

Cost-Benefit Analyses of Employee Dependent Care Assistance Plans

Thomas S. Coe*

Assistant Professor, Department of Finance, Quinnipiac University, 275 Mount Carmel Avenue, Hamden, CT 06518, USA

Accepted 15 August 2002

Abstract

An Employee Dependent Care Assistance Plan reduces the amount of tax withheld, increasing annual take-home pay. However, there are also costs of participating in a Plan. The funds deducted from the employee's earnings will not be immediately available. This penalizes the employee until expenses are actually reimbursed. This paper shows that the cost of not participating in a Dependent Care Assistance Plan is substantially higher for most employees than the opportunity cost of lost interest on savings. The findings hold even if finance charges for cash advances are necessary. © 2002 Academy of Financial Services. All rights reserved.

JEL classification: H24; J13; J32

Keywords: Child care; Employee benefits; Tax reduction

1. Introduction

The Dependent Care Assistance Plan (DCAP or “the Plan”) is an employer-sponsored employee benefit that allows for the reduction of taxable earnings from wages of eligible employees for qualified expenses. Qualified expenses include payments for in-home services for dependents, which include child care for those under age 13 as well as eldercare, and services outside the home for physically or mentally impaired dependents. The primary intention for the tax benefit is to allow both parents to be employed (or allow a non-working

* Corresponding author. Tel.: +1-203-582-3455; fax: +1-203-582-8664.

E-mail address: thomas.coe@quinnipiac.edu (T.S. Coe).

spouse to be enrolled in school on a full-time basis); therefore, babysitting during the evening or on weekends is not a qualifying expense.

The Internal Revenue Service provides for, in 26 USC Sec. 129, an employer-sponsored plan for the benefit of eligible employees to exclude from their gross income (pretax dollars) the amount paid for qualified child care services. The provisions of Section 129 provide that the Plan be available to all eligible employees and not discriminate in favor of highly compensated employees. Eligible employees generally are those at least 21 years of age and having one year of service with the employer.

The Internal Revenue Service also provides for, in 26 USC Sec. 125, Cafeteria Plans that employers can sponsor for employees. These are also referred to as Flexible Spending Accounts (FSAs). Similar to Section 129 plans, employees can use pretax dollars to be used for the cost of dependent health insurance premiums as well as those medical and child care expenses that are not reimbursed by an insurance provider. In fact, due to the employee being able to choose the size of the Dependent Care benefit, DCAPs are essentially FSAs.

With both the DCAP as well as the Flexible Spending Account, employers can save on Social Security, Medicare, and other payroll taxes. Employees save on the FICA contributions as well as Federal, state, and any local income taxes.

Under both plans, pretax wages can be reduced by the total expected annual expense, up to a maximum of \$5,000 (\$2,500 for employees who are married, filing separately). For example, if an employee anticipates \$1,000 of qualified expenses for the year and is paid weekly, the earnings reduction would be \$19.23. Similarly, an employee who elects to deduct the maximum would have a bimonthly wage reduction of \$208.33.

The attractiveness of a DCAP over similar flexible spending accounts is the greater certainty that the anticipated expenses will be those of the subsequent actual expenses. For example, one is pretty certain that there will be the continual use of daycare throughout the year, and there wouldn't be much, if any, changes in the cost of daycare. This is in direct contrast to forecasting medical costs, which may or may not occur. In other words, a participant in a DCAP should have less fear of forfeiting any contributions that will not be used, and therefore, would be lost. In fact, the opposite is probably true: the actual dependent care costs incurred for the year may exceed the maximum allowance (\$5,000) by hundreds or thousands of dollars.

2. Related literature

The focus of much of the existing literature provides for a descriptive examination of Flexible Spending Accounts and DCAPs within the greater arena that encompasses employee benefits (Hamill, 1993; King, 1996; Lewis, 1991; Piturro, 1989; Pretzer, 2000). Kossek et al. provide evidence for the need to provide sick care, child care and elder care benefits to employees to promote productivity and reduce absenteeism. Collins, Krause, and Machida (1990) as well as *Profit-Building Strategies for Business Owners* (1993) suggest that employers should consider all employees and their benefit concerns when considering which benefits to provide. FSAs and DCAPs provide an equitable, minimal cost option for most employers to offer as a benefit compared to alternatives. Drinkwater (1993) and Connelly

(2000) suggest that businesses definitely should sponsor such employee benefits as part of their recruiting and retention strategies for employees, especially those at higher income levels.

A few authors cite potential downsides to employees participating in flexible spending accounts. The primary risk is that any FSA contribution by an employee that is not used during the calendar year is forfeited (the oft-quoted “use it or lose it” provision). For the IRS to allow these tax benefits, there must be some risk involved for taxpayers (Ferling, 1997). Levitan, Coppage, and Baxendale (1993) also cite that the reduced wages from plan participation would reduce future Social Security benefits, since employees earning less than the maximum Social Security taxable wages are contributing less to the fund. Generally, they find that employees earning less than \$24,000 should never participate in FSAs, unless they qualify for Earned Income Credits, and those earning less than \$36,000 may be better off by not participating, depending on their circumstances.

The participation in a DCAP could also have an adverse result financially due to the loss of the full child care credit available with annual income tax filings. Baxendale, Coppage, and Attaway (1993) find that employees at lower income levels would be better off not participating in the DCAP whereas higher income employees would not face this tradeoff. While generally arguing against lower income employees participating in such benefit plans, the threshold level of income for electing any benefit could differ with changing tax regulations. In fact, while the IRS regulations state that employer sponsored plans cannot discriminate against lower income employees, the tax codes themselves, with the complicated decision towards electing to participate in a DCAP or waiting to receive the child care tax credit, may make participating in a DCAP unattractive.

Bialkowski (1991) and Martin (2000) cite another risk that employees face when determining the amount to contribute to either FSA; the opportunity cost of underestimating the annual costs. One consequence cited by this was the increased taxes that could have been avoided. The other was the delay in the use of medical services until the following calendar year, when the full benefits of a medical FSA could have been enjoyed. These, as well as the risk behind the principle of “use it or lose it” provide a further explanation to the historic, relatively low levels of participation of FSAs and DCAPs (Connelly, 2000). He cites the reluctance of employees may also stem from paperwork hassles as well as the feeling that the benefit from tax savings does not outweigh the opportunity cost from the waiting period for reimbursement. This contrasts to the findings of Prince (2001), showing that, in a 2001 Society for Human Resource Management survey of 754 human resource professionals, that 69% of responding employers offer dependent care flexible spending accounts, up from 58% in 1997.

3. The tax savings provided by the plan

To illustrate the impact that participating in the Plan has on take-home pay, assume the employee elects the maximum benefit of \$5,000 to be deducted proportionally per pay period from wages. Table 1 shows an illustrative periodic reduction in taxable wages.

Table 1
Illustration of the maximum \$5,000 pre-tax reduction in wages from participating in the plan

Frequency	Number of pay periods per year	Periodic reduction in taxable wages
Weekly	52	\$96.15
Bi-weekly	26	\$192.31
Bi-monthly	24	\$208.33
Monthly	12	\$416.67

If the employee were to elect the maximum wage reduction (\$5,000 per annum) the amounts above would be deducted from the pre-tax gross wages per pay period shown. Any other level of participation would result in a different periodic reduction than those illustrated here.

Elections of any amount less than \$5,000 will be calculated in a similar fashion. The change in the take-home pay will be determined by

$$\Delta Pay = GP - DCA + (\Delta FWH + \Delta OASDI + \Delta HI + \Delta SWH) \quad (1)$$

where

ΔPay is the change in take-home pay

GP is the Gross earnings

DCA is the periodic Dependent care allowance

ΔFWH is the reduction in the federal withholding tax

$\Delta OASDI$ is the reduction in social security old age, disability, and health insurance premium

ΔHI is the reduction in social security medicare insurance premium

ΔSWH is the reduction in the state withholding tax

In the above calculation, there will be a decrease in take-home pay due to the dependent care allowance. When one considers that this will be reimbursed dollar-for-dollar at a later date, the aggregate take home pay actually increases due to the reduction in taxes.

To gain further appreciation of the overall effect that the participation in the Plan has on annual tax savings, consider the effect on couples in different federal tax brackets and filing statuses (ignoring any exemptions or deductions elsewhere) if the maximum allowance were elected, as shown in Table 2. The dollar savings increase as income increases, whereas the percentage impact is greater for lower income earners.

4. The tradeoff of opportunity cost and the cost of not participating in the plan

Table 2 demonstrates the sizeable benefits that employees may gain by participating in the plan. However, one potential hurdle exists. That is the actual reduction in take-home pay and the need to pay for these services from the reduced take-home pay. This hurdle could present a financial hardship, especially for lower-income employees. The impact from the reduced take-home pay may necessitate a withdrawal from savings or even taking a credit card cash

Table 2
Comparison of annual tax savings for various incomes

Income	Adjusted income	Old tax	New tax	Tax savings	Percentage saved
Married filing jointly or qualifying widow(er)					
\$10000	\$5000	\$1500.00	\$750.00	\$750.00	50.00%
30000	25000	4500.00	3750.00	750.00	16.67%
50000	45000	8100.00	6750.00	1350.00	16.67%
75000	70000	14975.00	13600.00	1375.00	9.18%
100000	95000	21850.00	20475.00	1375.00	6.29%
105000	100000	23225.00	21850.00	1375.00	5.92%
125000	120000	29197.50	27672.50	1525.00	5.22
Married filing separately					
\$10000	\$5000	\$1500.00	\$750.00	\$750.00	50.00%
30000	25000	5425.00	4050.00	1375.00	25.35%
50000	45000	10925.00	9550.00	1375.00	12.59%
75000	70000	18411.26	16886.26	1525.00	8.28%
100000	95000	26873.75	25098.75	1775.00	6.60%
105000	100000	28648.75	26873.75	1775.00	6.20%
125000	120000	35748.75	33973.75	1775.00	4.97%
Head of household					
\$10000	\$5000	\$1500.00	\$750.00	\$750.00	50.00%
30000	25000	4500.00	3750.00	750.00	16.67%
50000	45000	8076.00	6750.00	1326.00	16.42%
75000	70000	14826.00	13476.00	1350.00	9.11%
100000	95000	21576.00	20226.00	1350.00	6.26%
105000	100000	22926.00	21576.00	1350.00	5.89%
125000	120000	29906.25	28156.25	1750.00	5.85%

Note: The tax savings are illustrated for federal withholding taxes. Additional savings would result from the difference on Social Security taxes, 6.2% of income (up to the maximum income level) and for Medicare, 1.45% of all income; state tax savings will depend on the locality of the employee.

If the employee were to elect the full \$5,000 wage reduction for participating in the Plan, the pre-tax income level would be reduced by this amount. The annual Federal withholding tax would be reduced according to the appropriate tax based on the new level of income. The Tax Savings and the Percentage Saved show the difference between the taxes paid. Any wage reduction other than the full \$5,000 would result in a different adjusted income as well as different tax savings.

advance or some other short-term financing option to make up for the temporary reduction in usable funds. Although this is a legitimate concern, it is not one that should dissuade an employee from taking advantage of the tax savings provided by the plan. In light of the tax savings foregone by not participating in the Plan, these opportunity costs are small in comparison.

The foregone cost is the personal tax percentage of the given payroll taxes. These savings would be lost if the employee did not participate in the Plan. In comparison, the opportunity cost of withdrawing from savings or even taking a cash advance would be the periodic interest rate until the funds were repaid from the reimbursed expenses. To calculate the foregone cost, the following formula is applied:

$$I = \frac{T}{X} \quad (2)$$

where

I is the periodic foregone cost,

T is the appropriate marginal tax rate, and

X is the number of pay periods until reimbursement of expenses (the waiting period to recover the expense).

This periodic rate can be annualized by compounding the foregone cost by the number of pay periods,

$$APR = (1 + I)^{PP/X} - 1 \quad (3)$$

where

APR is the annualized foregone cost and

PP is the number of pay periods per year.

For illustration, assume an individual were in a 27.5% marginal tax bracket, is paid bi-monthly, and waits two and a half pay periods for reimbursement of expenses. The periodic tax savings foregone would be

$$I = \frac{0.275}{2.5} = 0.11 = 11\%$$

To compound this for the entire year, the foregone tax savings would amount to

$$APR = (1.11)^{24/2.5} - 1 = 1.7233 = 172.33\%$$

This is far greater than the annual interest rate on any cash advance or on any savings account.

The results shown in Table 3 are somewhat misleading. No savings or investment will be available with returns of such levels. But, if the periodic tax savings could be reinvested at the marginal tax rate, the annualized rate of return would be conceptually possible. Putting the tax savings into a bank account would obviously diminish the annualized returns. The main point of the illustration in Table 3 is the negative association between the waiting period and the benefits of tax savings. That is, as the waiting period (X) increases, the benefit of the tax savings decreases. In contrast, if an employee were allowed to recycle the savings more frequently during the year, the benefits would increase dramatically.

A further benefit of participating in the Plan concerns the relatively small amount of money that would need to be withdrawn from savings or borrowed at the beginning of the first year that the employee participates in the Plan. The most anyone would need to withdraw from savings (or to borrow) at the beginning of the year would be

$$Withdrawal = \frac{Allowance}{PP} * X \quad (4)$$

Table 3
Comparison of tax savings under various reimbursement frequencies

Tax savings rate (T)	Pay periods per year (PP)	Pay periods before reimbursement (X)	Annualized rate (APR)
15%	12	1	435%
	24	2	138%
	52	3	133%
27.5%	12	1	1,746%
	24	2	369%
	52	3	357%
30.5%	12	1	2,340%
	24	2	449%
	52	3	436%
35.5%	12	1	3,731%
	24	2	610%
	52	3	595%
39.1%	12	1	5,147%
	24	2	752%
	52	3	736%

Note: The tax savings rates are based on the 2001 marginal tax rates for married couples, filing jointly. For further illustration, the reader should add the 7.65% Social Security taxes and any State income taxes for their location into T. The Annualized Rate would differ for any employee with a different filing status.

The annualized rate is the compounded rate of return if the reimbursed tax savings were invested at the tax savings rate per period (I). The Annualized Rate can be calculated by

$$APR = (1 + I)^{PP/X} - 1$$

The Annualized Rate reflects the difference in the level of income as well as the frequency that the employee is paid and the speed of the reimbursement from the employer. In general, the higher the income, the more frequent the paycheck, and the more rapid the reimbursement, the greater the annualized savings.

For example, the maximum one-time withdrawal (loan) would be \$624.99, if the maximum allowance of \$5,000 was taken (\$208.33 per each of 24 pay periods) and the reimbursement waiting period were three pay periods. An allowance of \$2,500 for the year with bi-weekly (PP = 26) pay periods would have a loan of \$192.31, if the employee had to wait two pay periods for reimbursement. This short-term reduction in take-home pay would be reimbursed at a later date and be completely paid back through tax savings during the year. The opportunity cost of this would be the interest lost on the withdrawal or the finance charges on a short-term loan. Table 4 shows the different annualized interest costs based on a maximum participation in the Plan.

Even if this “seed” money were not paid back for the entire year, the financial costs would be a small fraction of the annual tax savings shown in Table 2.

Another, somewhat neglected, consideration would be that an employee who wishes to participate in the Plan might not have the resources to draw upon to replace the temporary reduction in take-home pay. There may not be sufficient savings or credit available. While this, again, would be more of an issue for lower-income employees, any employee may be confronted with this dilemma (this may be especially true since most employers require that the decision to participate in the Plan be made in January, right after the holiday season, which results in its own cash and credit squeeze). A partial solution would be for electing a

Table 4
Annualized interest cost of \$624.99 needed to initially finance plan expenses

Annual savings account or credit card interest rate	Annualized interest lost (charged)
5%	\$32.04
10%	\$65.72
15%	\$101.12
20%	\$137.12

Note: The Annualized Interest shown in the second column is calculated using daily compounding.

To illustrate the opportunity cost of providing personal funds to cover the temporary loss of take-home pay, assume that an employee elects the maximum \$5,000 annual wage reduction with bi-monthly pay periods. Wages are reduced by \$208.33 per pay period. If there is a 3 pay period waiting period for reimbursement, the maximum amount of temporary financing is \$624.99. The Annualized Interest Lost (charged on cash advances or other loans) is found by multiplying the effective annual interest rate by the dollar amount of financing. Given the nominal rates shown in the first column, the Annualized Interest can be found. This would be the opportunity cost of participating in the Plan. A reduced level of participation in the Plan would lower this opportunity cost.

reduced participation in the plan. While this would be similar to the consequences of underestimating the costs cited by Bialkowski (1991), the employee would still benefit from some tax savings, albeit at a lower amount.

5. Comparing the savings from the plan to taking the child care tax credit

When an employee elects to participate in the Plan and receive the tax benefit from the reduced income and payroll taxes, she gives up the full use of the child care tax credit applied to her Federal income tax return. Baxendale, Coppage, and Attaway (1993) show a numerical illustration where the child care tax credit is more beneficial than participating in a DCAP. Their illustrations show (using 1993 tax rates for married couples filing jointly) that taxpayers earning less than \$9,220 with one child (\$10,485 with two children) should not participate in an employer-sponsored Plan.

This paper presents a general model showing that higher-wage earning families would benefit by participating in their employer-sponsored Plans. The mutual goal of participating in the Plan or electing the child care tax credit is to minimize taxes paid. This can be achieved by either reducing the Adjusted Gross Income by excluding earnings (through the Plan) or receiving the tax credit.

The decision of electing the child care tax credit or the wage exclusion can be determined by the level of income that will provide a greater benefit by having the wage exclusion throughout the year than by waiting for the child care tax credit at the time of filing. This is the same as setting the tax liability equal to the effective child care tax credit,

$$(AGI - D)*t = QE*cl \quad (5)$$

where

AGI is the Adjusted Gross Income, which is gross wages minus the elected Dependent Care Benefit, **DCB**,

D is the deduction, either itemized or with the standard deduction,

t is the marginal tax applied to taxable liability,

QE is the Qualified expenditures, which are determined by the number of eligible children,

$$QE = \min(2400, \max(2400 - DCB), 0), \text{with one child};$$

$$QE = \min(4800, \max(4800 - DCB), 0), \text{with more than one child};$$

cl is the tax credit limit based on the Adjusted gross income of the family and is found as

$$cl = .30 - \left[(.01) * \left(\frac{AGI - 10000}{2000} \right) \right].$$

The resulting solution for the minimum level of income at which a family will benefit more by use of the Dependent Care Plan is

$$AGI = \frac{QE * cl}{t} + D. \quad (6)$$

Table 5 shows the minimum level of income required for taxpayers based on their filing status and the number of eligible children. The differences in minimum income levels for the various filing statuses are due to the limits on the tax credit and the amount of deductions allowed for each as well as the different tax rates. For an employee with a status of Married filing jointly or Qualified widow(er), the minimum level of income ranges from \$16,852 with one child (when participating at the maximum level of \$5,000) to \$20,517 with two or more children. A lower level of participation in the Plan would lower the minimum level of income to justify participation. For Heads of households, the minimum level ranges from \$13,972 with one child to \$19,698 with two or more children. For those who are Married filing separately, the minimum level is reduced to \$10,644 with any number of children. These results support those illustrated by Baxendale, Coppage, and Attaway (1993).

6. Conclusion

This paper attempts to illustrate the benefits of employees participating in the DCAP through their employer's Plans. When a comparison of lost interest is made to the tax savings, the decision to participate in the Plan should be a foregone conclusion. The financial benefits for wage earners at middle- and high-income levels to participate to the fullest extent possible overwhelm the costs of participation.

The results also show that employees in lower income levels would not benefit by participating in an employer-sponsored Plan, but would be better off by the use of the Child Care Tax Credit. The savings using this tax-reducing benefit would be greater than the tax savings realized through Plan participation.

The illustrations in the paper should convince more employees to take advantage of the

Table 5

Minimum level of income to receive more benefits from the wage exclusions of a dependent care assistance plan (DCAP) versus receiving the child care tax credit

Income	Children	DCAP exclusion
Married filing jointly or qualified widow(er)		
\$14,444.41	1	\$2,400
\$16,851.83	1	\$5,000
\$20,344.80	2 or more	\$4,800
\$20,517.22	2 or more	\$5,000
Married filing separately		
\$10,644.42	any number	\$2,400
\$10,744.42	any number	\$2,500
Head of household		
\$13,564.79	1	\$2,400
\$15,972.20	1	\$5,000
\$19,525.84	2 or more	\$4,800
\$19,698.25	2 or more	\$5,000

Note: The values are based on the 2001 tax rates and standardized deductions of \$7,600 for married couples filing jointly, \$3,800 for married couples filing separately and \$6,650 for heads of households. The different DCAP Exclusions are based on the qualified expenditures allowed or the maximum wage reduction allowed by the Plan.

This table illustrates the level of income below which an employee would be better off by not participating in the Plan, thus waiting to reduce the annual tax liability with the annual Child Care Tax Credit. The minimum level of income varies based on the employee's filing status, the number of children and the level of participation in the Plan. The maximum annual qualified expenditures allowed for calculating the tax credit is \$4,800 (\$2,400 with only one child).

resulting tax savings allowed for expenses they would incur for child care. The results of the paper should further induce employers to sponsor a DCAP as a benefit to their employees.

Acknowledgements

The author wishes to acknowledge the assistance of Karen Eilers Lahey, the former editor, Conrad Ciccotello, the current editor, two anonymous referees, as well as David Lange and other participants at the 2001 Eastern Finance Association Annual Meeting.

References

- Baxendale, S. J., Coppage, R. E., & Attaway, A. (1993). Choosing between the child care credit and flexible accounts. *Taxation for Accountants*, 50, 278–282.
- Bialkowski, C. (1991). Flexible benefits: More options or more headaches? *Black Enterprise*, 22, 3–6.
- Collins, P. R., Krause, P., & Machida, S. (1990). Making child care an employee benefit. *Management Accounting*, 26–29.
- Connelly, B. (2000). FSAs for the future. *Compensation and Benefits Review*, 32, 61–64.
- Drinkwater, C. J. (1993). Employers benefit from dependent care plans. *National Underwriter*, 97, 18–21.
- Ferling, R. L. (1997). Use it or lose it? *Financial Executive*, 13, 59–60.

- Hamill, J. R. (1993). The design and operation of cafeteria plans. *The Tax Adviser*, 24, 657–664.
- King, J. W. (1996). Reimbursement plans can provide large tax savings. *Taxation for Accountants*, 53, 302–303.
- Kossek, E. E., DeMarr, B. J., Blackman, K., & Kollar, M. (1993). Assessing employees' emerging elder care needs and reaction to dependent care benefits. *Public Personnel Management*, 22, 617–638.
- Levitan, A. S., Coppage, R. E., & Baxendale, S. J. (1993). Flexible spending accounts: By participating, are employees borrowing from their future? *The Tax Adviser*, 24, 317–323.
- Lewis, D. J. (1991). The new trend in life cycle benefits. *Risk Management*, 38, 30–34.
- Martin, D. D. (2000). How to maximize the use of the flexible spending account. *National Public Accountant*, 45, 18–20.
- Pituro, M. C. (1989). How salary-reduction programs help cut benefit costs. *The Financial Manager*, 34–38.
- Pretzer, M. (2000). Let your kids save you money, for a change. *Medical Economics*, 77, 155–158.
- Prince, M. (2001). Work/life benefits growing. *Business Insurance*, 35, 41–44.
- Profit-Building Strategies for Business Owners. What your business can do to help employees with child care, 23:23–25, 1993.
- Title 26 USCS Section 125 (2002).
- Title 26 USCS Section 129 (2002).

