So, the incentive compatibility constraint against a one period deviation to low effort is

$$p_i \geq p_{i+1} + (1 + b_i)\, w_i \tag{4}$$

where b_i is the positive constant defined as

$$\begin{aligned} b_i &\equiv b \cdot \frac{1}{(\pi^L - \pi^H) \sum_{\tau=i}^{\infty} (1 - \pi^H)^{\tau}} \\ &= b \cdot \frac{\pi^H}{(\pi^L - \pi^H)(1 - \pi^H)^i} \end{aligned} \tag{5}$$

As well as the one period deviation, the firm has other possible deviations (for instance, a permanent deviation to low effort). It turns out, however, that the incentive compatibility constraint (4) is sufficient to rule out all other possible deviations from high effort. The appendix provides the argument.

The constraint (4) captures the *recursive moral hazard* inherent in our model. The moral hazard is recursive in the sense that the payment to firm i must be sufficiently large so as to induce it not to take the private benefit, but the payment to firm i also includes the rent that is due to its supplier firm, $i+1$. In turn, the payment p_{i+1} includes rents that accrue to suppliers further up the chain.

The optimal contract solves for the prices $\{p_i\}$ that maximize the expected surplus of firm 0, subject to the incentive compability constraints (4) for all upstream firms, and the participation (break-even) constraints of all upstream firms. Equivalently, we can think of the problem as a sequence of overlapping bilateral contracting problems, where firm i acts as principal with respect to firm $i+1$, but acts as agent with respect to firm $i-1$.

The participation constraint for firm i is that it breaks even in expected terms. The financing of the initial triangle of costs before cash flows materialize will necessitate compensation for working capital. We will postpone the discussion of the participation constraint until we have introduced accounts