Post-Vest Holding Periods and Their Relationship to Discount for Lack of Marketability

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A post-vest holding period (PVHP) is an additional holding period requirement imposed on shares which have already vested. Once the shares have vested and are distributed, the recipient must hold them for an additional set period of time, usually from one to three years. During that time, any dividends are paid directly to the recipient, but the shares cannot be sold or pledged as collateral. This is different from a *service period* or *vesting period*. This concept is not new, but we have seen greatly renewed interest in it over the last two years. In fact, we have delivered valuations to two community banks which have included PVHPs in their incentive compensation programs for 2016.

Inclusion of a PVHP in a restricted stock award or total shareholder return (TSR) award program has certain advantages for the company making the award. First, a PVHP guarantees that there will be a reserve of available shares if the company needs to make a Dodd-Frank mandated "clawback" from an executive. This would be straightforward, as opposed to attaching the executive's funds or other property.

Second, under the ISS Equity Plan Scorecard published in February 2015, points are awarded for executive incentive compensation plans which include a PVHP. Companies with a significant percentage of institutional ownership of their stock will find the PVHP attractive for this reason.

Finally, the inclusion of a PVHP in a share-based payment award may allow a company to reduce the ASC 718 accounting expense on the award. The cost savings, or discount, may be significant in some cases.

Intuitively, it is reasonable that shares of stock which must be held for a predetermined amount of time before they may be converted to cash would have less value than shares which may be sold or converted immediately. Certainly, the additional restriction placed upon the recipient of such shares would be reasonably expected to reduce their value. In the academic and professional literature, this reduction or impairment in value has been likened to that which is experienced by the owner of shares in a privately held or thinly traded company. The common shares of a closely held private company are distinguished from the common shares of a publicly held company by their lack of marketability. Common shares of privately held companies are not traded on organized exchanges; therefore, a seller of such shares may incur significant costs and or delays in realizing the cash proceeds from the sale of the shares. In the valuation of closely held private companies, a discount (either an amount or percentage) is deducted from the nominal value of the common shares to reflect this lack of marketability.

This discount for lack of marketability (DLOM) may be estimated either by the examination of empirical models based on actual transactions, or theoretical models. There are three

commonly used theoretical models based on option pricing theory; the Chaffe, Longstaff, and Finnerty. Since we have equated the imposition of a PVHP on the shares of a publicly traded company to the lack of marketability of the shares of a closely held company, the use of models based on option pricing theory is especially convenient, because the expected volatility of the publicly traded shares may be readily estimated from either historical volatility or the implied volatility computed from the market prices of traded options, if these exist.

The Chaffe Model

This model,[1] also known as the "European Put Option Model," estimates the DLOM as the value of a European-style put option on the common shares with a strike price equal to the share price on the valuation date. The Black-Scholes-Merton model is used to calculate the put option price. The strike price is set equal to the share price on the valuation date. The term of the option is set equal to the length of the holding period. The risk-free interest rate over the option term may be estimated from the yield of US Treasury debt issues. Expected volatility is estimated from either historical or implied (if available) volatility of traded shares.

The Chaffe model represents a case in which all downside risk is eliminated, but appreciation of the shares over the holding period may be realized. We would expect that the DLOM would be somewhat overstated.

The Longstaff Look-Back Put Option Model

This model[2] provides an estimate of the DLOM assuming the seller of the shares has perfect market knowledge, and is able to time his sale to maximize the proceeds. The so-called "look-back put option" allows the seller to exercise his put at the end of the holding period at the highest or best price attained by the stock in the period from valuation date to expiration. This allows the seller to obtain a better price, but the option itself is more costly.

Due to the unrealistic assumption of perfect market knowledge, this model is not commonly employed. One may consider the result of the Longstaff model as an upper bound for the value of the DLOM.

The Finnerty Average-Strike Put Option Model

The Finnerty model[3] assumes that the put option is struck at the average risk-neutral forward price of the stock over the period from valuation date to expiration date. This type of option is referred to as "Asian style." The seller is not assumed to have any special market timing ability.

In practice the choice of model is determined by the expected volatility of the underlying shares. Comparison with empirical data has led to the recommendation that the Chaffe model be employed when the expected volatility of the underlying shares is less than 40%. The results of the Finnerty model are considered most reliable when the expected volatility of the underlying shares lies between 40% and 75%.

Acceptance of DLOM Models as Applied to PVHP

Although theoretical models have been used to estimate discounts to the grant-date fair value of share-based payments, there is no broad consensus or regulatory sanction for the process.

The practice was called into question on December 9, 2015, when Mr. Barry Kanczuker, Associate Chief Accountant of the SEC, in an address before the AICPA, cited ASC 718-10-55-5, which states that *"… if shares are traded in an active market, post-vesting restrictions may have little, if any, effect on the amount at which the shares being valued would be exchanged."* Mr. Kanczuker further stated, *"With that being said, I would encourage you to consult with the Staff if you believe that you have a fact pattern in which a post-vesting restriction results in a significant discount being applied to the grant-date fair value of a share-based award."*

Note that on the SEC website, Mr. Kanczuker's remarks are preceded by the disclaimer:

"The Securities and Exchange Commission, as a matter of policy, disclaims responsibility for any private publication or statement by any of its employees. The views expressed herein are those of the author and do not necessarily reflect the views of the Commission or of the author's colleagues upon the staff of the Commission."

Although these statements are vague, they indicate that the question of the accounting treatment of PVHPs is an unresolved issue, subject to debate and subsequent promulgation of regulatory guidelines. Although the use of DLOM models to estimate the grant-date fair value of share-based payment awards has been used successfully, there remains a question as to the equivalence of a PVHP restriction on publicly traded shares and the "lack of marketability" for shares of closely held companies. Let us consider the case of publicly traded shares from the points of view of both the Grantor and the Recipient.

For the Grantor, the vesting of restricted stock with a PVHP is equivalent to placing the shares into an escrow account for the Recipient. Although the Recipient will receive any dividends, sale or transfer of the shares cannot take place until the holding period expires. When the Grantor places the shares in escrow, their cost is the market price on the vesting date. It appears that no discount applies.

For the Recipient, the situation is somewhat more involved. There is an agreement to deliver a fixed number of shares upon the date that the holding period expires. Any dividends will be paid to the Recipient, but no sale or other transfer of the shares may take place before the delivery date. What is the value of the "promise of future delivery" to the Recipient?

On the vesting date, the value of the shares is known. If the Recipient desires immediate liquidity, he may borrow this value and pay some market rate of interest, which is greater than the so-called "risk-free rate." With the borrowed cash, the Recipient may do anything, including purchasing identical shares at their value upon the vesting date. These identical shares may increase or decline in value over the holding period, but they may be sold at any time. In performing this transaction, the Recipient has obligated himself to pay interest

on the loan, and has also assumed market risk. This market risk may be hedged away if the recipient constructs a synthetic short position consisting of European-style options with a strike price equal to the share price on the vesting date and an expiration date coincident with the expiration of the post-vest holding period. This position consists of a long put and a short call for the exact number of shares which are vested. At expiration, the intrinsic value of this position will precisely match the difference between the share value on the vest date and the value on the expiration of the holding period. The shares are then delivered to the recipient. If their value has increased, the put expires worthless, and the loss on the call is equal to the increase in value of the shares. If the value of the shares has decreased, the call expires worthless and the profit on the put offsets the decline in value of the delivered shares. Under ideal theoretical conditions, a *perfect hedge* has been executed. Proceeds of the stock + synthetic short position are used to pay back the loan. The cost to the Recipient is the interest on the loan plus the cost of the option position.

The interest on the loan is $\mathbf{S_0 r_m T}$ which is a cost or *negative cash flow* to the Recipient.

$\mathbf{S_0}$: Principal of the loan, or the value of the shares on the vesting date.

$\mathbf{r_m}$: Interest rate on the loan, or market rate.

T : Length of the holding period.

We use the principle of *Put-Call Parity* to establish the cash flow associated with the establishment of the synthetic short position.

$$\mathbf{C(0) - P(0) = S_0(1 - \exp(-r_0 T))}$$

C(0) : Proceeds from sale of the call. This is a *positive cash flow* to the Recipient.

P(0) : Cost of the put. This is a *negative cash flow* to the Recipient.

$\mathbf{S_0}$: Value of the shares on the vesting date.

$\mathbf{r_0}$: The risk-free interest rate.

$\mathbf{(1 - \exp(-r_0 T))}$: A number greater than zero.

C(0) – P(0) : The credit balance obtained upon establishing the synthetic short position.

The total cost to the Recipient incurred in borrowing the cash and establishing the hedge is:

$$\mathbf{S_0(r_m T + \exp(-r_0 T) - 1)}$$

For a stock trading at $100 per share on the vest date with a PVHP of 2.0 years and a market interest rate of 6.0% with a risk-free rate of 2.0%, the cost per share to borrow the cash for two years and establish the theoretical perfect hedge is $8.0789 per share, or approximately 8%.

When compared to the discounts calculated by the Chaffe or Finnerty models, this is a low number. Note that the discount depends only upon interest rates. The expected volatility of the stock does not enter into this calculation.

The identical result may be obtained by using the Black-Scholes model to determine the theoretical values of both the European call and put. The result is unaffected by the expected volatility of the shares. However, since only the *difference* between the theoretical values of the put and call is used, there is no requirement to calculate the theoretical value of the individual legs of the synthetic short position.

Discount to Nominal Value on Vesting Date:

Chaffe:	19.926%	Market Rate:	6.000%
Finnerty (2012):	12.627%	Risk Free Rate:	2.000%
Hedged Borrowing:	8.079%	Holding Period:	2.00 Years

The volatility used for Chaffe and Finnerty models is 40%. The Hedged Borrowing model does not require a volatility input.

Note that the discount to nominal value applies only to the point of view of the Recipient. The Grantor experiences no discount when placing shares into escrow.

There is no definitive regulatory guidance on discounting the grant-date fair value of share-based awards subject to post vest holding periods. The proper recommendation for a course of action depends not only upon the viewpoint of the valuator (Grantor or Recipient) but also upon the validity of each potential model.

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Post Vest Holding Periods					
Estimation of Value with Hedged Borrowing Model					
Value of Shares on Vesting Date		S_0	100.0000		
Market Interest Rate		r_m	6.00%		
Length of the Holding Period		**T**	2.00		
Proceeds from the sale of a European Call		**C(0)**			
Cost of a European Put		**P(0)**			
Risk-Free Interest Rate		r_0	2.00%		
Interest on the Loan		$S_0 r_m T$	12.0000		
C(0)-P(0)		$S_0(1-\exp(-r_0 T))$	3.9211		
Net Cost			8.0789		
Discount			8.079%		
Check and Verify					
Black-Scholes Call		23.84727641			
Black-Scholes Put		19.92622032			
Expected Volatility Over Holding Period		40%			
C(0) - P(0)		3.921056085			
Discount		8.079%			
Comparison					
Chaffe		19.926%			
Finnerty (2012)		12.627%			

[1] Chaffe, "Option Pricing as a Proxy for Discount for Lack of Marketability in Private Company Valuations," ***Business Valuation Review***, December 1993, pp. 182-6

[2] Longstaff, "How Much Can Marketability Affect Security Values?" ***The Journal of Finance***, December 1995, pp. 1767-74

[3] Finnerty, "An Average-Strike Put Option Model for the Marketability Discount," ***The Journal of Derivatives***, Summer 2012, pp. 53-70