

# Algebraic Exploration of NSW Health “Employer Share” Calculation

## Definitions and Notation

Let the following variables be defined:

- $S$ : Gross salary pre-packaging
- $P$ : Packaged amount
- $E$ : Employer share
- $C$ : Salary packaging fees
- $f(x)$ : Function that maps gross income  $x$  to income tax payable

As Australian income tax is progressive, the tax function  $f(x)$  is non-linear and piecewise defined, and in general:

$$f(x) - f(y) \neq f(x - y)$$

However, if both  $x$  and  $y$  lie within the same marginal bracket range, the difference in tax payable can be derived linearly:

$$f(x) - f(y) = r \cdot (x - y) \tag{1}$$

where  $r \in \{0.32, 0.39, 0.47\}$  denotes the applicable marginal tax rate (inclusive of Medicare levy).

### Example:

Let  $x = \$90,000$  and  $y = \$80,000$ , both of which fall under the 32% marginal bracket, therefore:

$$f(\$90,000) - f(\$80,000) = 0.32 \cdot \$10,000 = \$3,200$$

## Formal Derivation of the Employer Share Formula

NSW Health defines “employer share”  $E$  as the net gain retained by the employer, which is equal to the employee’s increase in disposable income due to salary packaging, relative to a counterfactual where the employee receives no packaging benefit but incurs the same post-tax expenses.

In short:

**Net Gain of NSW Health**

= **Disposable Income (with packaging) – Disposable Income (without packaging)**

Let us define:

- **Disposable income with salary packaging and employer share:**

$$D_1 = S - P - E - C - f(S - P - E - C)$$

- **Disposable income without salary packaging, but with equivalent post-tax expenditure of the packaged items:**

$$D_0 = S - f(S) - P$$

Then,

$$E = D_1 - D_0$$

Substituting the expressions of  $D_1$  and  $D_0$  yields:

$$E = [S - P - E - C - f(S - P - E - C)] - [S - f(S) - P]$$

Simplifying and rearranging yields:

$$f(S) - f(S - P - E - C) = 2E + C$$

Assuming the pre- and post-packaging incomes fall within the same tax bracket  $r$ , we may apply equation (1):

$$r \cdot (P + E + C) = 2E + C$$

Solving for  $E$ :

$$E = \frac{r \cdot P - (1 - r)C}{2 - r}$$

**Values at different marginal tax rates:**

Marginal tax rate $r$	Approximate $E$
32%	$0.1905P - 0.4048C$
39%	$0.2422P - 0.3789C$
47%	$0.3072P - 0.3464C$

This result holds under the assumptions that both the gross salary and the effective salary after salary packaging and employer share deductions remain within the same tax bracket. If the packaging pushes the income across marginal tax threshold, the piecewise nature of  $f$  means that  $E$  cannot be derived with a closed-form formula.

## Remarks on Simplified but Incorrect Approximations

It is sometimes incorrectly assumed that the employer share equals 50% of the tax saving from salary packaging. Under this assumption:

$$E \approx 0.5 \cdot r \cdot P$$

For 32% tax bracket, this yields  $E = 0.16P$  which underestimates the true value of  $E$  as defined by NSW Health.

## Comparison to Other States

In states other than NSW, where employers do not retain a share of tax benefit, and assume identical fees, the disposable income is:

$$D_{\text{interstate}} = S - P - C - f(S - P - C)$$

Assuming the same tax bracket  $r$ , the net benefit in other states is:

$$\begin{aligned} & D_{\text{interstate}} - D_0 \\ &= [S - P - C - f(S - P - C)] - [S - f(S) - P] \\ &= f(S) - f(S - P - C) - C \\ &= r \cdot (P + C) - C \end{aligned}$$

Therefore, the difference in disposable saving between an NSW Health employee and their interstate counterpart is:

$$\begin{aligned} \Delta &= [D_{\text{interstate}} - D_0] - [D_1 - D_0] = [r \cdot (P + C) - C] - \left[ \frac{r \cdot P - (1 - r)C}{2 - r} \right] \\ &\approx r \cdot P - \frac{r \cdot P}{2 - r} \approx \frac{rP - r^2p}{2 - r} \end{aligned}$$

the second line is approximated with  $C \approx 0$  as the packaging fee is typically a lot smaller than packaged amount.

Hence, the proportion of tax saving forfeited due to employer share is:

$$\frac{\Delta}{D_{\text{interstate}} - D_0} \approx \frac{\frac{rP - r^2p}{2-r}}{rP} \approx \frac{1-r}{2-r}$$

### Values at different marginal tax rates:

Marginal tax rate $r$	Approximate proportion forfeited
32%	$\frac{1 - 0.32}{2 - 0.32} \approx 0.4048$
39%	$\frac{1 - 0.39}{2 - 0.39} \approx 0.3789$
47%	$\frac{1 - 0.47}{2 - 0.47} \approx 0.3464$

Hence, contrary to the common perception that “you lose 50% saving of salary packaging and novated lease” with employer share, in practice **NSW employees forfeit approximately 40%, 38% or 35% of the saving obtainable by their interstate counterparts for equivalent packaging if they belong to 32%, 39% or 47% tax bracket respectively.**

## Verification via Examples by NSW Health (1)

NSW Health publishes a policy directive with worked example. Here I go through three examples to demonstrate the accuracy of the algebraic derivation above.

Source: [https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2018\\_044.pdf](https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2018_044.pdf)

### Page 55 of 90, Example 1A.

$S = 80,000; P = 11,659; C = 120. r = 0.345$  as the tax bracket was  $32.5 + 2\%$  when this document was published in 2018.

$$E = \frac{r \cdot P - (1 - r)C}{2 - r} = \frac{0.345 \cdot 11,659 - (1 - 0.345) \cdot 120}{2 - 0.345} = 2,383$$

Which corresponds to the worked derivation of  $E = 2,383$ .

Screenshot:

### Comparison of employee's net tax position

	Without packaging	With packaging
Gross salary	80,000	80,000
Benefit packaged (pre-tax dollars)	0	11,659
FBT payable	0	0
Employee's 50% share admin fee	0	60
Employer's 50% share admin fee	0	60
Health Service 50% share of saving	0	2,383
Taxable income	80,000	65,838
Income tax payable	17,547	12,944
Medicare levy	1,600	1,317
After tax income	60,853	51,577
Benefit payable w/out packaging (post tax dollars)	11,659	0
Disposable income after benefit	49,194	51,577
Reportable fringe benefits	0	21,998
Employee saving		2,383

Ordinarily interstate packaging of 11,659 would have derived  $0.345 \cdot 11,659 = 4,022$  dollars in saving, however only 2,383 is saved which is 59.2% of interstate (which also verifies the “lost 40%” in the interstate comparison section above, with small discrepancy explained by the simplification of  $C = 0$ ).

## Verification via Examples by NSW Health (2)

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$S = 140,000; P = 11,659; C = 120. r = 0.39$  as the tax bracket was 37 + 2% when this document was published in 2018.

$$E = \frac{r \cdot P - (1 - r)C}{2 - r} = \frac{0.39 \cdot 11,659 - (1 - 0.39) \cdot 120}{2 - 0.39} = 2,779$$

Which corresponds to the worked derivation of  $E = 2,779$ .

Screenshot:

### Comparison of employee's net tax position

	Without packaging	With packaging
Gross salary	140,000	140,000
Benefit packaged (pre-tax dollars)	0	11,659
FBT payable	0	0
Employee's 50% share admin fee	0	60
Employer's 50% share admin fee	0	60
Health Service 50% share of saving	0	2,779
Taxable income	140,000	125,442
Income tax payable	39,297	33,910
Medicare levy	2,800	2,509
HELP repayment amount	0	0
After tax income	97,903	89,023
Benefit payable w/out packaging (post tax dollars)	11,659	0
Disposable income after benefit	86,244	89,023
Reportable fringe benefits	0	21,998
Employee saving		2,779

Ordinarily interstate packaging of 11,659 would have derived  $0.39 \cdot 11,659 = 4,547$  dollars in saving, however only 2,779 is saved which is 61.1% of interstate (which also verifies the “lost 38%” in the interstate comparison section above, with small discrepancy explained by the simplification of  $C = 0$ ).

### Verification via Examples by NSW Health (3)

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$S = 200,000; P = 11,659; C = 120. r = 0.47$  as the tax bracket was 45 + 2% when this document was published in 2018.

$$E = \frac{r \cdot P - (1 - r)C}{2 - r} = \frac{0.47 \cdot 11,659 - (1 - 0.47) \cdot 120}{2 - 0.47} = 3,540$$

Which corresponds to the worked derivation of  $E = 3,540$ .

Screenshot:

#### Comparison of employee's net tax position

	Without packaging	With packaging
Gross salary	200,000	200,000
Benefit packaged (pre-tax dollars)	0	11,659
FBT payable	0	0
Employee's 50% share admin fee	0	60
Employer's 50% share admin fee	0	60
Health Service 50% share of saving	0	3,540
Taxable income	200,000	184,681
Income tax payable	63,097	56,203
Medicare levy	4,000	3,694
HELP repayment amount	0	0
After tax income	132,903	124,784
Benefit payable w/out packaging (post tax dollars)	11,659	0
Disposable income after benefit	121,244	124,784
Reportable fringe benefits	0	21,998
Employee saving		3,540

Ordinarily interstate packaging of 11,659 would have derived  $0.47 \cdot 11,659 = 5,480$  dollars in saving, however only 3,540 is saved which is 64.6% of interstate (which also verifies the “lost 35%” in the interstate comparison section above, with small discrepancy explained by the simplification of  $C = 0$ ).