, sed dictum orci congue id. Proin dignissim velit sit amet finibus egestas.

The management and Qapita also discussed potential comparable public companies and the management selected the following comparables based on size, business model, industry and business description:

- Company 1
- Company 2
- Company 3
- Company 4
- Company 5
- Company 6
- Company 7

Quisque ornare viverra sapien eget congue. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia curae; Nullam eu porttitor odio. Duis sed venenatis massa. Praesent cursus vitae enim et congue. Pellentesque vitae orci faucibus, hendrerit tellus eu, facilisis ipsum. Sed eleifend nisl ac velit fringilla, nec viverra dui mattis. Phasellus dictum, nulla quis tristique feugiat, enim purus sodales leo, id finibus ligula arcu at ligula. Nunc dictum nibh pulvinar metus venenatis, sit amet commodo mauris rutrum. Maecenas eget lobortis lectus. Orci varius natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Vivamus dapibus leo sed nulla laoreet ornare. In et convallis ipsum.

Market Approach – Comparable Transactions

Based on discussions with management, Qapita searched public and proprietary databases for transactions in the [] industry. Qapita reviewed merger and acquisition data regarding transactions in which the acquired company is similar to the Company in terms of industry, size and or developmental stage. In addition, Qapita performed searches based on the following keyword terms:

- XXX
- XXX

As a result of this analysis, Qapita identified 15 transactions in which the target company completed in an industry or supplied a service that was similar to that of the Company.

Appendix A provides additional information about the resulting transaction analysis, including descriptive information about the target companies.

The Comparable Transaction Methodology of the Market Approach was not utilized in this analysis as the preferred financing was considered the best indication of value.

Market Approach – Backsolve

Backsolve is a method within the market approach wherein the equity value for a privately held company is derived from a recent transaction in the company's own securities. The backsolve method requires considering the rights and preferences of each class of equity and solving for the total equity value that is consistent with a recent transaction in the company's own securities, considering the rights and preferences of each class of equity.

In an Options Pricing Model (OPM) framework, the backsolve method for inferring the equity value implied by a recent financing transaction involves making assumptions for the expected time to liquidity, volatility, and risk-free rate and then solving for the value of equity such that value for the most recent financing equals the amount paid. Next section on Allocation Analysis has more details on this.

In a PWERM framework, the backsolve method for inferring the equity value implied by a recent financing transaction involves selecting the future outcomes available to the enterprise, and then calibrating the future exit values, the probabilities for each scenario, and the discount rates for the various equity securities such that value for the most recent financing equals the amount paid.

Since the Company had recently raised a preferred stock financing from a venture capitalist therefore, we used OPM Backsolve to arrive at the equity value of the Company.

Income Approach – DCF method

The Income Approach was not utilized in this Analysis as the Company has yet to stabilize their operating cash flows as well as the preferred financing was deemed the best indication of value

Asset Approach

This methodology was not used, as it does not accurately represent the going concern value of the Company.

Equity Value Determination and Allocation Analysis

The equity value determination and allocation herein has been developed primarily on the basis of OPM. We believe this methodology is better suited to addressing the outcomes associated with the Company. Based on the considerations detailed above, as well as Qapita's observations of guidelines and general industry experience, Qapita noted that the possible future outcomes and the resulting equity value indications for the Company would be reasonably approximated by a lognormal distribution (though we note that tails of the distribution would likely be larger at low value exits and high value exits than that which would be implied by the Black-Scholes option pricing framework). As such, Qapita elected to rely on the OPM as a primary allocation methodology.

Based on the considerations detailed above, Qapita noted that the circumstances surrounding the Company, notably those pertaining to an imminent liquidity event or being at early stage of development, do not meet the appropriate criteria for the application of the CVM. As such, Qapita has elected not to rely upon the CVM as an appropriate allocation methodology for this engagement.

Qapita also noted uncertainty surrounding the future exits of the Company; as such, Qapita elected not to rely on the PWERM.

OPM

Qapita estimated the value of the common equity of the Company using the OPM. The OPM treats the rights of the holders of preferred and common shares as equivalent to that of call options on any value of the equity above certain breakpoints ("Break Points") of value based upon the liquidation preferences of the holders of preferred shares, as well as their rights to participation and conversion. Thus, the value of the common stock can be determined by estimating the value of its portion of each of these call option rights.

Summary

As outlined in the AICPA accounting and valuation guide:

"The OPM treats common stock and preferred stock as call options on the enterprise's equity value, with exercise prices based on the liquidation preference of the preferred stock. Under this method, the common stock has value only if the funds available for distribution to shareholders exceed the value of the liquidation preference at the time of a liquidity event (for example, a merger or sale), assuming the enterprise has funds available to make a liquidation preference meaningful and collectible by the shareholders. The common stock is modeled as a call option that gives its owner the right, but not the obligation, to buy the underlying equity value at a predetermined or exercise price. In the model, the exercise price is based on a comparison with the equity value rather than, as in the case of a "regular" call option, a comparison with a per share stock price. Thus, common stock is considered to be a call option with a claim on the equity at an exercise price equal to the remaining value immediately after the preferred stock is liquidated. The OPM has commonly used the Black-Scholes model to price the call option."

"The OPM considers the various terms of the shareholder agreements that would affect the distributions to each class of equity upon a liquidity event, including the level of seniority among the securities, dividend policy, conversion ratios and cash allocations. In addition, the method implicitly considers the effect of the liquidation preference as of the future liquidation date, not as of the valuation date."

PWERM

Given the subjectivity and difficulty associated with estimating exit values and lack of empirical data to support the values at the Company's current stage of development, the probability-weighted expected return method was not selected.

CVM

The company is not very early in its development and does not face any imminent liquidity/dissolution event as of the Valuation Date. Therefore, the Current Value Method was not selected.

OPM Backsolve: Detailed Steps

In this section we detail the general steps that comprise the dynamic option analysis as it applies to the valuation of the Company.

The following table illustrates the Company's financing rounds:

Round	Date	Amount

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris, suscipit dignissim odio lacinia in. Suspendisse et sollicitudin velit, nec dapibus est. Praesent sodales massa vel ligula fringilla, eget lacinia lorem efficitur. Phasellus iaculis leo laoreet efficitur rhoncus. Nunc ante libero, vehicula eu quam non, tempor tincidunt metus. Integer eget nisl elementum, ullamcorper elit nec, venenatis lectus. Etiam condimentum massa risus, sed dictum orci congue id. Proin dignissim velit sit amet finibus egestas.

$X per Series X preferred share

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris.

Preferred Shares*										
Short Name	Original Issue Price	Liquidation Rights (per share)	Share Count	Strike Price (if Warants)	Seniority	Dividend (per share)	Conversion Ratio	Participation Rights (No/Full/Capped)	Per Share Cap	Original Issue Date

*Common Shares**	
Common Name	*Share Count*

Common options*	
Strike Price	Count

Available Options*	
Strike Price	Count

Common Warrants*	
Strike Price	Count

Exhibit 1: Capitalization Table

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris, suscipit dignissim odio lacinia in. Suspendisse et sollicitudin velit, nec dapibus est.

OPM Inputs & Output		
Field	Value	Estimate
Equity Value		
Term		
Risk-Free Rate		
Volatility		
DLOM		

Exhibit 2: OPM Inputs

The re-levered asset volatility for OPM is based on comparable public companies:

S.No.	Ticker	Company Name*	Equity Volatility (σE)#	Market Cap (E0)*#	Book Value of Debt (P)*#	Risk Free Rate (r)	Term (T)	Volatility (σA)	Total Inv. Capital (A0)*

Exhibit 3: Re-levered Asset Volatility for OPM

The equity value derived using the OPM Backsolve is

Equity Value = $X million.

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Breakpoints				
Breakpoint No.	1	2	3	4

Exhibit 4A: OPM Allocation

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris, suscipit dignissim odio lacinia in. Suspendisse et sollicitudin velit, nec dapibus est. Praesent sodales massa vel ligula fringilla, eget lacinia lorem efficitur. Phasellus iaculis leo laoreet efficitur rhoncus. Nunc ante libero, vehicula eu quam non, tempor tincidunt metus. Integer eget nisl elementum, ullamcorper elit nec, venenatis lectus. Etiam condimentum massa risus, sed dictum orci congue id. Proin dignissim velit sit amet finibus egestas.

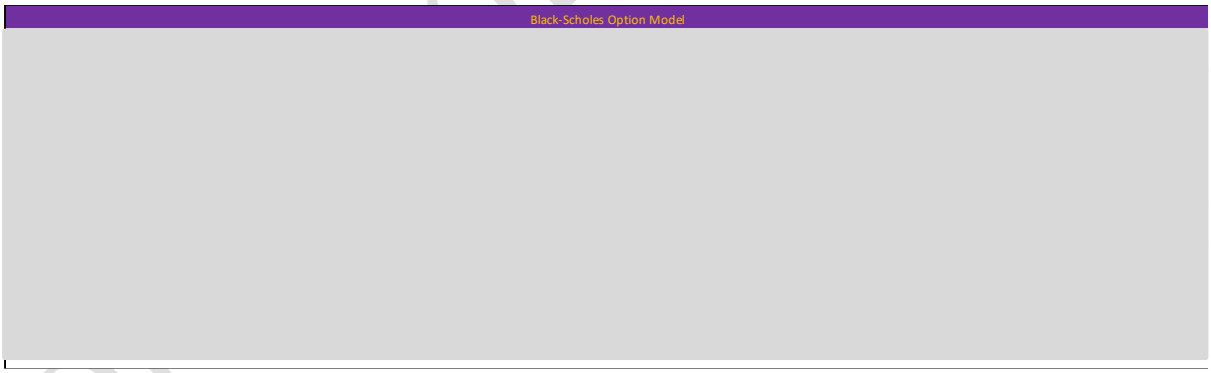

Exhibit 4B: OPM Allocation

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris, suscipit dignissim odio lacinia in. Suspendisse et sollicitudin velit, nec dapibus est. Praesent sodales massa vel ligula fringilla, eget lacinia lorem efficitur. Phasellus iaculis leo laoreet efficitur rhoncus. Nunc ante libero, vehicula eu quam non, tempor tincidunt metus. Integer eget nisl elementum, ullamcorper elit nec, venenatis lectus. Etiam condimentum massa risus, sed dictum orci congue id. Proin dignissim velit sit amet finibus egestas.

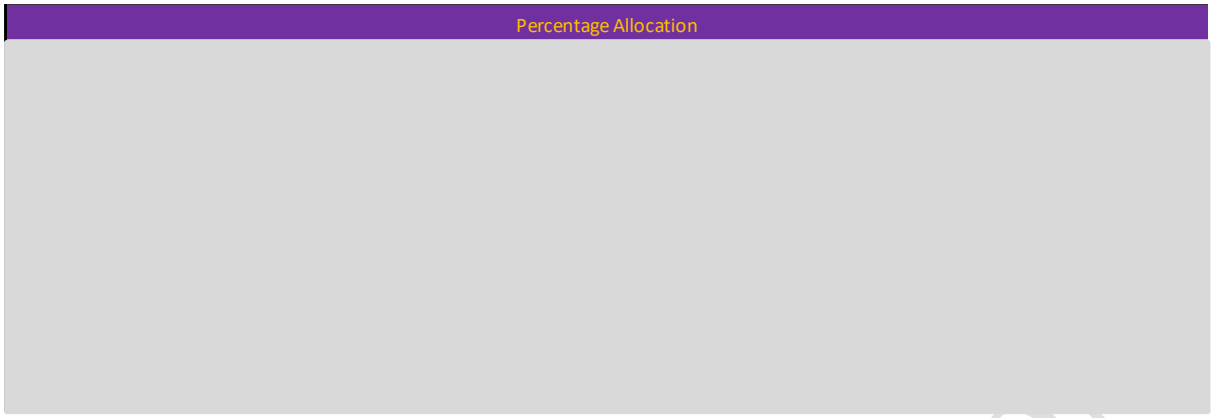

Exhibit 4C: OPM Allocation

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris, suscipit dignissim odio lacinia in. Suspendisse et sollicitudin velit, nec dapibus est. Praesent sodales massa vel ligula fringilla, eget lacinia lorem efficitur. Phasellus iaculis leo laoreet efficitur rhoncus. Nunc ante libero, vehicula eu quam non, tempor tincidunt metus. Integer eget nisl elementum, ullamcorper elit nec, venenatis lectus. Etiam condimentum massa risus, sed dictum orci congue id. Proin dignissim velit sit amet finibus egestas.

Exhibit 4D: OPM Allocation

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DLOM – Discount to Lack of Marketability

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dapibus est. Praesent sodales massa vel ligula fringilla, eget lacinia lorem efficitur. Phasellus iaculis leo laoreet efficitur rhoncus. Nunc ante libero, vehicula eu quam non, tempor tincidunt metus. Integer eget nisl elementum, ullamcorper elit nec, venenatis lectus. Etiam condimentum massa risus, sed dictum orci congue id. Proin dignissim velit sit amet finibus egestas.

S.No.	Ticker	Company Name*	Equity Volatility (σE)#	Market Cap (E0)*#	Book Value of Debt (P)*#	Risk Free Rate (r)	Term (T)	Volatility (σA)	Total Inv. Capital (A0)*

Exhibit 5: Re-levered Asset Volatility for DLOM

The chosen method for DLOM is the differential put option model and is computed to be **25%.**

Selected DLOM (Differential Put Option)	25%

Exhibit 6: DLOM

Valuation Conclusion

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris, suscipit dignissim odio lacinia in. Suspendisse et sollicitudin velit, nec dapibus est. Praesent sodales massa vel ligula fringilla, eget lacinia lorem efficitur. Phasellus iaculis leo laoreet efficitur rhoncus. Nunc ante libero, vehicula eu quam non, tempor tincidunt metus. Integer eget nisl elementum, ullamcorper elit nec, venenatis lectus. Etiam condimentum massa risus, sed dictum orci congue id. Proin dignissim velit sit amet finibus egestas.

Equity Value Determination Summary			
	Market Approach	Income Approach	Asset Approach

Approach (Figures in USD)	Guideline Public Company Method	Market Approach Guideline Public Transaction Method	Backsolve Method		

Exhibit 7: Equity Value Determination Summary

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	Values

Pellentesque id blandit libero. Nam placerat arcu erat, at vestibulum dui mattis varius. Nulla rhoncus finibus mauris, suscipit dignissim odio lacinia in. Suspendisse et sollicitudin velit, nec dapibus est.

ESOP VALUATION

Valuation Methodology

Options are typically valued using a Binomial/Trinomial models or a Black Scholes Merton Model. The Binomial/Trinomial models can be used to value both European and American options, whereas Black Scholes Merton model has been developed to value European options, i.e. options, which can only be exercised at the expiry date. When the dividend yield is zero or close to zero, the models will yield the same result. If the dividend yield is more than zero, the Binomial/Trinomial models would yield a correct value in relation to the valuation of an American option as these models will take the valuation of the early exercise into consideration, whereas the Black Scholes Merton Model will not and the latter will undervalue the option in the instance when the dividend yield is above zero.

As ABC is in the development phase, the Company is likely to use all cash generated to fund its operations and no dividend is expected to be paid during the life of the Options. Accordingly, we have applied the Black Scholes Merton Model to arrive at the FV of the Options as at each grant date.

Valuation Assumptions

In using the Black-Scholes-Merton model to compute the FV of the Options as at each grant date, we have applied the following assumptions:

Valuation Dates

During 2021, stock options were granted to employees of the Company via ESOP on the following dates and these stock options are valued as at its respective Grant Dates:

- Date 1
- Date 2
- Date 3
- Date 4
- Date 5

Exercise Price

According to the letters of award, the exercise price for each share option granted in the year 2021 is S$X.

Expected Life of the Options

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Expected Volatility

To estimate the expected volatility, volatility data from comparable public listed companies is retrieved. ABC is in the business of software development for the building and construction industry.

Qapita searched for the public companies listed on the exchanges in the software development for the building and construction industry. The primary sources of data used to produce this list included:

- Capital IQ database
- Company Information

In addition, Qapita performed searches based on the following keyword terms:

- ABC
- DEF

The Management and Qapita also discussed potential guideline public companies and the Management selected the following comparables based on size, business model, industry and business description:

- Comp 1
- Comp 2
- Comp 3
- Comp 4
- Comp 5
- Comp 6
- Comp 7
- Comp 8

Please refer to Exhibit 1 for detailed business description for each of the above public companies.

Qapita utilized statistically trading information from these guideline companies in its calculation of volatilities. Please see the table below to see the concluded volatility:

5-year Volatility												
S. No.	Company Ticker	Company Name	14/6/2021	15/9/2021	1/1/2021	15/3/2021	9/3/2021	7/9/2021	20/5/2021	15/7/2021	2/6/2021	29/7/2021
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

Low	
1st Quartile	
Median	
Mean	
3rd Quartile	
High	

Selected Multiple (High)	

Dividend Yield

As the Company is in its early stage and requires all cash to be ploughed back to its operations, the Management does not expect to pay any dividend during the expected life of the Options. Accordingly, the dividend yield is 0%. We understand from the Management that the Company has not paid any dividend since its incorporation. Considering that the Company is in a lossmaking position, we have applied a dividend yield of 0% to estimate the FV of the Option.

Risk-free Rate

According to paragraph B 37 of FRS[30] 102, "Typically, the risk-free interest rate is the implied yield currently available on zero coupon government issues of the country in whose currency the exercise price is expressed, with a remaining term equal to the expected term of the option being valued (based on the option's remaining contractual life and taking into account the effects of expected early exercise)".

For the ESOP, we have applied risk free rates which commensurate with the time to expiry of the ESOP of approximately five (5) years, based on Singapore's zero-coupon yields[31] tabled below:

Date of Grant	5-year Bond Yield

Share Price

ABC was incorporated on XXX by the founding shareholders with share capital of S$XX, valued at S$X per share.

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[30] Singapore Financial Reporting Standards
[31] https://www.mas.gov.sg/bonds-and-bills/SGS-Bond-Statistics

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Market Approach – Used as a corroboration

The following table summarizes the Enterprise Value to Revenue multiple of the set of comparable public companies as of the December 31st 2020:

Included Public Comparables					
S. No.	Company Name*	Ticker	Enterprise Value (MM)	LTM Revenue (MM)	LTM Revenue Multiple
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
				Mean	
				Median	
				High	
				Low	
				1st Quartile	
				3rd Quartile	
				Other	

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maximus eu eros vitae, bibendum consectetur dolor. Suspendisse mi mauris, dapibus eu magna euismod, vulputate tincidunt neque. Praesent sed nibh blandit, aliquet quam ac, lobortis lectus.

Included Public Comparables					
S. No.	Company Name*	Ticker	Enterprise Value (USD MM)	LTM Revenue (USD MM)	LTM Revenue Multiple
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
				Mean	
				Median	
				High	
				Low	
				1st Quartile	
				3rd Quartile	
				Other	

Forfeiture Rate

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Treatment of Vesting Conditions

According to FRS 102 paragraph 19, a grant of equity instruments might be conditional upon satisfying specified vesting conditions. For example, a grant of shares or share options to an employee is typically conditional on the employee remaining in the entity's employment for a specified period of time. Vesting conditions, other than market conditions, shall not be taken into
account when estimating the FV of the shares or share options at the measurement date. Instead, vesting conditions shall be taken into account by adjusting the number of equity instruments included in the measurement of the transaction amount so that, ultimately, the amount recognized for goods or services received as consideration for the equity instruments granted shall be based on the number of equity instruments that eventually vested.

As a result, an entity recognizes cost of goods and services received when all service and non-market vesting conditions are met, regardless of the market conditions or non-vesting conditions are met.

Based on the requirements in FRS 102, we note that when calculating the accounting cost of options, ABC shall recognize an amount based on the best available estimate of the number of equity instruments expected to vest and shall revise the estimate, if subsequent information indicates that the number of equity instruments expected to vest differs from the previous estimates. On vesting date, ABC shall revise the estimate to be equal the number of equity instruments that ultimately vested.

Conclusion

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Total Number of Options	Total Expected # of options to vest	Total FV of Options at Grant Date (SGD)

Please refer Exhibit 2 for detailed calculations.

APPENDIX A: EXHIBITS

Exhibit 1: Guidelines Public Company Description

S. No.	Business Description
1	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis faucibus magna in nunc volutpat, id posuere nulla hendrerit. Pellentesque tristique felis sed arcu maximus, at commodo nibh pulvinar. Suspendisse potenti. Nullam facilisis nisi mauris, in tempor risus cursus ut. Vivamus justo tortor, maximus eu eros vitae, bibendum consectetur dolor. Suspendisse mi mauris, dapibus eu magna euismod, vulputate tincidunt neque. Praesent sed nibh blandit, aliquet quam ac, lobortis lectus.
2	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis faucibus magna in nunc volutpat, id posuere nulla hendrerit. Pellentesque tristique felis sed arcu maximus, at commodo nibh pulvinar. Suspendisse potenti. Nullam facilisis nisi mauris, in tempor risus cursus ut. Vivamus justo tortor, maximus eu eros vitae, bibendum consectetur dolor. Suspendisse mi mauris, dapibus eu magna euismod, vulputate tincidunt neque. Praesent sed nibh blandit, aliquet quam ac, lobortis lectus.
3	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis faucibus magna in nunc volutpat, id posuere nulla hendrerit. Pellentesque tristique felis sed arcu maximus, at commodo nibh pulvinar. Suspendisse potenti. Nullam facilisis nisi mauris, in tempor risus cursus ut. Vivamus justo tortor, maximus eu eros vitae, bibendum consectetur dolor. Suspendisse mi mauris, dapibus eu magna euismod, vulputate tincidunt neque. Praesent sed nibh blandit, aliquet quam ac, lobortis lectus.

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5	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis faucibus magna in nunc volutpat, id posuere nulla hendrerit. Pellentesque tristique felis sed arcu maximus, at commodo nibh pulvinar. Suspendisse potenti. Nullam facilisis nisi mauris, in tempor risus cursus ut. Vivamus justo tortor, maximus eu eros vitae, bibendum consectetur dolor. Suspendisse mi mauris, dapibus eu magna euismod, vulputate tincidunt neque. Praesent sed nibh blandit, aliquet quam ac, lobortis lectus.

Exhibit 2: Calculations

Name	Ref	Grant Date	Vesting Start Date	Fully Vested Date	Time to fully vest from Grant Date (years)	Expected Expiry Date	Expected Life (years)	Share Price (SGD)	Exercise Price (SGD)	Volatility	Dividend Yield	Risk Free Rate	Fair Value of the Option (SGD)	Number of Options	Forefeiture Rate	Expected # of options to vest	FV of Options at Grant Date (SGD)

Name	Ref	Grant Date	Vesting Start Date	Fully Vested Date	Time to fully vest from Grant Date (years)	Expected Expiry Date	Expected Life (years)	Share Price (SGD)	Exercise Price (SGD)	Volatility	Dividend Yield	Risk Free Rate	Fair Value of the Option (SGD)	Number of Options	Forefeiture Rate	Expected # of options to vest	FV of Options at Grant Date (SGD)

Name	Ref	Grant Date	Vesting Start Date	Fully Vested Date	Time to fully vest from Grant Date (years)	Expected Expiry Date	Expected Life (years)	Share Price (SGD)	Exercise Price (SGD)	Volatility	Dividend Yield	Risk Free Rate	Fair Value of the Option (SGD)	Number of Options	Forefeiture Rate	Expected # of options to vest	FV of Options at Grant Date (SGD)

Name	Ref	Grant Date	Vesting Start Date	Fully Vested Date	Time to fully vest from Grant Date (years)	Expected Expiry Date	Expected Life (years)	Share Price (SGD)	Exercise Price (SGD)	Volatility	Dividend Yield	Risk Free Rate	Fair Value of the Option (SGD)	Number of Options	Forefeiture Rate	Expected # of options to vest	FV of Options at Grant Date (SGD)