

## Ralph's Earnings Management B<sup>1</sup>

Ralph manages a business for the owner, Alice. They contract over two periods (Ralph receives compensation and Alice receives her residual payoff at the end of period two).<sup>2</sup> Ralph's action  $a$  affects the likelihood that the business is successful. In particular, the likelihoods associated with Alice's payoff each period are

action/payoff	200	0
$a_H$	prob = 0.7	prob = 0.3
$a_L$	prob = 0.6	prob = 0.4

Alice's payoffs are the present values of cash flows and the periodic payoffs are stochastically independent period-to-period. Ralph bears personal cost  $c(a)$  for his (two-period) action;  $c(a_H) = 1$  and  $c(a_L) = 0$ . Ralph privately observes the first period outcome. If (and only if) Ralph supplies  $a_H$ , he acquires expertise and is able to perfectly forecast period two's results. At the end of period one, Ralph submits a report to the owner of period one's earnings. However, Ralph is unable to *credibly* communicate his forecast (this restriction on communication disables the revelation principle and opens the possibility for earnings management).

All parties are risk neutral and Ralph never supplies funds to operate the business (management compensation is non-negative in all states). Ralph's two-period reservation wage ( $RW$ ; outside employment opportunity cost) equals 1.

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<sup>1</sup> This example is adapted from Demski. 1998. "Performance Measure Manipulation," *Contemporary Accounting Research* 15 (3), Fall, 261-285.

<sup>2</sup> This settling-up feature is exploited for supplying reporting incentives.

Required:

1. Alice can discourage earnings management with the following contract:  $t_{0,0} = t_{0,200} = t_{200,0} = 0$  and  $t_{200,200} = 1/.13 \approx 7.69$  (the first subscript refers to first period report and the second subscript refers to the second period report). Verify that this contract is sufficient for Alice to retain Ralph as a manager and is incentive-compatible. Determine Alice's expected payoff.

2. Alice realizes that she benefits if Ralph is encouraged to acquire expertise (recall expertise is only acquired if  $a_H$  is supplied). Alice pays Ralph 2.50 if the income reports in each period are equal and pays nothing if they are unequal. This encourages Ralph to manage earnings (without penalty when losses are reported). Verify that this contract is sufficient for Alice to retain Ralph as a manager and is incentive-compatible. (The key here is to determine Ralph's reporting strategy if he supplies  $a_L$ .) Determine Alice's expected payoff.

3. Which reporting regime/contract does Alice prefer?

4. Suppose communication is not restricted (a benchmark case). At time 1, Alice can request Ralph report the first period results,  $y_1$ , and his forecast for period 2,  $y_2^f$ , and, at time 2, report second period results,  $y_2$ . Determine an incentive contract based on  $(y_1, y_2^f, y_2)$  and Alice's expected payoff. (Hint: for the contract offered check Ralph's reporting incentives, especially for supplying input  $a_L$ ). Compare  $RW = 0$  with  $RW = 1$  results.

5. Suppose the likelihood associated with a payoff equal to 200 given  $a_H$  is 0.8 rather than 0.7 (everything else remains the same).

(Note: the unmanaged earnings contract is revised to reflect the change in probabilities; try  $t_{200,200} = 1/.28 \approx 3.57$ .) Does Alice prefer managed or unmanaged earnings?

6. Income smoothing is frequently maligned. What role does income smoothing play here? Is income smoothing always harmful or always beneficial?