

# Survey of Valuing Stock Options of Selected Publicly Listed Philippine Companies

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Firms have the flexibility to choose the valuation model and the sources for input variables in determining the fair value of stock options. Thus, firms may be motivated to choose the variables which will result in lower fair value for the stock options. This will translate to lower compensation expense and higher net income. This paper aims to show how selected publicly listed Philippine companies determine the fair value of their stock options.

## 1 Introduction

Stock options are increasingly becoming attractive compensation packages for managers. In the US, participants of Employee Stock Option Plans ("ESOP") have increased from 10.23 million in 2002 to 14.05 million in 2014, a 37.3% increase ("ESOPs by the Numbers", 2017). In the Philippines, among the 30 companies in the Philippine Stock Exchange Index ("PSEi"), 12 have stock option plans for management. Companies use them primarily to align managerial and stockholder interests. Other reasons include scarcity of cash, employee retention, and accounting and tax treatment (Damodaran, 2005). These stock options are charged to the company as compensation expense over the vesting period, which eventually affects the firm's net income. The compensation expense is determined by a valuation model used to determine the stock options' fair value (Echanis, 2016). Accounting standards do not suggest a specific valuation model to use, which allows companies to be flexible with their option valuation. This flexibility on the choice of valuation model and the variables used provide opportunities for companies to manage the amount of compensation expense to be recognized. This paper examines the option valuation practices of 20 publicly-listed Philippine companies with stock option plans (12 PSEi and 8 non-PSEi). The appropriateness of their choices will be assessed based on theoretical frameworks behind the valuation models used.

## 2 Literature Review

Stock options give the employer the following advantages: (1) allow start-ups to recruit highly-skilled managers and staff, (2) provide a more powerful incentive than bonuses/salaries, (3) act as a selection tool in recruitment and retention, (4) tie performance targets to long-term business strategies and (5) reduce agency problem between managers and owners. Because the vesting period is set in the future, managers focus not only on the short-term, but also on the firm's long-term financial performance (Echanis, 2016). On the contrary, Borja and Ang (2003) stated that stock options do not actually mitigate agency costs; they even exacerbate it because managers make decisions that lead to increased volatility of the underlying stock prices, which in return, increase the value of options.

The amount of compensation expense from stock options is based on the fair value of these options at grant date. Such fair value is determined using an option pricing model. This compensation expense is recognized over the stock options' vesting period. These stock options are treated as equity if equity-settled, and liability if cash-settled.<sup>1</sup> However, Kirschenheiter, Mathur, & Thomas (2004) argued that equity treatment distorts performance measures because (1) deferred taxes on nonqualified options are not included as equity, (2) combining the interests of option holders and equity holders provides average earnings which are not representative of either group and (3) cash flow statement projections are overstated to current equity holders by the pretax value of projected option grants. According to them, these distortions will be avoided by always treating stock options,

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<sup>1</sup> Equity-settled – equity instruments of the company are used to pay the share-based compensation; Cash-settled, cash is used to pay the share-based compensation

whether equity or cash-settled, as liabilities. On the other hand, Balsam (1994) contended that equity-settled and cash-settled stock options are substantially and economically equivalent. A study on Australian listed companies presented three accounting treatments for stock options: (1) the current practice of not recognizing stock options unless and until exercised – intrinsic value approach, (2) the position of the Financial Accounting Standards Board (“FASB”) that stock options should be recognized as equity over the options’ vesting period and (3) the treatment of the Australian Accounting Standards Board (“AASB”) that stock options should not be recorded until fully vested. According to Brown & Yew (2002), results of the study showed that changing the current practice to FASB’s and AASB’s recommendations would both change a firm’s financial position.

Studies also analyzed how the markets reacted to adopting fair value accounting on stock options. Results showed that there is a positive and significant abnormal return in the three days around the adoption announcement. This signaled transparency in financial reporting to the markets (Robinson & Burton, 2004). Cron & Hayes (2004) mentioned that FASB’s suggestion to shift to a “fair value” method from an “intrinsic value” method was met with strong opposition from companies concerned on the impact to their profitability. However, Howe & Lippitt (2012) found out that the reported expense under the fair value approach significantly understates the cash cost incurred by the entity at exercise date. They added that the Verified Fair Value (“VFV”) approach, which disaggregates the stock options expense into accruals and fair value changes, could provide accurate, transparent, readily verified, practical and consistent accounting approach (Howe & Lippitt, 2010). Yamashita, Mohd Hanefah, & Noguchi (2010) discussed that countries may also have different reactions to adoption of share-based accounting principles because of their history and culture.

There are many stock option valuation models that can be used. These include Black-Scholes-Merton model, Binominal model and Monte Carlo simulation model (Damodaran, 2005). While there may be fine distinctions, Ammann & Seiz (2003) stated that the values arrived using different valuation models are not dissimilar. Therefore, Damodaran (2005) suggested that simpler models be employed. Chan, Lee, & Wang (2010) talked about a valuation model called the “reset pricing model,” which represents the most pertinent model to price Taiwanese stock options because it deals with restricted exercise price more appropriately. Pan & Tang (2011) said the General Error Distribution Stochastic Volatility Model was also proposed and was found to have a greater veracity in describing stock market return volatility vs. the Black-Scholes-Merton model. Ammann & Seiz (2004) argued that even if different valuation models use completely different approaches, the pricing effect is negligible as long as the expected life of the option is the same.

The six key variables in most option valuation models include: spot price ( $S$ ), strike price ( $K$ ), volatility ( $\sigma$ ), term of the option ( $T$ ), risk-free rate ( $r$ ), and expected dividend yield ( $Y$ ).

Damodaran (2005) cited that the current stock price must be used for the valuation models. Estimated value per share may also be used and the dilution effect should be factored in (Damodaran, 2005). For the term, expected life of the option is normally used as the input. However, this approach presents theoretical weaknesses because the correct input should be the total potential life of the option.<sup>2</sup> This may be addressed by estimating the amount by which the stock price must exceed the strike price to trigger early exercise (Hull & White, 2004). An examination by the Australian Stock Exchange (“ASX”) also stated that using the last traded implied volatility level will result to stale volatility estimates, stale option prices, and therefore stale fair values (Easton & Ivanovic, 2007).

Another finding by Amoruso & Beams (2014) on volatility stated that firms with greater stock-based compensation understate stock volatility, resulting in lower value for the options, particularly on the time value component. Beams, Amoruso, & Richardson (2005) discussed that zero volatility is not also advisable because this will result in an average estimated fair value of options, less than the fair value computed using a volatility estimate from a peer group. Another study claimed that standard option valuation models developed for traded stock options cannot be directly applied to employee stock options because of the problem of potential early exercise. Hemmer, Matsunaga, & Shevlin (1994) proposed that expected contract term, rather than full contract term of the stock

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<sup>2</sup> Expected life of an option is the average length of time the grant is expected to be exercised by an employee while potential life is the maximum life the option can be outstanding.

options, be used for valuing stock options. For American-style options, a change-of-numeraire technique, factoring option delta, and vega can be used to value American-style options properly (Jorgensen, 2002). Delayed vesting only leads to a moderate reduction in the value of American-style options (Jorgensen, 2002).

### 3 What are Stock Options?

Stock options give the holder the right to buy a stock at a certain price (exercise price) in the future. The option will be beneficial to the holder if the stock price increases above the exercise price, because the holder can buy it at a lower price.<sup>3</sup>

Stock options come in different names. In this paper, the following names were used by the companies studied:

	Name	Grantees
1.	Executive Long-Term Incentive Plan	Senior managers
2.	Executive Stock Option Plan	Executives, directors, managers and officers
3.	Executive Stock Purchase Plan	Executives and employees
4.	Employee Share Option Plan	Key executives and employees
5.	Employee Stock Grant Plan	Officers and employees
6.	Employee Stock Option Plan	Key executives
7.	Employee Stock Ownership Plan	Executives, officers and employees
8.	Employee Stock Purchase Plan	Executives, directors, officers and employees
9.	Long-Term Incentive Plan	Executives and senior managers
10.	Management Stock Option Program	Senior managers
11.	Share Incentive Plan	Directors, officers and employees
12.	Stock Incentive Plan	Officers

These stock options usually have a vesting period, which refers to the length of time by which a manager earns and becomes entitled to the option. This waiting period incentivizes managers to stay with the company and perform well ("Employee Stock Options", 2017).

Three valuation models are used by companies in determining the fair values of stock options (see Appendix A for option valuation models). These valuation models are affected by six variables as stated in the previous section.

### 4 Significance of the Study

This study aims to show how selected publicly listed Philippine companies determine the fair value of their stock options. The valuation models used affect the timing and the amount of compensation expense recognized in the income statement which affects profitability.

This study aims to answer the following problems:

- What are the valuation model/s used by publicly listed Philippine companies to determine the fair value of their stock options?
- What are the variables used in the valuation model/s?
- What are the bases used in determining the required variables?
- What is the impact of the bases used vis-à-vis theoretical bases on compensation expense and income?
- What are the tax implications on the companies' income?

<sup>3</sup> For example, a stock option was vested to a manager and exercise price is P1,200. If the underlying stock price goes up to P1,500, the holder can exercise its option at P1,200, giving him a gain of P300.

## 5 Methodology

The following procedures were conducted:

1. Reviewed the financial statements of 30 publicly listed Philippine companies which comprised the PSE index to identify which have stock option plans. Out of the 30, 12 were identified to have stock option plans (see Table 1 for the list).
2. Reviewed the financial statements of eight more PSE-listed companies (non-PSEi) to increase sample size to 20. These eight companies were selected based on market capitalization (see Table 1 for the list).
3. Identified the valuation model/s used by each company in determining the fair value of their stock options.
4. Identified the variables used by each company in their stock option valuation models.
5. Compared the companies' bases for the variables they used vis-a-vis theoretical bases.
6. Identified the impact on financial reporting, income taxes, and net income of using other bases. The appropriate revenue memorandum circulars governing taxation of stock options were discussed.

**Table 1. List of PSEi and Non-PSEi Companies with Stock Option Plans**

	Company	Symbol	Type of Stock Options	Market Capitalization (in PHP) As of Dec. 31, 2016
<b>PSEi</b>				
1	Ayala Corp.	AC	Executive Stock Option Plan Employee Stock Ownership Plan	453,779,502,462
2	Alliance Global Group, Inc.	AGI	Executive Stock Option Plan	130,024,299,944
3	Ayala Land, Inc.	ALI	Executive Stock Option Plan Employee Stock Ownership Plan	471,198,321,856
4	BDO Unibank, Inc.	BDO	Not disclosed	489,811,488,087
5	Bank of the Philippine Islands	BPI	Executive Stock Option Plan Executive Stock Purchase Plan	348,903,226,898
6	First Gen Corp.	FGEN	Executive Stock Option Plan	80,406,751,854
7	Globe Telecom, Inc.	GLO	Executive Stock Option Plan Long-Term Incentive Plan	200,571,126,765
8	International Container Terminal Services, Inc.	ICT	Stock Incentive Plan	146,360,363,779
9	Jollibee Foods Corp.	JFC	Management Stock Option Program Executive Long-term Incentive Program	210,593,608,998
10	Megaworld Corp.	MEG	Executive Stock Option Plan	115,094,821,763
11	Metro Pacific Investments Corp.	MPI	Executive Stock Option Plan	209,873,774,488
12	San Miguel Corp.	SMC	Employee Stock Purchase Plan Long-Term Incentive Plan	219,537,855,469
<b>Non-PSEi</b>				
13	Energy Development Corporation	EDC	Employee Stock Grant Plan	96,495,601,500
14	Emperador Inc.	EMP	Employee Share Option Plan	113,380,537,732
15	Travellers International Hotel Group, Inc.	RWM	Employee Stock Option Plan	51,836,828,257
16	Manila Water Company, Inc.	MWC	Employee Stock Ownership Plan	59,564,430,636
17	Nickel Asia Corporation	NIKL	Executive Stock Option Plan	60,671,373,053
18	Melco Resorts and Entertainment (Philippines)	MRP	Share Incentive Plan	21,420,369,458
19	First Philippine Holdings Corporation	FPH	Executive Stock Option Plan	37,419,117,535
20	Lopez Holdings Corporation	LPZ	Employee Stock Purchase Plan	36,103,646,366

Source: 2016 Annual Reports from [edge.pse.com.ph](http://edge.pse.com.ph), market capitalization from Thomson Reuters Eikon

## 6 Results and Discussion

Eleven of the 20 companies used the Black-Scholes-Merton model for valuing their stock options. Four Ayala-affiliated companies used a combination of Binomial Tree, Trinomial Option Model, and the market price of the stock at grant date. One simply used market price of stock at grant date. Four did not provide information on the valuation model they used (see Table 2):

**Table 2. List of Companies with Stock Option Plans and their Valuation Models**

Company	
<b>Black-Scholes-Merton Model</b>	
1	Alliance Global Group, Inc.
2	Bank of the Philippine Islands
3	Jollibee Foods Corp.
4	Megaworld Corp.
5	Metro Pacific Investments Corp.
6	San Miguel Corp.
7	Emperador Inc.
8	Nickel Asia Corporation
9	Melco Resorts and Entertainment (Philippines)
10	First Philippine Holdings Corporation
11	Lopez Holdings Corporation
<b>Combination (Black-Scholes-Merton, Binomial Tree, Trinomial Tree, market price at grant date)</b>	
1	Ayala Corp.
2	Ayala Land, Inc.
3	Globe Telecom, Inc.
4	Manila Water Company, Inc.
<b>Market price at grant date</b>	
1	International container Terminal Services, Inc.
<b>Not disclosed</b>	
1	BDO Unibank, Inc.
2	First Gen Corp.
3	Energy Development Corporation
4	Travellers International Hotel Group, Inc.

Source: 2016 Annual Reports from [edge.pse.com.ph](http://edge.pse.com.ph)

The following section discusses the findings of the study based on the variables used in the models.

### 6.1 Stock Price (\$)

Eight of the 20 companies used the closing price at grant date, six used average price, and six did not disclose their stock price reference (see Table 3).

**Table 3. References for Stock Price (S)**

<b>Company</b>	
<b>Closing price at grant date</b>	
1	Alliance Global Group, Inc.
2	Globe Telecom, Inc.
3	International Container Terminal Services, Inc.
4	Jollibee Foods Corp.
5	Megaworld Corp.
6	Metro Pacific Investments Corp.
7	Nickel Asia Corporation
8	Melco Resorts and Entertainment (Philippines)
<b>Average share price</b>	
1	Ayala Corp.
2	Ayala Land, Inc.
3	Emperador Inc.
4	Manila Water Company, Inc.
5	First Philippine Holdings Corporation
6	Lopez Holdings Corporation
<b>Not disclosed</b>	
1	BDO Unibank, Inc.
2	Bank of the Philippine Islands
3	First Gen Corp.
4	San Miguel Corp.
5	Energy Development Corporation
6	Travellers International Hotel Group, Inc.

Source: 2016 Annual Reports from [edge.pse.com.ph](http://edge.pse.com.ph), historical prices from Thomson Reuters Eikon; **Note:** ND = not disclosed

The six companies that used average share prices had either higher or lower option fair value, because these average share prices were either higher or lower than the spot prices at grant date. Spot price was directly related to a call option's fair value.

**Table 4. Impact of Spot Price (S) Used on Option Fair Value (FV)**

	<b>Company</b>	<b>Closing Share Price</b>	<b>Average Share Price</b>	<b>Impact of S Used to Option FV</b>
<b>PSEi</b>				
<b>1</b>	<b>Ayala Corp.</b>			
	Grant date: April 16, 2010	275.00	303.70	Higher
	Grant date: April 18, 2011	327.83	352.08	Higher
	Grant date: April 26, 2013	640.00	640.00	Same
	Grant date: April 30, 2012	430.00	434.47	Higher
	Grant date: April 11, 2014	619.00	673.96	Higher
	Grant date: December 23, 2015	759.00	718.88	Lower
	Grant date: December 9, 2016	732.00	717.30	Lower
<b>2</b>	<b>Ayala Land, Inc.</b>			
	Grant date: June 30, 2005	6.50	8.36	Higher
	Grant date: November 16, 2005	7.75	9.30	Higher
	Grant date: June 5, 2006	10.83	13.00	Higher
	Grant date: September 20, 2007	15.00	15.00	Same
	Grant date: May 15, 2008	10.50	10.50	Same
	Grant date: April 30, 2009	6.40	6.40	Same
	Grant date: March 31, 2010	13.00	13.00	Same
	Grant date: March 31, 2011	15.50	15.50	Same
	Grant date: March 13, 2012	20.75	21.98	Higher
	Grant date: March 18, 2013	29.55	30.00	Higher
	Grant date: March 20, 2014	28.40	31.46	Higher
	Grant date: March 20, 2015	37.85	36.53	Lower



	Company	Closing Share Price	Average Share Price	Impact of S Used to Option FV
<b>Non-PSEi</b>				
<b>3</b>	<b>Emperador Inc.</b>			
	Grant date: November 7, 2014	11.00	8.90	Lower
<b>4</b>	<b>Manila Water Company, Inc.</b>			
	Grant date: September 19, 2011	19.07	19.80	Higher
	Grant date: October 5, 2012	28.31	26.24	Lower
	Grant date: November 19, 2013	25.17	23.00	Lower
	Grant date: February 10, 2015	31.11	21.35	Lower
<b>5</b>	<b>First Philippine Holdings Corporation</b>			
	Grant date: March 2005	51.50	60.00	Higher
	Grant date: March 2006	46.50	41.00	Lower
<b>6</b>	<b>Lopez Holdings Corporation</b>			
	Grant date: March 2011	5.43	4.57	Lower

## 6.2 Strike Price (K)

None of the companies covered in the study disclosed their reference for establishing the strike price of their stock options, but majority of these companies provided discount relative to the spot price used in the option valuation models. Seven companies provided discounts, one at premium, five provided both discount and premium, one at market price, and six with no disclosure. Discounts ranged from 0.1% to 100%, while premiums ranged from 0.2% to 21.8%. Companies that provided discounts included Ayala firms (Ayala Corp., Ayala Land, Inc.) and Andrew Tan firms (Alliance Global Group, Inc., Megaworld Corp., Emperador Inc.). International Container Terminal Services, Inc. issued Stock Incentive Plans (SIP) at 100% discount. Meanwhile, Metro Pacific Investments Corp. consistently issued stock options at a premium. Globe, Jollibee, Manila Water, Melco Resorts and First Philippine Holdings had stock options issued at both discounts and premiums (see Table 5).

**Table 5. Strike Price (K) Relative to Share Price (S)**

	Company	Range of Discount/Premium
<b>Discount</b>		
1	Ayala Corp.	10.0% to 31.6%
2	Alliance Global Group, Inc.	10.7% to 40.0%
3	Ayala Land, Inc.	7.2% to 33.2%
4	International Container Terminal Services, Inc.	100.0%
5	Megaworld Corp.	29.5%
6	Emperador Inc.	21.4%
7	Nickel Asia Corporation	10.0% to 45.6%
<b>Premium</b>		
1	Metro Pacific Investments Corp.	0.2% to 3.0%
<b>Both discount and premium</b>		
1	Globe Telecom, Inc.	
	Granted in 2006 to 2009	Discount: 0.1% to 8.1%
	Granted in 2004	Premium: 0.7%
2	Jollibee Foods Corp.	
	Granted in 2004 to 2007, 2009 to 2010	Discount: 3.3% to 17.5%
	Granted in 2008	Premium: 17.2%
3	Manila Water Company, Inc.	
	Granted in 2011 to 2013	Discount: 0.4% to 12.2%
	Granted in 2015	Premium: 21.8%
4	Melco Resorts and Entertainment (Philippines)	
	Granted in Feb to Mar 2014	Discount: 34.9% to 38.4%
	Granted in May 2014	Premium: 1.9%
5	First Philippine Holdings Corporation	
	Granted in 2005	Discount: 2.3%
	Granted in 2006	Premium: 1.6%

Company	Range of Discount/Premium
<b>Market price (no discount nor premium)</b>	
1 Lopez Holdings Corporation	0.0%
<b>Not disclosed</b>	
1 BDO Unibank, Inc.	
2 Bank of the Philippine Islands	
3 First Gen Corp.	
4 San Miguel Corp.	
5 Energy Development Corporation	
6 Travellers International Hotel Group, Inc.	

Source: 2016 Annual Reports from edge.pse.com.ph, historical prices from Thomson Reuters Eikon; **Note:** ND = not disclosed

Appendix C provides the details of the strike prices used in determining the fair value of the options.

### 6.3 Volatility ( $\sigma$ )

Fourteen of the 20 companies estimated volatility of historical returns. Only JFC and EMP specifically mentioned their usage of share price returns for the past 365 days/1 year. The remaining six did not disclose any volatility reference (see Table 6).

**Table 6. Disclosure/Non-disclosure of Volatility ( $\sigma$ ) Reference**

Company	Range of Volatility	Volatility ( $\sigma$ ) Reference
<b>Disclosed volatility reference</b>		
1 Ayala Corp.	38.2% to 49.9%	Expected volatility based on historical volatility
2 Alliance Global Group, Inc.	14.3% to 16.8%	Average standard deviation of share price returns
3 Ayala Land, Inc.	31.9% to 46.3%	Expected volatility based on historical volatility
4 Globe Telecom, Inc.	29.5% to 48.5%	Standard deviation of expected share price returns for the past 365 days
5 Jollibee Foods Corp.	17.8% to 36.9%	Expected volatility based on historical volatility
6 Megaworld Corp.	9.4%	Average standard deviation of share price returns
7 Metro Pacific Investments Corp.	33.1% to 94.1%	Expected volatility based on historical volatility
8 San Miguel Corp.		Average share price volatility
9 Emperador Inc.	10.2%	Expected volatility based on historical volatility (1-year)
10 Manila Water Company, Inc.	24.9% to 33.7%	Expected volatility based on historical volatility
11 Nickel Asia Corporation	33.3% to 53.4%	Expected volatility based on historical volatility
12 Melco Resorts and Entertainment (Philippines)	40.0% to 45.0%	Expected volatility based on historical volatility of peer group of publicly traded companies
13 First Philippine Holdings Corporation	21.7% to 38.2%	Expected volatility based on historical volatility
14 Lopez Holdings Corporation	42.6%	Expected volatility based on historical volatility
<b>Did not disclose volatility reference</b>		
1 BDO Unibank, Inc.		
2 Bank of the Philippine Islands		
3 First Gen Corp.		



	Company	Range of Volatility	Volatility ( $\sigma$ ) Reference
4	International container Terminal Services, Inc.		
5	Energy Development Corporation		
6	Travellers International Hotel Group, Inc.		

Source: 2016 Annual Reports from edge.pse.com.ph; **Note:** ND = not disclosed

Borja and Ang (2003) mentioned that stock options do not actually mitigate agency costs, but rather exacerbate it because volatility increases stock option value. As shown in Table 6, the computed volatility of the stock options covered in the study ranged from 9.4% to 94.1%.

#### 6.4 Term of the Option (T)

Twelve of the 20 PSE companies disclosed the expected life of their stock options. The rest did not disclose stock option life. Expected life of stock options ranged from 3.5 years to as long as 20.23 years. Ayala-affiliated companies seemed to have long tenors with Ayala Corp., Ayala Land, Inc. and Globe Telecom, Inc. having an expected life of 10 years. Megaworld Corp. had 15.29 years while another affiliated company, Emperador Inc., provided the longest expected life with 20.23 years (see Table 7). Note that higher term leads to higher stock option value.

**Table 7. References for Term of the Option (T)**

	Company	Expected Life
<b>Disclosed expected life of stock options</b>		
1	Ayala Corp.	10 yrs
2	Alliance Global Group, Inc.	7 yrs
3	Ayala Land, Inc.	10 yrs
4	First Gen Corp.	10 yrs
5	Globe Telecom, Inc.	10 yrs
6	Jollibee Foods Corp.	3.5 to 6 yrs
7	Megaworld Corp.	15.29 yrs
8	San Miguel Corp.	8 yrs
9	Emperador Inc.	20.23 yrs
10	Manila Water Company, Inc.	4.00 yrs
11	Nickel Asia Corporation	3.97 to 5 yrs
12	Melco Resorts and Entertainment (Philippines)	5.2 to 5.4 yrs

Source: 2016 Annual Reports from edge.pse.com.ph; **Note:** ND = not disclosed, NA = not applicable

#### 6.5 Risk-free Rate (r)

The basis of determining risk-free rate varies for each company and for each option. Thirteen of the 20 companies disclosed their risk-free rate reference (see Table 8.1 below). It should be noted that the higher the risk-free rate reference, the higher is the fair value of the option. There are stock options provided by companies coming from the same group which used significantly different risk-free rate references for valuing stock options granted at almost similar dates. Ayala Corporation used 8.6% risk-free rate for the stock options on grantees in April 2010 while its subsidiary Ayala Land, Inc. used 5.9% for stock options granted in March 2010. Both stock options have terms of 10 years. The yield on 10-year Republic of the Philippines (ROP) bond in 2009 was 7.88% and 7.21% in 2010 (see Appendix E). The use of 8.6% risk-free rate by Ayala Corp. led to higher stock option value, while the use of 5.9% by Ayala Land, Inc. led to lower stock option value.

**Table 8.1. Disclosure/Non-disclosure of Risk-free Rate (r) Reference**

	Company	Range of Risk-free Rate	Tenor
<b>Disclosed risk-free rate reference</b>			
1	Ayala Corp.	3.0% to 8.6%	10 yrs
2	Alliance Global Group, Inc.	2.5% to 2.9%	7 yrs
3	Ayala Land, Inc.	2.8% to 12.6%	10 yrs
4	Globe Telecom, Inc.	7.0% to 12.9%	10 yrs
5	Jollibee Foods Corp.	2.6% to 8.4%	3.5 to 6 yrs
6	Megaworld Corp.	3.7%	15.29 yrs
7	Metro Pacific Investments Corp.	0.7% to 6.6%	ND
8	Emperador Inc.	4.9%	20.23 yrs
9	Manila Water Company, Inc.	2.9% to 4.8%	4 yrs
10	Nickel Asia Corporation	3.2% to 4.5%	3.97 to 5 yrs
11	Melco Resorts and Entertainment (Philippines)	3.8% to 4.1%	5.2 to 5.4 yrs
12	First Philippine Holdings Corporation	8.5% to 10.9%	ND
13	Lopez Holdings Corporation	4.3%	ND
<b>Did not disclose risk-free rate reference</b>			
1	BDO Unibank, Inc.		
2	Bank of the Philippine Islands		
3	First Gen Corp.		
4	International container Terminal Services, Inc.		
5	San Miguel Corp.		
6	Energy Development Corporation		
7	Travellers International Hotel Group, Inc.		

Source: 2016 Annual Reports from [edge.pse.com.ph](http://edge.pse.com.ph), historical risk-free rates from the Bureau of Treasury;

**Note:** ND = not disclosed

It was observed that the risk-free rate used by some of the companies covered were lower than what should have been used given the tenor of the options. Lower risk-free rate used in the valuation model led to lower option fair value. Note that risk-free rate is directly related to a call option's fair value (see Appendix D for details).

For example, Jollibee Foods Corp. granted two stock options in 2015 with tenors of 3.5 years and 6 years. The risk-free rate used for both stock option valuation was the same at 3%. The yields on one-year and five-year Philippine government treasury note in 2015 were 1.9% and 2.5%, respectively.

Table 8.2 shows that risk-free rates used by companies covered in the study vary per year. For example, Jollibee Foods Corp. used 2.6% in 2016, while Ayala Corp. and Ayala Land used 4.8%. Comparable risk-free rates in 2016 are 3.38% for Jollibee and 3.56% for Ayala Land. In 2011, Alliance Global Inc. used 2.5%, while Ayala Corp. used 6.6%. Comparable risk-free rates in 2011 are 5.48% for Alliance Global and 7.21% for Ayala Land. This shows the discretion of management in determining the risk-free rate to value their stock options. Except for Ayala Land, these examples used risk-free rates which were lower than the comparable risk-free rates prevailing during the year these options were granted.

Table 8.2. Risk-free Rates (r) Used by Evaluated PSE Companies

Company	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>PSEi</b>														
1 Ayala Corp.							7.5%	8.6%	6.6%	5.6%	3.0%	4.4%	4.1%	4.8%
2 Alliance Global Group, Inc.									2.5%		2.9%			
3 Ayala Land, Inc.			12.0%	10.6%	6.9%	8.5%	5.9%	6.0%	5.9%	5.7%	2.8%	3.1%	4.1%	4.8%
7 Globe Telecom, Inc.	11.5%	12.9%		10.3%	7.0%	9.6%	8.1%							
9 Jollibee Foods Corp.		6.2%	6.2%	6.2%	6.4%	8.4%	5.3%	5.3%	4.2%	3.6%	2.7%	2.6%	3.0%	2.6%
10 Megaworld Corp.										3.7%	3.7%	3.7%		
11 Metro Pacific Investments Corp.						6.3%	4.5%	4.1%	3.6%		1.5%			
<b>Non-PSEi</b>														
14 Emperor Inc.												4.9%		
16 Manila Water Company, Inc.									4.8%	4.6%	3.0%		3.8%	
17 Nickel Asia Corporation									4.5%			3.3%	3.2%	
18 Melco Resorts and Entertainment (Philippines)											3.8%	3.8%	4.1%	4.1%
19 First Philippine Holdings Corporation			10.9%	8.5%										
20 Lopez Holdings Corporation									4.3%					

## 6.6 Dividend Yield (Y)

Twelve of the 20 companies disclosed the dividend yield used for valuing options (see Table 9 below). The rest of the companies did not disclose their dividend yield completely.

**Table 9. Disclosure/Non-disclosure of Dividend Yield (Y) Reference**

	Company	Ave. Div. Yield (as disclosed)
<b>Disclosed dividend yield reference</b>		
1	Ayala Corp.	0.85%
2	Alliance Global Group, Inc.	2.11%
3	Ayala Land, Inc.	1.18%
4	Globe Telecom, Inc.	5.07%
5	Jollibee Foods Corp.	1.89%
6	Megaworld Corp.	0.59%
7	Emperador Inc.	1.08%
8	Manila Water Company, Inc.	2.86%
9	Nickel Asia Corporation	2.23%
10	Melco Resorts and Entertainment (Philippines)	0.00%
11	First Philippine Holdings Corporation	0.00%
12	Lopez Holdings Corporation	2.50%
<b>Did not disclose dividend yield reference</b>		
1	BDO Unibank, Inc.	
2	Bank of the Philippine Islands	
3	First Gen Corp.	
4	International container Terminal Services, Inc.	
5	Metro Pacific Investments Corp.	
6	San Miguel Corp.	
7	Energy Development Corporation	
8	Travellers International Hotel Group, Inc.	

Source: 2016 Annual Reports from [edge.pse.com.ph](http://edge.pse.com.ph), historical dividend yields from Thomson Reuters DataStream

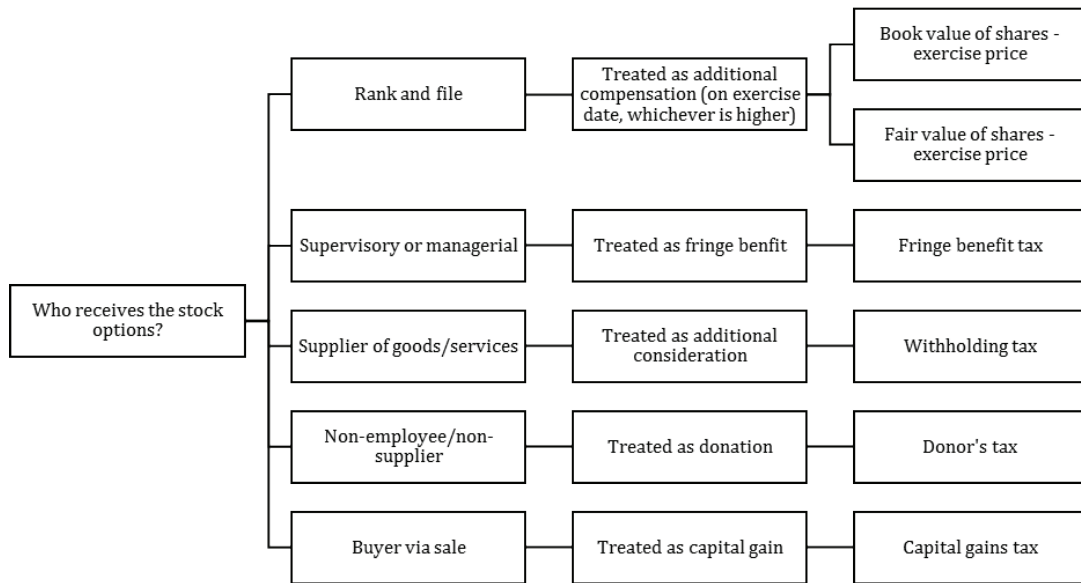
## 6.7 Impact on Taxation

There are two Revenue Memorandum Circulars (RMC) governing taxation on stock options:

1. RMC No. 88-2012
2. RMC No. 79-2014

The provisions of these circulars for the stock option recipient are summarized in Figure 1:

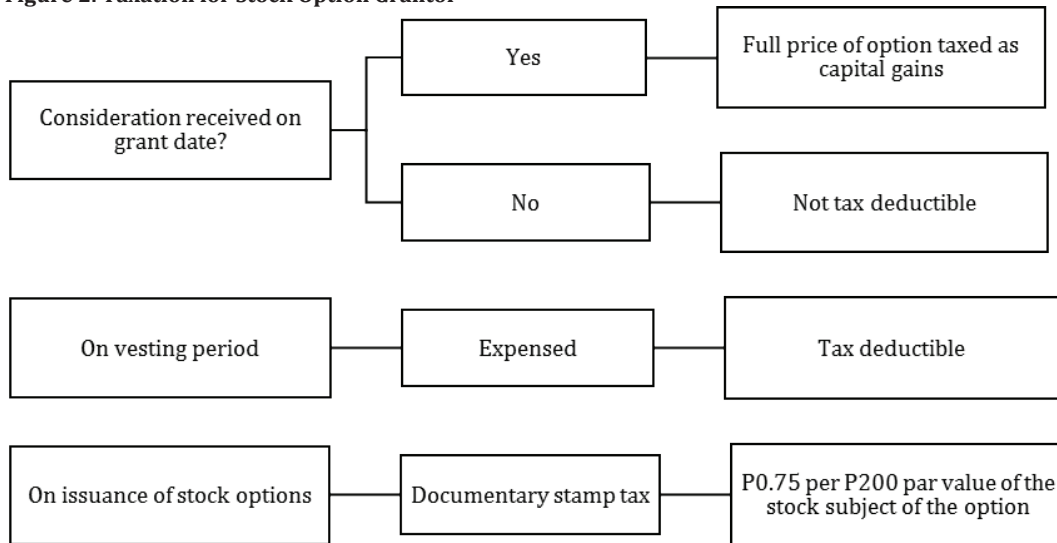
**Figure 1. Taxation for Stock Option Recipient**



Source: RMC No. 88-2012, RMC No. 79-2014

The provisions of these circulars for the stock option grantor are summarized in Figure 2:

**Figure 2. Taxation for Stock Option Grantor**



Source: RMC No. 88-2012, RMC No. 79-2014

The bias of companies to reduce the fair value of stock options resulted in higher taxable income and income taxes. However, given the 30% income tax rate for corporations, this increase in taxable income still resulted in higher net income for these companies.

## 7 Conclusion

Stock option plans have become prevalent in the corporate world, particularly for publicly-listed companies. They have been considered effective means to attract, retain and motivate good managers. From the 20 companies covered in this study, the following observations were drawn:

- (1) Different stock option valuation models were used by companies covered in the study. The most common is the Black-Scholes-Merton model.
- (2) Companies use different variables that have different effects on the fair values of the stock options as shown in Table 10.

**Table 10. Full Summary of Impact on Compensation Expense**

	Company	S	K	T	$\sigma$	r	Y
<b>PSEi</b>							
1	Ayala Corp.	Mixed	NA	✓	Indeterminate	Mixed	Mixed
2	Alliance Global Group, Inc.	✓	NA	✓	Indeterminate	Lower	Mixed
3	Ayala Land, Inc.	Mixed	NA	✓	Indeterminate	Mixed	Mixed
4	BDO Unibank, Inc.	NA	NA	Indeterminate	Indeterminate	NA	NA
5	Bank of the Philippine Islands	NA	NA	Indeterminate	Indeterminate	NA	NA
6	First Gen Corp.	NA	NA	✓	Indeterminate	NA	NA
7	Globe Telecom, Inc.	✓	NA	✓	Indeterminate	Mixed	Lower
8	International container Terminal Services, Inc.	✓	NA	Indeterminate	Indeterminate	NA	NA
9	Jollibee Foods Corp.	✓	NA	✓	Indeterminate	Lower	Mixed
10	Megaworld Corp.	✓	NA	✓	Indeterminate	Lower	Higher
11	Metro Pacific Investments Corp.	✓	NA	Indeterminate	Indeterminate	Lower	NA
12	San Miguel Corp.	NA	NA	✓	Indeterminate	NA	NA
<b>Non-PSEi</b>						Indeterminate	
13	Energy Development Corporation	NA	NA	Indeterminate	Indeterminate	NA	NA
14	Emperador Inc.	Lower	NA	✓	Indeterminate	Higher	Lower
15	Travellers International Hotel Group, Inc.	NA	NA	NA	Indeterminate	NA	NA
16	Manila Water Company, Inc.	Mixed	NA	✓	Indeterminate	Higher	Mixed
17	Nickel Asia Corporation	✓	NA	✓	Indeterminate	Higher	Mixed
18	Melco Resorts and Entertainment (Philippines)	✓	NA	✓	Indeterminate	Higher	✓
19	First Philippine Holdings Corporation	Mixed	NA	✓	Indeterminate	Mixed	NA
20	Lopez Holdings Corporation	Lower	NA	✓	Indeterminate	Mixed	NA

**Note:** ✓ = no effect, NA = not applicable, Lower = lower fair value, Higher = higher fair value, Mixed = mixed effect on fair value, Indeterminate = need more information

- (3) The degree of disclosures on the variables used in stock option valuation varies from one company to another. Companies from the Ayala Group (Ayala Corp., Ayala Land, Inc., Globe Telecom, Inc., Manila Water Company, Inc.) and the Andrew Tan Group (Alliance Global Group, Inc., Megaworld Corp., Emperador Inc.) have the most informative disclosures and theoretically sound references on their stock option valuation. Jollibee Foods Corp., Metro Pacific Investments Corp., Nickel Asia Corporation, Melco Resorts and Entertainment (Philippines) and the Lopez' companies (First Philippine Holdings and Lopez Holdings Corporation) also disclosed properly and used appropriate references for many of their input variables. On the other hand, BDO Unibank, Inc., Bank of the Philippine Islands, Energy Development Corporation, and Travellers International Hotel Group, Inc. failed to disclose relevant information on the valuation of stock options like stock price, strike price, volatility, risk-free rate, and dividend yield (see Table 11).



**Table 11. Summary of PSEi Companies Using Theoretical Bases**

	Company	S	K	T	$\sigma$	r	Y
<b>PSEi</b>							
1	Ayala Corp.	×	ND	✓	✓	×	×
2	Alliance Global Group, Inc.	✓	ND	✓	✓	×	×
3	Ayala Land, Inc.	×	ND	✓	✓	×	×
4	BDO Unibank, Inc.	ND	ND	×	ND	ND	ND
5	Bank of the Philippine Islands	ND	ND	×	ND	ND	ND
6	First Gen Corp.	ND	ND	✓	ND	ND	ND
7	Globe Telecom, Inc.	✓	ND	✓	✓	×	×
8	International Container Terminal Services, Inc.	✓	ND	×	ND	ND	ND
9	Jollibee Foods Corp.	✓	ND	✓	✓	×	×
10	Megaworld Corp.	×	ND	✓	✓	×	×
11	Metro Pacific Investments Corp.	✓	ND	×	✓	×	ND
12	San Miguel Corp.	ND	ND	✓	✓	ND	ND
<b>Non-PSEi</b>							
13	Energy Development Corporation	ND	ND	×	ND	ND	ND
14	Emperador Inc.	×	ND	✓	✓	×	×
15	Travellers International Hotel Group, Inc.	ND	ND	×	ND	ND	ND
16	Manila Water Company, Inc.	×	ND	✓	✓	×	×
17	Nickel Asia Corporation	✓	ND	✓	✓	×	×
18	Melco Resorts and Entertainment (Philippines)	✓	ND	✓	✓	×	×
19	First Philippine Holdings Corporation	×	ND	✓	✓	×	×
20	Lopez Holdings Corporation	×	ND	✓	✓	×	×

**Note:** ✓ = used theoretical bases, × = did not use theoretical bases, ND = not disclosed

## References

- Ammann, M., & Seiz, R. (2003). *Does the model matter? A valuation analysis of employee stock options*. EFMA 2004 Basel Meetings Paper.
- Ammann, M., & Seiz, R. (2004). Valuing employee stock options: Does the model matter? *Financial Analysts Journal*, 60(2), 21-37.
- Amoruso, A. J., & Beams, J. D. (2014). CEO compensation and the reported value of stock options in initial public offerings. *Review of Accounting and Finance*, 232-250.
- Balsam, S. (1994). Extending the method of accounting for stock appreciation rights to employee stock options. *Accounting Horizons*, 52-60.
- Beams, J. D., Amoruso, A. J., & Richardson, F. M. (2005). Discretionary reporting of stock options by IPO firms. *Accounting Horizons*, 223-236.
- Borja, D. V., & Ang, C. S. (2003). Executive stock options, stock price volatility, and agency costs in the Philippine setting. *The Philippine Review of Economics*, 117-124.
- Brown, P., & Yew, E. (2002). How do investors regard ESOs? *Australian Accounting Review*, 36-42.
- Chan, C.-Y., Lee, L.-C., & Wang, M.-C. (2010). Employee stock options pricing and the implication. *Rev Quant Finan Acc*, 247-271.
- Cron, W. R., & Hayes, R. B. (2004). Accounting for stock options: Measuring the real cost through time. *Mid-American Journal of Business*, 13-21.
- Damodaran, A. (2005). *Employee stock options (ESOPs) and restricted stock: Valuation effects and consequences*. New York: Stern School of Business.
- Easton, S., & Ivanovic, I. (2007). An examination of the Australian Stock Exchange and Australian financial review's fair values. *International Journal of Managerial Finance*, 306-312.
- Echanis, E. S. (2016). Stock options: An incentive compensation scheme for managers. In E. R. Roman, *Readings on strategic management* (pp. 305-320). Quezon City: UP Business Research Foundation, Inc.
- Employee Stock Options: Definitions and Key Concepts. (2017). Retrieved from <https://www.investopedia.com/university/employee-stock-options-eso/eso1.asp>
- ESOPs by the Numbers. (2017, March). *National Center for Employee Ownership*. Retrieved from <https://www.nceo.org/articles/esops-by-the-numbers>
- Hemmer, T., Matsunaga, S., & Shevlin, T. (1994). Estimating the "fair value" of employee stock options with expected early exercise. *Accounting Horizons*, 23-42.
- Howe, H., & Lippitt, J. (2010). The development of a verified fair value approach to accounting for employee stock options. *International Journal of Management*, 162-201.
- Howe, H., & Lippitt, J. W. (2012). An evaluation of fair value accounting for employee stock options. *International Business & Economics Research Journal*, 821-826.
- Hull, J. C. (2015). *Options, futures, and other derivatives*, 9<sup>th</sup> ed. New York: Pearson Education, Inc.
- Hull, J., & White, A. (2004). How to value employee stock options. *Financial Analysts Journal*, 114-119.
- Jorgensen, P. (2002). American-style indexed executive stock options. *European Finance Review*, 325-358.
- Kirschenheiter, M., Mathur, R., & Thomas, J. (2004). Accounting for employee stock options. *Accounting Horizons*, 135-156.
- Pan, M., & Tang, S. (2011). Option pricing and executive stock option incentives: An empirical investigation under general error distribution stochastic volatility model. *Asia-Pacific Journal of Operational Research*, 81-93.
- Robinson, D., & Burton, D. (2004). Discretion in Financial Reporting: The voluntary adoption of fair value accounting for employee stock options. *Accounting Horizons*, 97-108.
- Trinomial Option Pricing Model. (2017). Retrieved from <https://www.investopedia.com/terms/t/trinomialoptionpricingmodel.asp>
- Yamashita, K., Mohd Hanefah, H., & Noguchi, A. (2010). Stock options rules in Malaysia and Japan: A comparative analysis. *Journal of International Business Research*, 99-118.

## Appendix A Option Valuation Models

The valuation models used by the companies in this study are the following:

### (1) Black-Scholes-Merton Model (Hull, 2015)

Developed by Fisher Black, Robert Merton and Myron Scholes, this is the most widely used option valuation model.

Call Option Price Formula

$$C = S_0N(d_1) - Ke^{-rT}N(d_2)$$

Where:

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

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

$S_0 =$  Spot price

$K =$  Strike price

$T =$  Time to expiration

$\sigma =$  Volatility

$r =$  Risk free rate

$N(d_1)$  and  $N(d_2)$  denotes the standard cumulative normal probability for  $d_1$  and  $d_2$

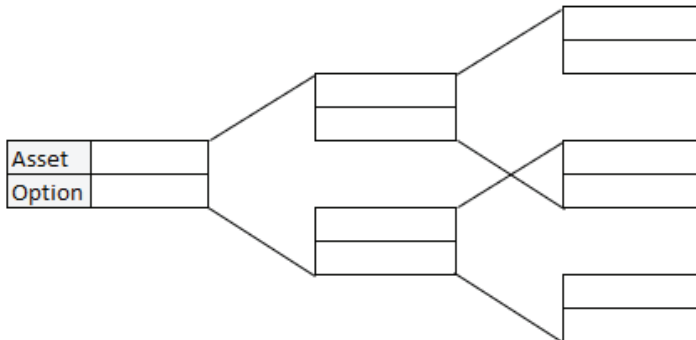
The relationship of the variables used in the model to the option's fair value are as follows:

Variable	Call Option Price
Spot price	DIRECT
Strike price	INVERSE
Time to expiration	DIRECT
Volatility	DIRECT
Risk-free rate	DIRECT
Dividends expected to be paid	INVERSE

This model will be the basis of the variables scrutinized in this study.

### (2) Binomial Model (Hull, 2015)

This model uses a decision tree to determine the option price:



Using the following variables:

$u$  (magnitude of up jump)

$d$  (magnitude of down jump)

$p$  (probability of up jump)

$1-p$  (probability of down jump)

$\Delta t$

$$\frac{e^{\sigma\sqrt{\Delta t}}}{1/u} = \frac{e^{r\Delta t} - d}{u - d}$$

$\frac{1 - p}{\text{Tenor}}$   
No. of steps

### (3) Trinomial Model (Trinomial Option Pricing Model, 2017)

This model also uses a decision tree to determine option price. While the binomial model incorporates only two possible price directions (up and down from current price), the trinomial model includes a third possible price direction which is unchanged.

**Appendix B**  
**Variables Used in Determining the Fair Value of Stock Options**

	Company	Date Granted	Type of Stock Options	S Share Price	K Strike Price	T Term	$\sigma$ Volatility	r Risk-free Rate	Y Dividend Yield	
1	Ayala Corp.	April 16, 2010	Executive Stock Option Plan	303.70	273.03	10 yrs	41.31%	8.56%	0.92%	
		April 18, 2011	Executive Stock Option Plan	352.08	316.87	10 yrs	41.21%	6.64%	0.86%	
		April 26, 2013	Executive Stock Option Plan	640.00	500.00	10 yrs	42.40%	3.04%	0.54%	
2	Alliance Global Group, Inc.	April 30, 2012	Employee Stock Ownership Plan	434.47	322.00	10 yrs	41.78%	5.59%	0.74%	
		April 11, 2014	Employee Stock Ownership Plan	673.96	480.00	10 yrs	42.13%	4.38%	0.74%	
		December 23, 2015	Employee Stock Ownership Plan	718.88	611.05	10 yrs	38.23%	4.81%	0.67%	
		December 9, 2016	Employee Stock Ownership Plan	717.30	717.30	10 yrs	38.38%	4.78%	0.70%	
		Dec-11	Executive Stock Option Plan	10.28	9.18	7 yrs	16.80%	2.48%	2.07%	
3	Ayala Land, Inc.	Mar-13	Executive Stock Option Plan	21.65	13.00	7 yrs	14.26%	2.92%	2.14%	
		June 30, 2005	Executive Stock Option Plan	8.36	6.75	10 yrs	46.30%	12.60%	3.21%	
		November 16, 2005	Employee Stock Ownership Plan	9.30	7.03	10 yrs	46.32%	11.30%	0.77%	
4	BDO Unibank, Inc.	June 5, 2006	Employee Stock Ownership Plan	13.00	10.35	10 yrs	46.03%	10.55%	1.56%	
		September 20, 2007	Employee Stock Ownership Plan	15.00	12.00	10 yrs	34.67%	6.93%	0.41%	
		May 15, 2008	Employee Stock Ownership Plan	10.50	9.74	10 yrs	32.04%	8.53%	0.49%	
		April 30, 2009	Employee Stock Ownership Plan	6.40	4.96	10 yrs	37.45%	5.94%	0.85%	
		March 31, 2010	Employee Stock Ownership Plan	13.00	9.74	10 yrs	43.57%	5.95%	0.48%	
		March 31, 2011	Employee Stock Ownership Plan	15.50	13.20	10 yrs	36.25%	5.60%	1.01%	
		March 13, 2012	Employee Stock Ownership Plan	21.98	14.69	10 yrs	33.00%	5.70%	0.90%	
		March 18, 2013	Employee Stock Ownership Plan	30.00	21.45	10 yrs	36.25%	2.78%	1.93%	
		March 20, 2014	Employee Stock Ownership Plan	31.46	22.55	10 yrs	33.50%	3.13%	1.42%	
		March 20, 2015	Employee Stock Ownership Plan	36.53	29.58	10 yrs	31.99%	4.11%	1.02%	
		April 5, 2016	Employee Stock Ownership Plan	35.58	26.27	10 yrs	32.03%	4.75%	1.27%	
				ND	ND	ND	ND	ND	ND	ND

Company	Date Granted	Type of Stock Options	S Share Price	K Strike Price	T Term	$\sigma$ Volatility	r Risk-free Rate	Y Dividend Yield
5	Bank of the Philippine Islands							
	November 27, 2013	Executive Stock Option Plan	ND	ND	ND	ND	ND	ND
	November 12, 2014	Executive Stock Option Plan	ND	ND	ND	ND	ND	ND
6	First Gen Corp.							
	November 27, 2013	Executive Stock Purchase Plan	ND	ND	ND	ND	ND	ND
	November 12, 2014	Executive Stock Purchase Plan	ND	ND	ND	ND	ND	ND
7	Globe Telecom, Inc.							
	July 1, 2003	Executive Stock Option Plan	ND	8.80	10 yrs	ND	ND	ND
	July 1, 2004	Executive Stock Option Plan	835.00	840.75	10 yrs	39.50%	12.91%	4.31%
	March 24, 2006	Executive Stock Option Plan	930.00	854.75	10 yrs	29.51%	10.30%	5.38%
	May 17, 2007	Executive Stock Option Plan	1340.00	1270.50	10 yrs	38.14%	7.04%	4.93%
	August 1, 2008	Executive Stock Option Plan	1130.00	1064.00	10 yrs	31.73%	9.62%	6.64%
	October 1, 2009	Executive Stock Option Plan	995.00	993.75	10 yrs	48.49%	8.08%	6.43%
8	International Container Terminal Services, Inc.							
	January 1, 2014	Long-Term Incentive Plan	ND	ND	ND	ND	ND	ND
	January 1, 2015	Long-Term Incentive Plan	ND	ND	ND	ND	ND	ND
	January 1, 2016	Long-Term Incentive Plan	ND	ND	ND	ND	ND	ND
	March 9, 2012	Stock Incentive Plan	57.00	-	ND	ND	ND	ND
	March 11, 2013	Stock Incentive Plan	89.70	-	ND	ND	ND	ND
	March 14, 2014	Stock Incentive Plan	100.00	-	ND	ND	ND	ND
	March 20, 2015	Stock Incentive Plan	112.60	-	ND	ND	ND	ND
	March 14, 2016	Stock Incentive Plan	65.00	-	ND	ND	ND	ND
9	Jollibee Foods Corp.							
	2004	Management Stock Option Program	24.00	20.00	6 yrs	36.91%	6.20%	1.72%
	2005	Management Stock Option Program	29.00	27.50	6 yrs	36.91%	6.20%	1.72%
	2006	Management Stock Option Program	35.00	32.32	6 yrs	36.91%	6.20%	1.72%
	2007	Management Stock Option Program	52.50	50.77	3.5 yrs	28.06%	6.41%	1.70%
	2008	Management Stock Option Program	34.00	39.85	3.5 yrs	26.79%	8.38%	1.80%
	2009	Management Stock Option Program	48.00	45.45	3.5 yrs	30.37%	5.28%	2.00%

Company	Date Granted	Type of Stock Options	S Share Price	K Strike Price	T Term	$\sigma$ Volatility	r Risk-free Rate	Y Dividend Yield	
10 Megaworld Corp.	2010	Management Stock Option Program	70.00	57.77	3.5 yrs	29.72%	5.25%	2.00%	
	2011	Management Stock Option Program	89.90	89.90	3.5 yrs	34.53%	4.18%	2.00%	
	2012	Management Stock Option Program	107.90	107.90	3.5 yrs	28.72%	3.50%	2.00%	
	2013	Management Stock Option Program	145.00	145.00	3.5 yrs	29.38%	2.68%	2.00%	
	2014	Management Stock Option Program	179.80	179.80	3.5 yrs	24.87%	2.64%	2.00%	
	2015	Management Stock Option Program	180.00	180.00	3.5 yrs	18.94%	2.98%	2.00%	
	2016	Management Stock Option Program	236.00	236.00	3.5 yrs	17.76%	2.63%	2.00%	
	2004	Executive Long-term Incentive Program	24.00	20.00	5.0 yrs	36.91%	6.20%	1.72%	
	2008	Executive Long-term Incentive Program	34.00	39.85	3.5 yrs	26.79%	8.38%	1.80%	
	2012	Executive Long-term Incentive Program	105.00	105.00	3.5 yrs	28.74%	3.60%	2.00%	
	2015	Executive Long-term Incentive Program	180.00	180.00	3.5 yrs	18.94%	2.98%	2.00%	
	2012, 2013, 2014	Executive Stock Option Plan	3.53	2.50	15.29 yrs	1.03%	4.63%	1.13%	
	11 Metro Pacific Investments Corp.	December 9, 2008	Executive Stock Option Plan	2.10	2.12	ND	94.07%	5.92%	ND
		December 9, 2008	Executive Stock Option Plan	2.10	2.12	ND	58.10%	6.60%	ND
		March 10, 2009	Executive Stock Option Plan	2.70	2.73	ND	61.25%	4.24%	ND
		March 10, 2009	Executive Stock Option Plan	2.70	2.73	ND	66.43%	4.82%	ND
July 2, 2010		Executive Stock Option Plan	2.65	2.73	ND	48.33%	4.16%	ND	
July 2, 2010		Executive Stock Option Plan	2.65	2.73	ND	69.83%	4.92%	ND	
July 2, 2010		Executive Stock Option Plan	2.65	2.73	ND	69.27%	4.61%	ND	
July 2, 2010		Executive Stock Option Plan	2.65	2.73	ND	67.52%	5.21%	ND	
July 2, 2010		Executive Stock Option Plan	2.65	2.73	ND	76.60%	5.67%	ND	
December 21, 2010		Executive Stock Option Plan	3.47	3.50	ND	46.62%	1.62%	ND	
December 21, 2010		Executive Stock Option Plan	3.47	3.50	ND	68.23%	2.83%	ND	
December 21, 2010		Executive Stock Option Plan	3.47	3.50	ND	72.82%	3.73%	ND	
March 8, 2011		Executive Stock Option Plan	3.53	3.53	ND	39.32%	2.56%	ND	
March 8, 2011		Executive Stock Option Plan	3.53	3.53	ND	61.39%	4.38%	ND	
March 8, 2011		Executive Stock Option Plan	3.53	3.53	ND	64.42%	5.01%	ND	
April 14, 2011		Executive Stock Option Plan	3.66	3.66	ND	39.13%	2.05%	ND	
April 14, 2011	Executive Stock Option Plan	3.66	3.66	ND	60.76%	3.83%	ND		
October 14, 2013	Executive Stock Option Plan	4.59	4.60	ND	35.23%	0.66%	ND		
October 14, 2013	Executive Stock Option Plan	4.59	4.60	ND	33.07%	2.40%	ND		



	Company	Date Granted	Type of Stock Options	S Share Price	K Strike Price	T Term	$\sigma$ Volatility	R Risk-free Rate	Y Dividend Yield
12	San Miguel Corp.		Employee Stock Purchase Plan	ND	ND	ND	ND	ND	ND
			Long-Term Incentive Plan	ND	ND	8 yrs	ND	ND	ND
<b>Non-PSEI</b>									
13	Energy Development Corp.								
		December 1, 2009	Employee Stock Grant Plan	ND	-	ND	ND	ND	ND
		June 1, 2010	Employee Stock Grant Plan	ND	-	ND	ND	ND	ND
		June 1, 2011	Employee Stock Grant Plan	ND	-	ND	ND	ND	ND
		June 1, 2012	Employee Stock Grant Plan	ND	-	ND	ND	ND	ND
		June 1, 2013	Employee Stock Grant Plan	ND	-	ND	ND	ND	ND
14	Emperador Inc.								
		November 7, 2014	Employee Share Option Plan	8.90	7.00	20.23 yrs	10.24%	4.89%	1.08%
15	Travellers International Hotel Group, Inc.								
		ND	Employee Stock Option Plan						Adopted but no grants yet
16	Manila Water Company, Inc.								
		September 19, 2011	Employee Stock Ownership Plan	19.80	17.38	4.00 yrs	33.68%	4.76%	2.68%
		October 5, 2012	Employee Stock Ownership Plan	26.24	24.07	4.00 yrs	30.66%	4.57%	2.56%
		November 19, 2013	Employee Stock Ownership Plan	23.00	22.92	4.00 yrs	24.90%	2.99%	3.47%
		February 10, 2015	Employee Stock Ownership Plan	21.35	26.00	4.00 yrs	26.53%	3.79%	2.55%
17	Nickel Asia Corporation								
		January 3, 2011	Executive Stock Option Plan	15.00	13.50	3.97 yrs	53.42%	4.50%	2.06%
		June 6, 2014	Executive Stock Option Plan	28.55	25.52	5.00 yrs	33.28%	3.30%	3.88%
		January 13, 2015	Executive Stock Option Plan	15.63	8.51	4.4 yrs	33.52%	3.23%	0.58%
18	Melco Resorts and Entertainment (Philippines)								
		June 28, 2013	Share Incentive Plan	8.30	8.30	5.20 yrs	40.00%	3.77%	0.00%
		February 17, 2014	Share Incentive Plan	13.48	8.30	5.20 yrs	40.00%	3.77%	0.00%
		February 28, 2014	Share Incentive Plan	13.00	8.30	5.20 yrs	40.00%	3.77%	0.00%
		March 27, 2014	Share Incentive Plan	12.76	8.30	5.20 yrs	40.00%	3.77%	0.00%
		March 28, 2014	Share Incentive Plan	12.96	8.30	5.20 yrs	40.00%	3.77%	0.00%
		May 30, 2014	Share Incentive Plan	13.00	13.26	5.20 yrs	40.00%	3.77%	0.00%
		September 29, 2015	Share Incentive Plan	3.99	3.99	5.40 yrs	45.00%	4.08%	0.00%
		November 16, 2015	Share Incentive Plan	3.46	3.46	5.40 yrs	45.00%	4.08%	0.00%
		September 30, 2016	Share Incentive Plan	3.91	NA	5.40 yrs	45.00%	4.08%	0.00%
19	First Philippine Holdings Corporation								
		March 2005	Executive Stock Option Plan	60.00	58.60	ND	38.20%	10.88%	0.00%
		March 2006	Executive Stock Option Plan	41.00	41.65	ND	21.70%	8.50%	5.00%

Company	Date Granted	Type of Stock Options	S Share Price	K Strike Price	T Term	$\sigma$ Volatility	r Risk-free Rate	Y Dividend Yield
20 Lopez Holdings Corporation	May 2011	Employee Stock Purchase Plan	4.57	4.57	ND	42.60%	4.30%	2.50%

**Source:** 2016 Annual Reports from edge.pse.com.ph; **Note:** ND = not disclosed, NA = not applicable

**Appendix C**  
**Strike Price (K) Discount/Premium to Share Price (S)**

Company	Date Granted	Type of Stock Options	Discount/Premium to Spot Price
<b>PSEi</b>			
1	Ayala Corp.		
	16/4/2010	Executive Stock Option Plan	-10.10%
	18/4/2011	Executive Stock Option Plan	-10.00%
	26/4/2013	Executive Stock Option Plan	-21.90%
	30/4/2009	Employee Stock Ownership Plan	-31.60%
	30/4/2012	Employee Stock Ownership Plan	-25.90%
	11/4/2014	Employee Stock Ownership Plan	-28.80%
	23/12/2015	Employee Stock Ownership Plan	-15.00%
	9/12/2016	Employee Stock Ownership Plan	0.00%
2	Alliance Global Group, Inc.		
	Dec-11	Executive Stock Option Plan	-10.70%
	Mar-13	Executive Stock Option Plan	-40.00%
3	Ayala Land, Inc.		
	30/6/2005	Executive Stock Option Plan	-19.30%
	16/11/2005	Employee Stock Ownership Plan	-24.40%
	5/6/2006	Employee Stock Ownership Plan	-20.40%
	20/9/2007	Employee Stock Ownership Plan	-20.00%
	15/5/2008	Employee Stock Ownership Plan	-7.20%
	30/4/2009	Employee Stock Ownership Plan	-22.50%
	31/3/2010	Employee Stock Ownership Plan	-25.10%
	31/3/2011	Employee Stock Ownership Plan	-14.80%
	13/3/2012	Employee Stock Ownership Plan	-33.20%
	18/3/2013	Employee Stock Ownership Plan	-28.50%
	20/3/2014	Employee Stock Ownership Plan	-28.30%
	20/3/2015	Employee Stock Ownership Plan	-19.03%
	5/4/2016	Employee Stock Ownership Plan	-26.17%
4	BDO Unibank, Inc.		ND
5	Bank of the Philippine Islands		
	27/11/2013	Executive Stock Option Plan	ND
	12/11/2014	Executive Stock Option Plan	ND
	27/11/2013	Executive Stock Purchase Plan	ND
	12/11/2014	Executive Stock Purchase Plan	ND
6	First Gen Corp.		
	1/7/2003	Executive Stock Option Plan	ND
7	Globe Telecom, Inc.		
	1/7/2004	Executive Stock Option Plan	0.70%
	24/3/2006	Executive Stock Option Plan	-8.10%
	17/5/2007	Executive Stock Option Plan	-5.20%
	1/8/2008	Executive Stock Option Plan	-5.80%
	1/10/2009	Executive Stock Option Plan	-0.10%
	Jan-14	Long-Term Incentive Plan	ND
	Jan-15	Long-Term Incentive Plan	ND
	Jan-16	Long-Term Incentive Plan	ND
8	International Container Terminal Services, Inc.		
	9/3/2012	Stock Incentive Plan	-100.00%
	11/3/2013	Stock Incentive Plan	-100.00%
	14/3/2014	Stock Incentive Plan	-100.00%

Company	Date Granted	Type of Stock Options	Discount/Premium to Spot Price
	20/3/2015	Stock Incentive Plan	-100.00%
	14/3/2016	Stock Incentive Plan	-100.00%
9	Jollibee Foods Corp.		
	1/7/2004	Management Stock Option Program	-16.70%
	1/7/2005	Management Stock Option Program	-5.20%
	1/6/2006	Management Stock Option Program	-7.70%
	29/6/2007	Management Stock Option Program	-3.30%
	1/7/2008	Management Stock Option Program	17.20%
	1/7/2009	Management Stock Option Program	-5.30%
	1/7/2010	Management Stock Option Program	-17.50%
	1/7/2011	Management Stock Option Program	0.00%
	2/7/2012	Management Stock Option Program	0.00%
	2/7/2013	Management Stock Option Program	0.00%
	2/7/2014	Management Stock Option Program	0.00%
	25/8/2015	Management Stock Option Program	0.00%
	1/7/2016	Management Stock Option Program	0.00%
	1/7/2004	Executive Long-term Incentive Program	-16.70%
	1/7/2008	Executive Long-term Incentive Program	17.20%
	4/7/2012	Executive Long-term Incentive Program	0.00%
	25/8/2015	Executive Long-term Incentive Program	0.00%
10	Megaworld Corp.		
	2012, 2013, 2014	Executive Stock Option Plan	-29.50%
11	Metro Pacific Investments Corp.		
	9/12/2008	Executive Stock Option Plan	1.00%
	9/12/2008	Executive Stock Option Plan	1.00%
	10/3/2009	Executive Stock Option Plan	1.10%
	10/3/2009	Executive Stock Option Plan	1.10%
	2/7/2010	Executive Stock Option Plan	3.00%
	2/7/2010	Executive Stock Option Plan	3.00%
	2/7/2010	Executive Stock Option Plan	3.00%
	2/7/2010	Executive Stock Option Plan	3.00%
	2/7/2010	Executive Stock Option Plan	3.00%
	21/12/2010	Executive Stock Option Plan	0.90%
	21/12/2010	Executive Stock Option Plan	0.90%
	21/12/2010	Executive Stock Option Plan	0.90%
	8/3/2011	Executive Stock Option Plan	0.00%
	8/3/2011	Executive Stock Option Plan	0.00%
	8/3/2011	Executive Stock Option Plan	0.00%
	14/4/2011	Executive Stock Option Plan	0.00%
	14/4/2011	Executive Stock Option Plan	0.00%
	14/10/2013	Executive Stock Option Plan	0.20%
	14/10/2013	Executive Stock Option Plan	0.20%
12	San Miguel Corp.		
		Employee Stock Purchase Plan	ND
		Long-Term Incentive Plan	ND
<b>Non-PSEi</b>			
13	Energy Development Corp.		
	1/12/2009	Employee Stock Grant Plan	ND
	1/6/2010	Employee Stock Grant Plan	ND
	1/6/2011	Employee Stock Grant Plan	ND
	1/6/2012	Employee Stock Grant Plan	ND
	3/6/2013	Employee Stock Grant Plan	ND
14	Emperador Inc.		
	7/11/2014	Employee Share Option Plan	-21.35%

Company	Date Granted	Type of Stock Options	Discount/Premium to Spot Price
15	Travellers International Hotel Group, Inc.	Employee Stock Option Plan	
16	Manila Water Company, Inc.		
	19/9/2011	Employee Stock Ownership Plan	-12.22%
	5/10/2012	Employee Stock Ownership Plan	-8.27%
	19/11/2013	Employee Stock Ownership Plan	-0.35%
	10/2/2015	Employee Stock Ownership Plan	21.78%
17	Nickel Asia Corporation		
	3/1/2011	Executive Stock Option Plan	-10.00%
	6/6/2014	Executive Stock Option Plan	-10.61%
	13/1/2015	Executive Stock Option Plan	-45.55%
18	Melco Resorts and Entertainment (Philippines)		
	28/6/2013	Share Incentive Plan	0.00%
	17/2/2014	Share Incentive Plan	-38.43%
	28/2/2014	Share Incentive Plan	-36.15%
	27/3/2014	Share Incentive Plan	-34.95%
	28/3/2014	Share Incentive Plan	-35.96%
	30/5/2014	Share Incentive Plan	1.97%
	29/9/2015	Share Incentive Plan	0.00%
	16/11/2015	Share Incentive Plan	0.00%
	30/9/2016	Share Incentive Plan	NA
19	First Philippine Holdings Corporation		
	1/3/2005	Executive Stock Option Plan	-2.33%
	1/3/2006	Executive Stock Option Plan	1.59%
20	Lopez Holdings Corporation		
	1/5/2011	Employee Stock Purchase Plan	0.00%

### Appendix D

#### References for Risk-free Rate (r)

	Company	Date Granted	Type of Stock Options	Risk-free Rate (r)	Reference
<b>PSEi</b>					
1	Ayala Corp.	16/4/2010	Executive Stock Option Plan	8.56%	Close to 10-year T-Bond
		18/4/2011	Executive Stock Option Plan	6.64%	Close to 10-year T-Bond
		26/4/2013	Executive Stock Option Plan	3.04%	Between 5-year and 6-year T-Bond
		30/4/2009	Employee Stock Ownership Plan	7.49%	Close to 10-year T-Bond
		30/4/2012	Employee Stock Ownership Plan	5.59%	Close to 10-year T-Bond
		11/4/2014	Employee Stock Ownership Plan	4.38%	More than 25-year T-Bond
		20/3/2015	Employee Stock Ownership Plan	4.11%	Closer to 10-year T-Bond
		5/4/2016	Employee Stock Ownership Plan	4.75%	More than 10-year T-Bond
2	Alliance Global Group, Inc.	Dec-11	Executive Stock Option Plan	2.48%	Average risk-free rate, close to 364-day T-Bill
		Mar-13	Executive Stock Option Plan	2.92%	Average risk-free rate, close to 5-year T-Bond
3	Ayala Land, Inc.	30/6/2005	Executive Stock Option Plan	12.60%	Close to 25-year T-Bond
		16/11/2005	Employee Stock Ownership Plan	11.30%	Close to 7-year T-Bond
		5/6/2006	Employee Stock Ownership Plan	10.55%	Close to 25-year T-Bond
		20/9/2007	Employee Stock Ownership Plan	6.93%	Close to 5-year T-Bond
		15/5/2008	Employee Stock Ownership Plan	8.53%	Close to 7-year T-Bond
		30/4/2009	Employee Stock Ownership Plan	5.94%	Close to 3-year T-Bond
		31/3/2010	Employee Stock Ownership Plan	5.95%	Close to 5-year T-Bond
		31/3/2011	Employee Stock Ownership Plan	5.60%	Close to 4-year T-Bond
		13/3/2012	Employee Stock Ownership Plan	5.70%	Close to 25-year T-Bond
		18/3/2013	Employee Stock Ownership Plan	2.78%	Close to 5-year T-Bond
		20/3/2014	Employee Stock Ownership Plan	3.13%	Close to 5-year T-Bond
		20/3/2015	Employee Stock Ownership Plan	4.11%	Closer to 10-year T-Bond
		5/4/2016	Employee Stock Ownership Plan	4.75%	More than 10-year T-Bond
4	BDO Unibank, Inc.				ND
5	Bank of the Philippine Islands	27/11/2013	Executive Stock Option Plan		ND
		12/11/2014	Executive Stock Option Plan		ND



Company	Date Granted	Type of Stock Options	Risk-free Rate (r)	Reference
6	27/11/2013	Executive Stock Purchase Plan	ND	
	12/11/2014	Executive Stock Purchase Plan	ND	
7	1/7/2003	Executive Stock Option Plan	ND	
	4/4/2003	Executive Stock Option Plan	11.46%	Close to 10-year T-Bond
	1/7/2004	Executive Stock Option Plan	12.91%	Close to 20-year T-Bond
8	24/3/2006	Executive Stock Option Plan	10.30%	Close to 25-year T-Bond
	17/5/2007	Executive Stock Option Plan	7.04%	Close to 5-year T-Bond
	1/8/2008	Executive Stock Option Plan	9.62%	Close to 20-year T-Bond
	1/10/2009	Executive Stock Option Plan	8.08%	Close to 10-year T-Bond
	1/1/2014	Long-Term Incentive Plan	ND	
9	1/1/2015	Long-Term Incentive Plan	ND	
	1/1/2016	Long-Term Incentive Plan	ND	
	9/3/2012	Stock Incentive Plan	ND	
	11/3/2013	Stock Incentive Plan	ND	
	14/3/2014	Stock Incentive Plan	ND	
	20/3/2015	Stock Incentive Plan	ND	
9	14/3/2016	Stock Incentive Plan	ND	
	1/7/2004	Management Stock Option Program	6.20%	Less than 91-day T-Bill
	1/7/2005	Management Stock Option Program	6.20%	Close to 91-day T-Bill
	1/6/2006	Management Stock Option Program	6.20%	Close to 182-day T-Bill
	29/6/2007	Management Stock Option Program	6.41%	Close to 5-year T-Bond
	1/7/2008	Management Stock Option Program	8.38%	Close to 7-year T-Bond
	1/7/2009	Management Stock Option Program	5.28%	Close to 3-year T-Bond
	1/7/2010	Management Stock Option Program	5.25%	3-year T-Bond
	1/7/2011	Management Stock Option Program	4.18%	Close to 5-year T-Bond
	2/7/2012	Management Stock Option Program	3.50%	Between 364-day T-Bill and 5-year T-Bond
	2/7/2013	Management Stock Option Program	2.68%	Between 364-day T-Bill and 5-year T-Bond
	2/7/2014	Management Stock Option Program	2.64%	Between 364-day T-Bill and 5-year T-Bond
	25/8/2015	Management Stock Option Program	2.98%	Closer to 5-year T-Bond
	1/7/2016	Management Stock Option Program	2.63%	Between 364-day T-Bill and 5-year T-Bond

Company	Date Granted	Type of Stock Options	Risk-free Rate (r)	Reference
10 Megaworld Corp.	1/7/2004	Executive Long-term Incentive Program	6.20%	Close to 91-day T-Bill
	1/7/2008	Executive Long-term Incentive Program	8.38%	7-year T-Bond
	4/7/2012	Executive Long-term Incentive Program	3.60%	Between 364-day T-Bill and 5-year T-Bond
11 Metro Pacific Investments Corp.	2012, 2013, 2014	Executive Stock Option Plan	3.65%	Average risk-free rate, between 364-day T-Bill and 5-year T-Bond
	9/12/2008	Executive Stock Option Plan	5.92%	Close to 182-day T-Bill
	9/12/2008	Executive Stock Option Plan	6.60%	Close to 364-day T-Bill
	10/3/2009	Executive Stock Option Plan	4.24%	Close to 91-day T-Bill
	10/3/2009	Executive Stock Option Plan	4.82%	Close to 364-day T-Bill
	2/7/2010	Executive Stock Option Plan	4.16%	Close to 364-day T-Bill
	2/7/2010	Executive Stock Option Plan	4.92%	Close to 3-year T-Bond
	2/7/2010	Executive Stock Option Plan	4.61%	Close to 364-day T-Bill
	2/7/2010	Executive Stock Option Plan	5.21%	Close to 3-year T-Bond
	2/7/2010	Executive Stock Option Plan	5.67%	Close to 5-year T-Bond
	21/12/2010	Executive Stock Option Plan	1.62%	Less than 91-day T-Bill
	21/12/2010	Executive Stock Option Plan	2.83%	Less than 91-day T-Bill
	21/12/2010	Executive Stock Option Plan	3.73%	91-day T-Bill
	8/3/2011	Executive Stock Option Plan	2.56%	Close to 364-day T-Bill
	8/3/2011	Executive Stock Option Plan	4.38%	Close to 5-year T-Bond
	8/3/2011	Executive Stock Option Plan	5.01%	Close to 7-year T-Bond
	14/4/2011	Executive Stock Option Plan	2.05%	Close to 364-day T-Bill
14/4/2011	Executive Stock Option Plan	3.83%	Between 364-day T-Bill and 4-year T-Bond	
14/10/2013	Executive Stock Option Plan	0.66%	Close to 364-day T-Bill	
14/10/2013	Executive Stock Option Plan	2.40%	Close to 5-year T-Bond	
12 San Miguel Corp.		Employee Stock Purchase Plan	ND	
		Long-Term Incentive Plan	ND	
<b>Non-PSEi</b>				
13 Energy Development Corp.	1/12/2009	Employee Stock Grant Plan	ND	
	1/6/2010	Employee Stock Grant Plan	ND	
	1/6/2011	Employee Stock Grant Plan	ND	
	1/6/2012	Employee Stock Grant Plan	ND	
	3/6/2013	Employee Stock Grant Plan	ND	

Company	Date Granted	Type of Stock Options	Risk-free Rate (r)	Reference
14 Emperador Inc.	7/11/2014	Employee Share Option Plan	4.89%	Greater than 19-year T-Bond
15 Travellers International Hotel Group, Inc.		Employee Stock Option Plan		
16 Manila Water Company, Inc.	19/9/2011	Employee Stock Ownership Plan	4.76%	Closer to 5-year T-Bond
	5/10/2012	Employee Stock Ownership Plan	4.57%	Closer to 7-year T-Bond
	19/11/2013	Employee Stock Ownership Plan	2.99%	Between 5-year and 6-year T-Bond
	10/2/2015	Employee Stock Ownership Plan	3.79%	Closer to 6-year T-Bond
17 Nickel Asia Corporation	3/1/2011	Executive Stock Option Plan	4.50%	Closer to 5-year T-Bond
	6/6/2014	Executive Stock Option Plan	3.30%	Between 5-year and 6-year T-Bond
	13/1/2015	Executive Stock Option Plan	3.23%	Closer to 5-year T-Bond
18 Melco Resorts and Entertainment (Philippines)	28/6/2013	Share Incentive Plan	3.77%	Closer to 6-year T-Bond
	17/2/2014	Share Incentive Plan	3.77%	Closer to 6-year T-Bond
	28/2/2014	Share Incentive Plan	3.77%	Closer to 6-year T-Bond
	27/3/2014	Share Incentive Plan	3.77%	Closer to 6-year T-Bond
	28/3/2014	Share Incentive Plan	3.77%	Closer to 6-year T-Bond
	30/5/2014	Share Incentive Plan	3.77%	Closer to 6-year T-Bond
	29/9/2015	Share Incentive Plan	4.08%	Closer to 10-year T-Bond
	16/11/2015	Share Incentive Plan	4.08%	Closer to 10-year T-Bond
	30/9/2016	Share Incentive Plan	4.08%	Greater than 10-year T-Bond
19 First Philippine Holdings Corporation	1/3/2005	Executive Stock Option Plan	10.88%	Closer to 5-year T-Bond
	1/3/2006	Executive Stock Option Plan	8.50%	Closer to 5-year T-Bond
20 Lopez Holdings Corporation	1/5/2011	Employee Stock Purchase Plan	4.30%	Closer to 5-year T-Bond

### Appendix E Government Securities Yield Rates

Tenor	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>T-Bills</b>																	
91-day	9.86	9.87	5.43	6.03	7.34	6.36	5.35	3.40	5.39	4.19	3.73	1.37	1.58	0.32	1.24	1.77	1.50
182-day	10.84	11.18	6.50	6.95	8.32	7.67	6.15	4.17	6.19	4.39	3.97	1.69	1.78	0.48	1.61	1.92	1.58
364-day	11.80	11.98	6.84	7.49	9.22	8.68	6.96	4.98	6.49	4.58	4.26	2.26	1.98	0.72	1.79	2.08	1.76
<b>T-Bonds</b>																	
2-year	12.31	13.40	9.03	8.50	10.38	8.88	7.13	-	-	-	-	-	-	-	1.63	-	-
3-year	-	-	9.91	9.70	12.38	10.13	9.21	7.60	5.38	5.81	5.25	-	-	1.63	2.46	2.13	-
4-year	-	-	10.47	10.31	11.33	11.15	6.50	5.88	-	8.75	-	5.63	-	-	-	-	-
5-year	13.76	14.49	12.02	10.58	11.55	10.99	8.72	6.67	7.88	6.25	5.83	4.63	5.19	2.13	3.00	3.19	3.38
6-year	-	-	-	-	-	-	-	-	-	-	-	-	-	3.88	3.88	3.50	-
7-year	14.35	14.94	14.00	11.88	11.75	11.29	8.67	7.63	8.36	7.00	6.68	5.48	4.73	3.88	3.50	4.19	3.56
10-year	14.80	17.00	12.56	11.81	12.38	11.69	8.06	8.58	7.72	7.88	7.21	6.31	5.15	4.00	-	4.13	3.56
15-year	-	-	-	-	-	-	-	-	-	-	-	-	8.00	-	-	-	-
18-year	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-year	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.63	-	-
20-year	-	-	13.88	12.23	13.00	12.13	9.69	8.63	9.50	9.50	8.75	11.25	5.83	3.63	-	-	-
25-year	18.25	-	-	-	-	12.50	10.31	8.50	-	9.25	8.00	7.72	5.75	-	-	-	-

Source: Bureau of Treasury