

Ralph's Earnings Management A¹

Ralph manages a business for the owner, Alice. The business has a two-period life (Alice receives the payoff at the end of period two) and then the firm is disbanded. Ralph's action a affects the likelihood that the business is successful. In particular, the likelihood associated with Alice's payoff each period (present of cash flow) is

action	10	0	$c(a)$
a_H	prob = 1/2	prob = 1/2	1
a_L	prob = 0	prob = 1	0

Ralph bears personal cost $c(a)$ each period for his action. If Ralph is retained by Alice to operate the business the second period, Alice's payoff is perfectly correlated with the first period payoff provided Ralph supplies a_H in both periods (i.e., Alice knows for certain that her second period payoff equals the first period payoff). However, if Ralph is fired then a new manager is hired. If a new manager is hired for the second period an independent draw occurs with the above payoffs, likelihoods, and personal cost. Even though Alice bears a cost equal to 3.50 for dismissing Ralph early (Ralph's severance pay), she cannot resist the temptation to fire Ralph if the first period report is 0. This inability to commit disables the revelation principle and opens the possibility for earnings management to be desirable.

Alice can implement either of two reporting regimes: (a) Alice limits Ralph's reporting discretion so that the first period report reveals the first period outcome, or (b) Alice allows Ralph discretion to build accrual reserves so the two-period (aggregate) report equals the two-period payoff but allows Ralph to always report 10 during the first period irrespective of the first period outcome (this implies that the first period report is noise and only the second period report is informative – effectively Alice employs an aggregated information system under option b).

All parties are risk neutral and the managers never supply funds to operate the business (management compensation is non-negative in all states). Alice compensates

¹ This example is adapted from Arya, Glover, and Sunder. 1998. "Earnings Management and the Revelation Principle," *Review of Accounting Studies* 3, 7-34.

any manager so that his/her expected utility net of personal cost is at least zero each period.

Required:

1. As a benchmark, suppose Alice is able to credibly commit to not fire Ralph.

Determine the incentive-compatible bonus contract for each period that maximizes Alice's payoff. Determine Alice's expected payoff over the two-period interval.

2. If Alice employs reporting system a , determine the incentive-compatible bonus contract for each period that maximizes Alice's payoff. Incentive compatibility requires sufficient payments to offset the severance payment if Ralph is dismissed. (Notice that if the first period report is 0 and a new manager is hired, Alice offers a one-period contract without severance to the new manager. On the other hand, if the first period report is 10 and Ralph is retained, Alice and Ralph know there is no uncertainty about the mapping between Ralph's second period act and the second period outcome.)

Determine Alice's expected payoff over the two-period interval (remember to include the expected firing cost).

3. If Alice employs reporting system b , check the two period incentive-compatibility of a payment equal to one (for certain) during the first period (to cover a_H ; recall earnings management renders the first period report useless) and a second period bonus contract that pays 3 for a two-period aggregate report equal to 20 and zero otherwise. Ralph has four potential strategies: $\{a_H, a_H/a_L\}$, $\{a_H, a_L\}$, $\{a_L, a_H\}$, and $\{a_L, a_L\}$ where $\{a_H, a_H/a_L\}$ means Ralph supplies input a_H the first period and input a_H the second period if Ralph observes a high outcome in period 1 and supplies a_L otherwise. Verify that Alice wishes to motivate $\{a_H, a_H/a_L\}$. Determine Alice's expected payoff over the two-period interval.

4. Which reporting regime does Alice prefer?

Suppose severance pay is 3.00, which reporting regime does Alice prefer?

Suppose severance pay is 2.50, which reporting regime does Alice prefer?

Suppose severance pay is 4.00, which reporting regime does Alice prefer?

What conclusions can be drawn about the welfare implications of earnings management?