The Deferral Value of Estate Freezees

Ling Chu, Glenn Feltham, and Robert Mathieu*

PRÉCIS
Dans cet article, les auteurs analysent la valeur de report d’un gel successoral. Plus précisément, les auteurs modélisent la valeur du report d’impôt sur la croissance future de l’entreprise et déterminent les conditions nécessaires pour que le gel successoral ait une valeur positive. En général, un gel successoral aura une valeur de report positive si on s’attend à ce que la valeur de l’entreprise qui fait l’objet du gel augmente, et que les enfants en restent actionnaires plus longtemps que si le parent en avait été actionnaire en l’absence du gel successoral. Ces résultats sont intuitifs.

La valeur spécifique de report du gel successoral est fonction de diverses variables. Elle est une fonction strictement croissante du taux de rendement (ou croissance de l’entreprise) et du nombre d’années avant que les enfants ne vendent leurs actions ou les transmettent à leurs propres enfants. La valeur du gel successoral augmente également avec l’augmentation du taux d’impôt marginal sur les gains en capital (du moins pour un intervalle réaliste de taux marginaux.) Finalement, la valeur du gel peut soit augmenter ou diminuer avec l’augmentation du nombre des années durant lesquelles le parent aurait gardé le contrôle de l’entreprise en l’absence du gel; le résultat dépend du nombre d’années durant lesquelles les enfants conserveront l’entreprise.

L’article discute également des implications de modèles analytiques pour la planification fiscale, y compris du moment optimal d’effectuer un gel successoral. Les résultats montrent que la valeur du report sera la plus élevée lorsque le parent effectue le gel dès qu’il peut bénéficier intégralement de l’exemption sur les gains en capital.

ABSTRACT
This article examines the deferral value of an estate freeze. To be more specific, it models the value of the deferral of tax on future growth. From this model, we

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determine the conditions that must be met if a freeze is to have value. In general, if a freeze is to have a positive expected deferral value, the business must be expected to increase in value and the children must be expected to remain shareholders of the corporation longer than the parent would have been a shareholder in the absence of a freeze. These results are intuitive.

The specific deferral value of a freeze is a function of several variables. It is a strictly increasing function of the rate of return (the growth of the firm) and of the number of years until the children sell the shares or pass them on to their own children. The value of a freeze also increases with an increase in the marginal tax rate on capital gains (over a realistic range of rates). Finally, the value of a freeze can either increase or decrease with an increase in the number of years during which the parent would retain control in the absence of a freeze; the outcome depends on how long in this case the children would then retain the company.

The article also discusses the implications of the analytic models for tax planning, including the optimal timing of a freeze. We find that it is advantageous (the deferral value is greatest) if the parent performs the freeze at the earliest possible moment in which he can use his capital gains exemption in full.

**Keywords:** Estate freezes; tax; succession; family; small business; estate planning.

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**INTRODUCTION**

For the owner of a family business who wants that business to remain in the family, passing from one generation to the next, estate freezes are an important (perhaps the most important) tax-planning and business strategy. The primary benefit of a freeze is that it allows future growth to be taxed in the hands of the owner’s children. In this article, we formally quantify the value of this tax deferral of future gains.

Why examine estate freezes? The importance of family-owned business in Canada cannot be overstated. The success of these businesses depends on a number of factors, including changes in ownership. If the owner wants to pass the business on to the next generation, tax considerations may play a major role in determining the success of the transfer and ultimately the success of the business. An estate freeze can significantly affect both the size and the timing of the tax liability associated with an intergenerational transfer.

Our analysis begins with an examination of the basic structure of an estate freeze. This discussion is not a comprehensive technical review; rather, it sets out a structure for further analysis. We then model the deferral value of an estate freeze in the absence of the capital gains deduction and determine the value of a freeze for different parameter values. We then extend the model to include the capital gains exemption for both the parent and the children. Some concluding comments complete the main text of the article. An appendix sets out in formal terms the effect on the value of a freeze of changes in important variables.
THE STRUCTURE OF ESTATE FREEZES
The structure of estate freezes can be complex. This article, however, will focus on a basic structure and will provide additional detail only where it is directly relevant.

An estate freeze fixes the value of the transferor’s interest in the property at a particular date; changes in value after that date (future growth) accumulate to the transferee. To simplify the discussion, let us make the common assumptions that the owner of the business or transferor is “the parent,” that the transferees are “the children,” and that the property to be transferred is “shares in the parent’s business.” Thus an estate freeze fixes the value of the parent’s interest in the business at a particular date, and future growth accumulates to the benefit of the children.

To perform an estate freeze, the parent exchanges his or her common shares of an operating company for fixed-value preferred shares (frozen shares) of the operating company or of a holding company. The parent may retract the fixed-value preferred shares, and the corporation may repurchase them, only at the shares’ fair market value at the time of the freeze (fixed-value redeemable and retractable preferred shares). In this way, the parent freezes his or her interest in the value of the company. The operating company or the holding company then issues new common shares, for nominal consideration, to the children or in trust for the children. Thus, future growth accumulates to the benefit of the children.

There are issues of practical relevance to the decision to freeze an estate that this article does not address. Valuation is central to the freeze process: improper valuation may result in adverse tax consequences. In addition, freezing may raise questions about income splitting and attribution. Finally, certain non-financial considerations, such as control of the firm and family harmony, are important in this connection as well.

THE DEFERRAL VALUE OF AN ESTATE FREEZE
The primary benefit of an estate freeze is that it allows future growth in the corporation to be taxed in the hands of the owner’s children rather than in the hands of the owner. This section examines the deferral value of an estate freeze. We shall begin by developing a model that quantifies this value without taking into account the effects of the capital gains exemption; we shall then extend the model to incorporate the exemption.

The Deferral Value of a Freeze Without the Capital Gains Exemption

The Setting
An individual, Joe Smith, has a private corporation that he would like to pass on to his children. Should Joe perform an estate freeze? We define the value of a freeze as the value of deferring the payment of tax on future growth—that is, the
value of having the children, rather than the parent, taxed on future growth. We shall quantify the value of this deferral by using a simplified model. In effect, we want to determine whether performing a freeze increases the after-tax future wealth of Joe’s family. It is important to understand that it is ultimately the family’s wealth, rather the wealth of any individual member of the family, that is at issue in determining the value of a freeze.

The Decision

Joe Smith owns all of the shares in the family corporation, Smithco, and wishes to pass Smithco on to his children. His current decision is whether to perform an estate freeze, under which his children would hold the common shares in Smithco, or to retain the current ownership structure.

Disposition or Redemption

If Joe does not perform an estate freeze, he will pay tax when he disposes of his common shares (this may be a deemed disposition on his death). If he performs an estate freeze, he will pay tax when he redeems or sells his preferred shares. He will pay tax on a deemed dividend if the shares are redeemed and on a capital gain if the shares are sold. To simplify the analysis, we assume that the same tax rate applies to both dividends and capital gains; the application of different rates makes the analysis far more cumbersome without resulting in much difference in outcomes, theoretical or quantifiable. To further simplify the analysis, we assume that the disposition date if Joe does not perform an estate freeze and the redemption date if Joe does perform an estate freeze are the same date. On this date, Joe will have to pay taxes. Since it is likely that the value of the shares has increased over time, the tax paid will usually be higher if Joe has not performed an estate freeze. If Joe has performed an estate freeze, the capital gain will reflect the fair market value of the firm at the date of the freeze and exclude any subsequent increase in value.4

We assume that the after-tax amount left by Joe, either on redemption if he performed an estate freeze or on disposition if he did not, is reinvested in Smithco. The following three alternative assumptions about this reinvestment provide identical results:

1) The value of the corporation (and therefore of the shares) is reduced by the tax paid by Joe at redemption or disposition.
2) The value of the corporation remains constant but the children own less than 100 percent of the shares, having sold some shares to pay the tax owed by Joe at redemption or disposition.
3) The value of the corporation remains constant and the children own all of the shares, having borrowed (at the same rate as the expected rate of return on the shares) to pay the tax payable at redemption or disposition.
To simplify the discussion, we assume that the children reduce their sharehold-
ing in Smithco to pay the tax owed by Joe at redemption or on disposition.

Disposition by the Children
At some point in the future, the children themselves will dispose of their shares
in Smithco. At that time, they will have to pay taxes on the capital gain that reflects
the difference between the value of the shares on that date and the adjusted cost
base of the shares.

The Model
Let us use a model that incorporates the foregoing assumptions to examine the
value of an estate freeze mathematically. We shall use the following notation
throughout the remainder of the article:

- \( n_p \) = the number of years from now until the parent would sell the com-
  pany or pass on control of it to his children in the absence of an estate
  freeze;
- \( n_c \) = the number of years from now until the children sell the shares or
  pass them on to their own children;
- \( r \) = the expected rate of growth of the business (the expected rate of
  return);
- \( t_p \) = the parent’s marginal tax rate on either capital gains or a deemed
  dividend;
- \( t_c \) = the children’s marginal tax rate on capital gains;
- \( c \) = the adjusted cost base of the shares; and
- \( v \) = the fair market value of the shares at the time of the freeze (today).

The timeline in figure 1 will clarify the process of evaluating an estate freeze.
To determine this value, we need to calculate the after-tax value of the shares
if a freeze is performed, \( V_f \), and the after-tax value of the shares if a freeze is not
performed, \( V_{nf} \). The value of the estate freeze, \( V \), is the difference between these
amounts.\(^5\)

If a freeze is performed, then the children own the common shares (the growth
shares) for \( n_c \) years. If a freeze is not performed, then the parent continues to
own the common shares for \( n_p \) years and the children own them for \( n_c - n_p \) years
(since they become shareholders \( n_p \) years from now).

To illustrate the components of the equations developed below, we shall con-
tinue to discuss (and expand upon) Joe Smith’s impending decision. Assume
that Joe is considering a freeze of assets with a net value of $1 million and an
adjusted cost base of zero \((c = 0)\). Further assume that the growth rate in the
business is a constant 7 percent \((r = 0.07)\), that in the absence of an estate
freeze the parent would sell or pass on control of the company to his children
in 10 years \((n_p = 10)\), and that the children will sell the shares or pass them on to their own children in 30 years \((n_c = 30\) or \(n_c - n_p = 20)\). Assume as well that the marginal tax rate on capital gains or redemption dividends is constant at 37.5 percent \((t = 0.375)\). Finally, assume that parent and children alike have no capital gains deduction room. We shall relax the last assumption later in the article.

**The Value with a Freeze**

Ultimately, we want to determine the after-tax value of the equity when the children sell the shares. To determine this amount, let us trace the value from the time of the freeze to the time of redemption and, finally, to the time when the children sell the shares.

**At the Time of the Freeze**

When the assets are frozen, the entire value \(v\) is available for growth; that is, no tax is paid on the amount at that time. In the Joe Smith example, there are no immediate tax consequences.

**At Redemption**

The parent redeems the shares \(n_p\) years after the freeze, for an amount \(v\). Note that because the preferred shares were frozen at their fair market value, \(v\) (the shares were retractable by the parent, and redeemable by the corporation, at the fair market value at the time of the freeze), their value at redemption remains \(v\). The after-tax amount received by the parent at redemption is, therefore,

\[
v - (v - c)t_p.
\]

From our example, Joe Smith, who froze $1 million of value, will have $625,000 remaining after paying tax on the deemed dividend (the adjusted cost base is zero). Note that the same result would have occurred if Joe had instead sold
these shares at their fair market value, since we have assumed that the capital
gains and dividend tax rates are equal.

Recall that we are ultimately examining whether a freeze increases after-tax
family wealth. For convenience, we assume that the parent will reinvest the
after-tax amount on redemption in the firm. For example, if redemption occurs
at the death of the parent, the children will be able to reinvest the after-tax
amount in the business, leaving the value as

\[ [v(1 + r)^{n_p} - v] + [v - (v - c)t_p], \]

or

\[ [v(1 + r)^{n_p} - (v - c)t_p]. \]

This equation essentially reflects the wealth that the family has in the business
immediately after redemption, after taxes have been paid, if the after-tax amount
is reinvested. The net result is a decrease in value equal to the taxes paid by the
parent. The first term, \([v(1 + r)^{n_p} - v] \), reflects the value after \(n_p\) years less the
redemption amount paid to the parent. This term is, in fact, the value of the
common shares held by the children. The second term, \([v - (v - c)t_p]\), is the
reinvested amount as determined above.

The value of the common shares held by Joe’s children after 10 years is
$1,592,151—the value of the common shares, $1,967,151, less the redemption
amount, $1,000,000, plus the after-tax value of the parent’s shares at redemp-
tion, $625,000. In other words, the total value 10 years after the freeze of the
children’s shares and the after-tax amount on redemption, given reinvestment in
the firm, is just under $1.6 million.

Disposition by the Children

The amount defined above will grow for \(n_c - n_p\) years, so that the before-tax
value of the shares, when the children dispose of them, is

\[ [v(1 + r)^{n_p} - (v - c)t_p] \cdot (1 + r)^{n_c - n_p}. \]

Thirty years after the freeze, and 20 years after redemption of the preferred
shares, the total value of the $1 million that Joe initially froze is $6,161,123. The
children will have to pay capital gains tax on disposition, however. After \(n_c\)
years, the after-tax value of the shares, given that the parent performed an estate
freeze, is

\[ V_f = [v(1 + r)^{n_p} - (v - c)t_p] \cdot [(1 + r)^{n_c - n_p} (1 - t_c)] + t_c[v - (v - c) \cdot t_p]. \]

The first term in equation 1 reflects the after-tax value of the shares when the
parent disposes of the shares, after \(n_p\) years, given reinvestment in the business.
We have assumed, remember, that this after-tax amount will be used to purchase shares in the corporation, although the same result would arise if these amounts were instead invested in another capital project that returned \( r \). The second term in equation 1 represents the after-tax return on these shares for the remaining period, \( n_c - n_p \), if the entire value of the shares after \( n_c \) years were taxed. An amount must be added back, however, to reflect the amount of tax already paid or the tax paid on the adjusted cost base; this amount is reflected in the third term of equation 1, \( t_c [v - (v - c) \cdot t_p] \).

Given that Joe’s children face the same tax rate as their parent, the amount remaining after they pay the capital gains tax is $4,085,077. This is the after-tax family wealth 30 years from now if Joe freezes $1 million.

**The Value Without a Freeze**

**Disposition by the Parent**

The parent sells the shares to his children \( n_p \) years from now at a fair market value equal to

\[
v(1 + r)^{n_p}.
\]

Thus, Joe Smith’s $1 million has grown to $1,967,151 after 10 years. In disposing of his shares to his children, however, he must pay capital gains tax. The amount that remains after paying capital gains tax is

\[
v(1 + r)^{n_p} - [v(1 + r)^{n_p} - c] \cdot t_p.
\]

Recall that Joe’s adjusted cost base is assumed to be zero, and that the assumed marginal tax rate is 37.5 percent. The after-tax value is, therefore, $1,229,470.

**Disposition by the Children**

The amount defined above will grow for \( n_c - n_p \) years, so that the before-tax value of the shares, when the children dispose of them, is

\[
\{v(1 + r)^{n_p} - [v(1 + r)^{n_p} - c] \cdot t_p\} \cdot (1 + r)^{n_c - n_p}.
\]

The before-tax value of the $1,229,470 that Joe put back into the business is now $4,757,659. The after-tax value of the shares in the corporation, \( n_c \) years from now, is

\[
V_{nf} = \{v(1 + r)^{n_p} - [v(1 + r)^{n_p} - c] \cdot t_p\} \cdot (1 + r)^{n_c - n_p} (1 - t_c) + t_c\}.
\]

Thus the after-tax value held by Joe’s children if the freeze is not performed is $3,434,588.

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\( V = V_f - V_{nf} = v \cdot [(1 + r)^{n_p} - 1] \cdot (1 + r)^{n_e - n_p} \cdot t_p (1 - t_e) - t_c (1 - t_p), \) 

(3)

where \( V \) denotes the future value of the estate freeze.

One can simplify this expression by assuming that the parent and the children have the same marginal tax rate. Thus the value of the deferral is as follows:

\[ V' = v \cdot t \cdot (1 - t) \cdot [(1 + r)^{n_p} - 1] \cdot [(1 + r)^{n_e - n_p} - 1], \]

(4)

where \( t \) is the common marginal tax rate. In general, the assumption that the marginal tax rates are equal should not distort reality. Whether the income from the sale of the firm went to the parent or the children, most of it or all of it would be subject to taxation at the top marginal rate. To simplify the analysis, we shall assume through much of the remainder of the article that the parent’s and the children’s marginal tax rates are equal.

In the case of Joe Smith, the after-tax value of the estate freeze 30 years from now is $650,489, which is the difference between the after-tax value with a freeze ($4,085,077) and the after-tax value without a freeze ($3,434,588).

**The Implications of the Valuation Equation**

**Attributes**

Equation 4 shows that the expected value of an estate freeze, \( V' \), without the capital gains exemption will always be positive if three conditions are met:

1) it is expected that the shares will gain in value \((r > 0)\),
2) the parent’s and children’s marginal tax rates are positive \((t > 0)\), and
3) the children are expected to remain shareholders of the corporation longer than the parent would remain a shareholder in the absence of the freeze \((n_c > n_p)\).

We shall show below, however, that an estate freeze may have a positive expected deferral value even if the final condition is not met, provided that the children can use the capital gains exemption.

How is the value of an estate freeze affected by different variables? The appendix to this article derives the results discussed here. To begin with, the value of an estate freeze is a strictly increasing function of the rate of growth, \( r \), and the number of years until the children sell their shares or pass them on to their own children, \( n_c \). A higher expected growth rate increases the amount of
the tax deferral and thus increases the value of the freeze. The longer the children hold the shares, the longer taxes are deferred, and thus the greater is the value of the freeze.

Less intuitive are the results related to the number of years, in the absence of a freeze, until the parent would sell the company or pass on control of it to his children for the value of \( n_p \). In the case of values of \( n_p \) that are small relative to \( n_c \) \((n_p < n_c/2)\), the value of a freeze increases with the number of years, in the absence of a freeze, until the parent would sell the company or pass it on to his children. The reverse is true in the case of values of \( n_p \) that are large relative to \( n_c \) \((n_p > n_c/2)\). It is easiest to understand these relationships by examining the extreme values \( n_p = 0 \) and \( n_p = n_c \). If \( n_p \) equals zero, the value of a freeze is zero. In other words, to perform a freeze and then immediately redeem the preferred shares is equivalent to immediately selling the shares (that is, the same gain arises). Similarly, as \( n_p \) approaches \( n_c \), the value of a freeze again approaches zero, since there is no deferral of tax. The value of the freeze is positive for all values of \( n_p \) such that \( 0 < n_p < n_c \) and is largest where \( n_p \) is one-half the time of \( n_c \).

Also less intuitive are the results related to marginal tax rates. The value of a freeze increases with any increase in the marginal tax rate on capital gains within the relevant range of marginal rates; that is, from 0 to 37.5 percent. This consideration is particularly relevant today, given the proposed reduction in the inclusion rate for capital gains, since as the inclusion rate declines so does the marginal tax rate and hence the deferral value of performing an estate freeze.\(^7\) The point is academic, but it is worth noting that if the marginal tax rate on capital gains were greater than 50 percent, any increase in the rate would reduce the value of the freeze; in other words, the value of a freeze is greatest at a marginal tax rate of 50 percent. Again, the relationship is easiest to understand if one considers the two extremes. If the marginal tax rate is zero percent, then a freeze has no value, since the taxpayer will retain the entire amount in any case. If the marginal tax rate is 100 percent, then the value of the freeze is again zero, since the taxpayer will lose everything whether he performs a freeze or not.

Figures 2 through 5 illustrate the relationships we have discussed here. Each of the figures demonstrates the effect of one of the four principal variables on the value of an estate freeze on shares with a fair market value of $1.00.

The Timing of an Estate Freeze

In the model we have presented here, it is advantageous to perform an estate freeze at the earliest possible time. In fact, at the limit, in the absence of a capital gains exemption, it is optimal to freeze the estate at the time of incorporation. To see this, assume that one has incorporated the business today. One can freeze the business either today or at some point in the future. As the freeze date is moved forward, the periods \( n_c \) and \( n_p \) decrease. However, the difference between the periods, \( n_c - n_p \), remains constant.\(^8\) In the valuation equation (equation 4), only the following expression varies:
where $v^*$ is the firm’s value at the time of the freeze. This value strictly decreases as the period $n_p$ decreases. Therefore, if one ignores the capital gains exemption and non-tax factors, it is optimal to perform an estate freeze when the business is incorporated.

**Illustrating the Deferral Value of a Freeze**

Table 1 illustrates the value of an estate freeze, as derived above in equation 4, for various parameter values.

The growth rate, $r$, varies in the table from 3 to 9 percent. In a 1998 survey of Canadian organizations, the median long-term projection for real growth in gross domestic product was 2.5 percent, and the projection for inflation (expected increase in the consumer price index) was 2.1 percent. If one combines these numbers, the nominal projected rate for Canada is 4.6 percent, with a first quartile rate from the survey of 3 percent and a fourth quartile rate of 7 percent. It is usually assumed that small business grows faster than the economy as a whole. Given
this assumption and the above projections, average long-term growth rates of 5 to 7 percent are probably the most realistic estimates.

Table 1 calculates both the value of freezing one dollar of the parent’s interest in the business, $V_t$, and the percentage increase in value attributable to the estate freeze, $V_t\%$. Let us return to the example of Joe Smith and assume that he froze $1 rather than $1 million. Recall that we have assumed the following: that the growth rate of Smithco is 7 percent ($r = 0.07$); that in the absence of an estate freeze Joe would sell the company or pass on control of it to his children in 10 years ($n_p = 10$); that the children will sell the shares or pass them on to their own children in 30 years ($n_c = 30$ or $n_c - n_p = 20$); and that Joe’s marginal tax rate is 37.5 percent ($t = 0.375$; that is, the tax rate on dividends or 50 percent of the three-quarters inclusion for capital gains). Given these assumptions, the after-tax value with an estate freeze, $V_f$, is $4.09 and the after-tax value without an estate freeze, $V_n$, is $3.43. Thus the additional future value of the estate freeze, $V_t$, is $0.65—18.9 percent more than the after-tax value of the shares without an estate freeze.

One can vary the example by simply assuming different freeze values for Joe Smith. It is only necessary to multiply the value frozen by the value of freezing one dollar. Given our assumptions about Joe Smith, if the value frozen is $500,000, the after-tax value of the freeze 30 years from now is $325,000 ($500,000 \times 0.65$);

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*Figure 3 Variation in the Value of an Estate Freeze, $V_f$, with the Number of Years Until the Children Sell the Shares, $n_c$*

Note: It is assumed that $n_p = 10$ years, $r = 7$ percent, and $t = 37.5$ percent.
if the value frozen is $1 million, the value of the freeze is $650,000 (recall that we worked out the value for Joe above as $650,489); and if the value frozen is $5 million, the value of the freeze is $3.25 million.

Of greatest interest, perhaps, are the results that arise if in the absence of an estate freeze the parent sells or passes on control of the company to his children in 20 years ($n_p = 20$). Given $n_p = 20$ years and the most realistic growth rates, 5 percent and 7 percent, table 1 shows that an estate freeze would add between 10.5 and 35.8 percent to the after-tax value of the frozen assets.

The Deferral Value of a Freeze with the Capital Gains Exemption

The analysis to this point has excluded the effects of the capital gains exemption. It appears, however, that the exemption can significantly affect the value of a freeze.

An estate freeze usually provides an opportunity to crystallize the transferor’s $500,000 capital gain exemption on qualified small business corporation shares.\textsuperscript{10} It is, of course, the parent’s decision how much of this exemption to use, and alternative minimum tax (AMT) liability and other considerations may lead the parent not to apply the exemption or to apply it only in part. For Canadian
taxpayers at the top marginal rate, the capital gains exemption on a disposition or deemed disposition in the tax year 1999 had a value between $169,388 (resident in Alberta) and $198,375 (resident in Newfoundland).\textsuperscript{11} It is important to note that the children too will eventually have access to a $500,000 enhanced capital gain exemption on the new common shares, provided that the new common shares qualify as small business corporation shares.

**The Model**

The parent’s or children’s marginal tax rate on the gain up to the exemption limit, $x$, is usually zero.\textsuperscript{12} If one assumes that it is zero, then the after-tax value of the children’s shares at disposition if there is a freeze and if the parent and the children both have capital gains exemptions, $V_f^E$, is as follows:

$$V_f^E = [v(1 + r)^{n_p} - A] \times (1 + r)^{n_c - n_p} - \max[0, (v(1 + r)^{n_p} - A)(1 + r)^{n_c - n_p}]$$

$$- (v - A) - x_r \cdot t_p,$$

where

$$A = \max[0, (v - c) - x_p] \cdot t_p,$$

\textsuperscript{(5)}
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and where $x_p$ is the parent’s exemption limit, $x_c$ is the children’s exemption limit, and $\text{max}$ is a maximization operator.

In this equation, $A$ is the amount of tax paid by the parent at the time of redemption. The amount taxable to the parent (the value of his shares at the time of the freeze less the shares’ adjusted cost base) is reduced by his exemption limit; if the parent’s exemption limit is higher than the amount taxable, the parent pays no tax. This outcome is accomplished mathematically through the maximization operator. The first term in equation 5, therefore, expresses the total value of the shares when the children dispose of them but before they pay income taxes. The second term in equation 5 expresses the amount of taxes that the children must pay on disposition of their shares. They may pay no tax if their exemption limit is high enough relative to the value of the corporation.

The after-tax value of the children’s shares after disposition if there is no freeze and if both the parent and the children have capital gains exemptions, $V_{nf}^E$, is as follows:

$$V_{nf}^E = [v(1+r)^{n_p} - B] \cdot (1+r)^{n_c-n_p} - \text{max}[0,[v(1+r)^{n_p} - B] \cdot (1+r)^{n_c-n_p} - 1] - x_c \cdot t_c,$$

where

$$V_{nf}^E = \max[v(1+r)^{n_p} - B, 0] \cdot (1+r)^{n_c-n_p} - x_c \cdot t_c.$$

### Table 1 The Value of an Estate Freeze, $V_t$, and the Percentage Increase in Value Attributable to the Estate Freeze, $V_t\%$

<table>
<thead>
<tr>
<th>$n_p$</th>
<th>$n_c \cdot (n_c - n_p)$</th>
<th>$V_t$</th>
<th>$V_t%$</th>
<th>$V_t$</th>
<th>$V_t%$</th>
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<th>$V_t%$</th>
<th>$V_t$</th>
<th>$V_t%$</th>
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<td>0.7</td>
<td>0.02</td>
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<td>2.1</td>
<td>0.07</td>
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</table>

Note: $n_p$ = the number of years until the parent would dispose of the shares to the children if there were no estate freeze; $n_c$ = the number of years until the children will dispose of the shares; and $r$ = the expected rate of growth in the value of the shares. The marginal tax rate is assumed throughout to be 37.5 percent. We provide the values for both $n_c$ and $n_c - n_p$, though it is redundant to do so, because we found that some readers can visualize the valuation equation better by using one expression rather than the other.
\[ B = \max\{0, v(1 + r)^{n_p} - c - x_p\} \cdot t_p. \]

One may interpret equation 6 in much the same manner as equation 5. \( B \) is the amount of tax paid by the parent at the time of the parent’s disposition. The first term in equation 6, therefore, expresses the before-tax value of the shares when the children dispose of them. The second term expresses the amount of tax owing by the children.

Thus the value of an estate freeze given the effects of the capital gains exemption, \( V^E \), is the difference between equations 5 and 6.

**Interpretation**

It is difficult to obtain insight into the implications of the capital gains exemption from a direct examination of \( V^E \)—the difference between equations 5 and 6. One must instead examine the value of a freeze with the capital gains exemption for different parameter values. Table 2, accordingly, determines the value of a freeze with the capital gains exemption, \( V^E \), by varying the limits of the parent’s exemption room, \( x_p \), and the children’s exemption room, \( x_c \), relative to amounts taxable. The table determines \( V^E \) after the maximization operators have been applied.

Let us first interpret the three columns in table 2. In column 1, the current value of the firm is large enough to allow the parent to use the capital gains exemption in full whether a freeze is performed or not. In column 3, conversely, the parent cannot use the exemption in full even if a freeze is not performed. If the parent cannot use the exemption in full, the value of a freeze is negative or zero. Finally, in column 2, the parent cannot use his capital gains exemption in full if a freeze is performed but can use it in full if a freeze is not performed; that is, he will be able to use the exemption in full in \( n_p \) years. Note that the value of a freeze decreases as we move from column 1 to column 2 to column 3. That is, the value of a freeze decreases as the exemption room, \( x_p \), increases.

To illustrate this point, let us re-examine Joe Smith’s freeze decision and include the effect of the capital gains exemption in the analysis. We continue to assume that the growth rate in the business is a constant 7 percent (\( r = 0.07 \)), that in the absence of an estate freeze the parent would sell or pass on control of the company to his children in 10 years (\( n_p = 10 \)), that the children will sell the shares or pass them on to their own children in 30 years (\( n_c = 30 \), or \( n_c - n_p = 20 \)), and that the marginal tax rate on capital gains or redemption dividends is constant at 37.5 percent (\( t = 0.375 \)). Let us further assume that Joe is considering freezing a net value of $200,000 (still with an adjusted cost base, \( c \), of zero), and that the children use their capital gains exemption in full; the last assumption allows us to focus on a single row in table 2, row A. If Joe has zero exemption room, the value of the freeze will be $130,098 (cell 1A). If Joe has instead exemption room of $300,000, the value of the freeze declines to $25,340 (cell 2A). Finally, if Joe’s exemption room is $500,000, the value of the freeze declines further to $72,536.
Table 2  The Value of an Estate Freeze with the Capital Gains Exemption, $V^E$

<table>
<thead>
<tr>
<th>Amount taxable to children relative to capital gains exemption room for children, $x_c$</th>
<th>Amount taxable to parent relative to parent’s capital gains exemption room, $x_p$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. $[v(1+r)^{y_p} - c] \geq (v-c) \geq x_p$</td>
</tr>
<tr>
<td>A. $C \geq D \geq x_c$</td>
<td>$v \cdot [(1+r)^{y_p} - 1] \cdot t_p \cdot [x_c \cdot (1-r) \cdot t_c + t_c \cdot t_p]$</td>
</tr>
<tr>
<td>B. $C \geq x_c \geq D$</td>
<td>$v \cdot [(1+r)^{y_p} - 1] \cdot (1+r)^{c-x_p} \cdot t_p$</td>
</tr>
<tr>
<td>C. $x_c \geq C \geq D$</td>
<td>$v \cdot [(1+r)^{y_p} - 1] \cdot (1+r)^{c-x_p} \cdot t_p$</td>
</tr>
</tbody>
</table>

Note: $C = [v(1+r)^{y_p} - \max(0, (v-r) \cdot t_p)] \cdot (1+r)^{c-x_p} - [v-r \cdot \max(0, (v-r) \cdot t_p)] \cdot t_p$, which is the amount taxable to the children if a freeze is performed, and $D = [v(1+r)^{y_p} - \max(0, v(1+r)^{y_p} - c - x_p)] \cdot (1+r)^{c-x_p} - 1]$, which is the amount taxable to the children if a freeze is not performed.
(cell 3A), a large negative amount. The last value is negative because the children will ultimately be taxed, although no tax need be paid if no freeze is performed. In other words, the negative amount reflects the taxes that the children will have to pay when they dispose of the frozen shares.

The rows in table 2 progress in somewhat the same manner as the columns. In row A, the future value of the firm will be large enough to allow the children to use their capital gains exemptions in full whether a freeze is performed or not. Conversely, in row C, the future value of the firm will be too low to enable the children to make full use of their exemptions in the future, even if a freeze is performed immediately. In rows A and C, in short, the value of an estate freeze is independent of the children’s exemption room. Finally, in row B, the children will be able to make full use of their capital gains exemptions in the future only if a freeze is performed.

Let us again revisit Joe Smith’s freeze decision, but let us assume this time that Joe has previously used his capital gains exemption in full; this assumption allows us to focus on a single column in table 2—column 1. If the children also have zero exemption room, the value of the freeze is $130,098 (cell 1A). If the children have exemption room of $300,000, the value of the freeze increases to $253,948 (cell 1B). Finally, if the children’s exemption room is $500,000, the value of the freeze increases further to $280,693 (cell 1C).

To gain further insight, let us focus on certain cells in table 2. First, the formula in cell 1A represents the value of a freeze if both the parent and the children can use their respective exemptions in full, whether a freeze is performed or not. Note that under these conditions the value of a freeze is identical to its value without the capital gains exemption—that is, it is equal to its value in equation 3, although the formula is written here in a slightly different manner in order to simplify comparison across cells. The implications of this identity are important. If the current value of the firm’s shares (less the adjusted cost base) is greater than the parent’s exemption room, $x_p$, and the future value to the children (less the adjusted cost base) without a freeze is greater than the children’s exemption room, $x_c$, then the value of a freeze is independent of the capital gains exemption. When is this likely to happen? The formula in cell 1A is applicable if the value of the parent’s shares less their adjusted cost base is greater than $500,000, and if the children run the corporation long enough for the accumulation of an additional amount sufficient to use the children’s exemption in full.

Cell 3C exhibits the value of a freeze—zero—if neither the parent nor the child is able to use his capital gains exemption in full, whether a freeze is performed or not. If a freeze is performed, neither the parent nor the children will pay taxes. If a freeze is not performed, again neither the parent nor the child will pay taxes. Of course, this outcome arises only if the current value and the expected future value of the firm are both very low.

The formulas in cells 1C and 3A represent the conditions under which a freeze has the greatest value and the least value. In cell 1C, the parent can use his exemption in full with or without a freeze but the children cannot use their
exemption in full even without a freeze. In no other cell does adding an additional dollar to the value of the firm add more to the value of the freeze. In cell 3A, conversely, the parent cannot use his exemption in full even without a freeze, but the children can use their exemption in full even if there is no freeze. In this case, a freeze has a lower value than it has in any other cell.

Also interesting is the centre cell in table 2, cell 2B. This cell shows the outcome if the parent cannot use his capital gains exemption in full if he performs a freeze and the children cannot use their exemption in full if the parent does not perform a freeze; that is, there is a tradeoff. Whether a freeze has a positive value or a negative one depends, therefore, on the current value of the firm, \( v \), the parent’s and children’s exemption levels, \( x_p \) and \( x_c \), and their marginal tax rates, \( t_p \) and \( t_c \). To put the matter in another way, the value of a freeze will be positive if the tax reduction that the parent enjoys if he performs a freeze outweigh the tax increases that the children suffer if he does not perform the freeze.

Recall that in the absence of the capital gains exemption a freeze will have value only if it is expected that the children will be shareholders of the company longer than the parents will be shareholders \( (n_c > n_p) \). This condition may not hold if the capital gains exemption applies. Assume, for example, that the parent can use his capital gains exemption in full whether a freeze is performed or not, but that the children can use their exemption in full only if a freeze is performed (cell 2B in table 2). If the children are expected to remain shareholders for exactly as long as the parent is a shareholder \( (n_c = n_p) \), the expected value of the freeze is positive \( (x_c \cdot t_c) \). If the children’s exemption room of $500,000 were fully available, then given a marginal tax rate of 37.5 percent the value of the freeze would be $187,500. This result has an important implication: even if the parent intends to sell the business when he retires, a freeze may nonetheless be valuable if the family would not otherwise be able to use the capital gains exemption.

Finally, let us consider the effect of the capital gains exemption on the timing of a freeze. Recall that if we do not consider the capital gains exemption, the earlier the freeze is performed the greater is its value. We must redefine this rule if the parent and children have access to the capital gains exemption. Let us first consider the case in which the parent can use his exemption in full if a freeze is performed; that is, column 1 in table 2. From this column, one can conclude that the earlier a freeze is performed (so that the parent can continue to use his capital gains exemption in full), the greater is the value of the freeze in each of the three cells. This outcome arises because it follows from the analysis of relative changes that in each equation the value of a freeze strictly increases as the periods \( n_c \) and \( n_p \) increase—that is, the earlier a freeze is performed (recall that the difference between the two periods, \( n_c - n_p \), remains constant). Therefore, if the parent can use his exemption in full, freezing at the earliest possible date maximizes the value of the freeze.

Is it optimal to freeze before the parent can use his capital gains exemption in full? The answer is no. If it will not be possible for the parent to make full use
of the exemption even if he delays the freeze, then the value of a freeze is negative or zero (see column 3 in table 2) and therefore a freeze should not be performed. If it will be possible to use the exemption in full in the future but it is not possible today, then the freeze should be delayed. To see this, note that $1 of tax deferred by the parent will have grown to \((1+r)^{n_p-n_p} \) when the children sell the firm. If the children do not have excess exemption room, then the cost of not delaying the freeze while the value of the firm grows by $1 is \([1+(1+r)^{n_p-n_p} - 1] \cdot t_c\). If the children have excess exemption room, there is neither a benefit to delay nor a cost. In other words, there will generally be additional value in delaying a freeze until the parent can use his capital gains exemption in full; in any case, there is no cost to delay.

As to the matter of timing, then, it is optimal to perform an estate freeze as soon as it becomes possible for the parent to use his capital gains exemption in full.

**CONCLUSIONS AND LIMITATIONS**

This article has modelled the deferral value of an estate freeze with and without the capital gains exemption. The initial model, which omitted the capital gains exemption, yielded a number of implications. To begin with, if the freeze is to have a positive deferral value, the business must increase in value and the children must remain shareholders of the corporation longer than the parent is a shareholder. These necessary conditions are fairly intuitive.

As one might also expect, the value of an estate freeze is a strictly increasing function of the rate of return. A higher growth rate increases the amount of the tax deferral and thus increases the value of the freeze as well. The value of a freeze also increases with the number of years until the children sell the shares or pass them on to their own children. The longer the children hold the shares, the longer is the period in which taxes are deferred, and hence the greater is the value of the freeze. The value of a freeze also increases with the marginal tax rate on capital gains up to a marginal rate of 37.5 percent. Finally, the value of a freeze can either increase or decrease with the number of years until the parent would pass on control of the company to his children in the absence of a freeze. The value increases if the children hold the business for a longer period than the parent would have held it and decreases if the children hold it for a shorter period. There is also the matter of the timing of a freeze. In the absence of the capital gains exemption, it is advantageous (the deferral value is greatest) to perform the freeze at the earliest possible time.

In general, these results continue to hold if one includes the capital gains exemption in the analytic model. In fact, for large values of \(v\), the value of a freeze will be the same with or without the exemption. What the addition of the capital gains exemption to the analysis does affect is the optimal timing of a freeze. The parent should perform the freeze as soon as he can use his exemption in full.

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The reader can download a spreadsheet that calculates the deferral value of an estate freeze from the Web at www.commerce.usask.ca/faculty/feltham by clicking on “Estate Freeze Spreadsheet.” Once the reader has downloaded the file, he or she can determine the deferral amount for any set of parameter values.

This article has focused on the value of the deferral of taxes from an estate freeze. We have not attempted to quantify other potential benefits of an estate freeze, such as family harmony and the potential for income splitting. Nor have we examined the financial and non-financial costs of an estate freeze. We acknowledge that these benefits and costs should and do affect the freeze decision. Given these caveats, we believe that this article makes a valuable contribution to the literature by quantifying a very important factor in the freeze decision, the value of the deferral of taxes.15

APPENDIX: THE EFFECT ON VALUE OF CHANGES IN KEY VARIABLES

The value of an estate freeze as it is derived in equation 4 above is

\[ V^t = v \cdot t \cdot (1-t) \cdot [(1+r)^{n_p} - 1] \cdot [(1+r)^{n_c-n_p} - 1]. \]

What is the effect of the variables on value? Let us partially differentiate the value of the estate freeze, \( V^t \), in terms of (1) the number of years until the parent would dispose of the shares to the children if there were no estate freeze, \( n_p \); (2) the number of years until the children dispose of the shares, \( n_c \); (3) the rate of growth in the value of the shares, \( r \); and (4) the individual’s marginal tax rate on capital gains, \( t \). In signing the partial derivatives, we assume that \( n_c > n_p \). Recall that if \( n_c < n_p \) it will not be optimal to perform an estate freeze, since one of the necessary conditions for performing a freeze will not be present.

1) \( V^t \) increases with increases in \( n_c \):

\[ \frac{\partial V^t}{\partial n_c} = v \cdot t \cdot (1-t) \cdot [(1+r)^{n_c} - 1] \cdot [(1+r)^{n_c-n_p} \cdot \ln(1+r)] \times \frac{\partial}{\partial n_c} > 0. \]

2) \( V^t \) can either increase or decrease with increases in \( n_p \):

\[ \frac{\partial V^t}{\partial n_p} = v \cdot t \cdot (1-t) \cdot \ln(1+r) \cdot [(1+r)^{n_c-n_p} - (1+r)^{n_p}] > 0 \text{ if } n_c > 2n_p \]

\[ < 0 \text{ if } n_c < 2n_p. \]

3) \( V^t \) increases with increases in \( r \):

\[ \frac{\partial V^t}{\partial r} = v \cdot t \cdot (1-t) \cdot n_c \cdot [(1+r)^{n_c-1} - (1+r)^{n_c-n_p-1}] > 0. \]
4) \( V \) increases with increases in \( t \) for all reasonable values of \( t \):

\[
\frac{\partial V}{\partial t} = v \cdot (1 - 2t) \cdot [(1 + r)^n - 1] \cdot [(1 + r)^c - n] - 1 > 0, \quad \text{if} \quad t < 0.5
\]

\[
< 0, \quad \text{if} \quad t > 0.5.
\]

Notes

1 Although there are few statistics on “family business,” there are statistics on “small business.” These terms are frequently used interchangeably, although this usage is not strictly correct. In a speech to the Canadian Club of Toronto on December 4, 1995, one speaker stated that “small business now accounts for a full 57% of Canada’s gross domestic product.” François Beaudoin, “Canada Needs Small Business Because We Need Big Business” (1996), vol. 9, no. 10 Canadian Speeches 35-38, at 36. He further noted that over the last 15 years small business has “post[ed] a spectacular 49% growth in employment” (ibid.), whereas employment in other sectors has steadily declined. According to Statistics Canada, Market Research Handbook (Ottawa: Statistics Canada, 1998), table 8-1, 87.0 percent of Canadian businesses employ fewer than 20 employees, 97.9 percent employ fewer than 100 employees, and 99.7 percent employ fewer than 500 employees. A Statistics Canada study by John Baldwin, Strategies for Success: A Profile of Growing Small and Medium-Sized Enterprises (GSMEs) in Canada (Ottawa: Statistics Canada, 1994), reported that firms with fewer than 500 employees accounted for 63 percent of all Canadian employment in 1989. The same study notes that more than three-quarters of small businesses in Canada are owned and operated by their managers. One could therefore assert that at least three-quarters of small firms are what we traditionally refer to as family businesses.

2 For a more complete discussion of the attributes of the preferred shares, see Maurice Cullity, Catherine Brown, and Cindy Rajan, “Estate Freezing,” in Taxation and Estate Planning (Scarborough, Ont.: Carswell) (looseleaf), chapter 7, at 7-13 to 7-17.

3 It is assumed that the parent does not transfer the shares of the freeze corporation to his spouse or a spousal trust; that is, it is assumed that a spousal rollover does not occur.

4 It is assumed that in order to avoid double taxation the taxpayer will take appropriate tax-planning steps under subsection 164(6) of the Income Tax Act. Unless otherwise stated, statutory references in this article are to the Income Tax Act, RSC 1985, c. 1 (5th Supp.), as amended (herein referred to as “the ITA”). For a discussion of planning considerations surrounding the use of subsection 164(6), see H. Elise Rees, “Testamentary Planning To Avoid Double Taxation” (2000), vol. 48, no. 1 Canadian Tax Journal 155-72.

5 In this article, we are interested in the impact of an estate freeze on the family’s wealth. When the parent redeems or sells the shares, this amount remains in the family. We assume that this amount is reinvested in the family business. An alternative assumption is that the parent purchases another asset that generates a similar rate of return. Since the economic impact on the family is the same under either scenario, we can assume reinvestment without loss of generality.

6 For illustrative purposes, we assume throughout this article that the marginal tax rate on capital gains or redemption dividends is constant at 37.5 percent. The inclusion rate on capital gains, however, has been reduced from three-quarters to two-thirds (Canada, Department of Finance, 2000 Budget, The Budget Plan, February 28, 2000, 115), and it may later be reduced to one-half (Canada, Department of Finance, Economic Statement and Budget Update (Ottawa: the department, October 18, 2000), at 137). The proposed highest marginal tax rate on capital gains, therefore, will be only about 25 percent, whereas the highest rate on dividends may remain above 30 percent. A significant difference between these rates can affect the value of an estate freeze and therefore may influence the freeze decision as well.
7 The method of computing provincial taxes (that is, tax on income or tax on tax) does not affect this conclusion.

8 This difference, \( n_c - n_p \), represents the length of time the children will hold the shares they receive from their parents if no freeze is performed. It is constant because the timing of the freeze affects neither the date upon which the children would receive shares in the absence of a freeze nor the date upon which they would dispose of these shares.


10 ITA section 110.6.

11 The Alberta top marginal rate for 1999, including federal tax and surtax and provincial tax and surtax, was 45.17 percent. The Newfoundland top marginal rate was 52.90 percent. To obtain the capital gains rate for 1999, one would multiply these rates by three-quarters. The calculations assume that the taxpayer is applying the exemption to income that would be taxed solely at these rates. Recall, however, that for 2000 the inclusion rate has been reduced from three-quarters to two-thirds, and that a further reduction to one-half is proposed. These reductions will reduce the value of the capital gains exemption.

12 Marginal tax rates on the amount eligible for the capital gains exemption can be positive if the individual is in an income-tested range for federal or provincial tax credits. This outcome arises because the full amount of the capital gain (including the amount eligible for the capital gains exemption) is included in the individual’s net income for tax purposes. Although the eligible amount is then deducted in the calculation of taxable income, credits are income tested on the amount of net income for tax purposes. In practice, it is unlikely that income-tested credits would affect either the parent’s or the children’s marginal tax rates in the context of a freeze. Further, if the credits did affect their rates, the effect would likely be small. For the purposes of analysis, therefore, we assume that the marginal tax rate on amounts subject to the capital gains exemption is zero for both the parent and the children.

13 The tax consequences may not occur strictly at the time of redemption. For example, the transaction may give rise to both a deemed dividend and a capital loss. The timing of the benefit from the capital gains exemption, reflected in the capital loss, will depend on when an offsetting capital gain is realized.

14 This analysis assumes that the parent does not have other qualifying shares that he could use the exemption against. The analysis becomes far more complex if the parent does have other qualifying shares.