N. The second is the *sustainability* of the production chain once the final product begins earning cash flow from date $N+1$ onwards.

2.1 Recursive Moral Hazard

Once the final product begins to generate a cash flow, the revenue cascades back up the production chain. A firm has the choice of two actions - high effort or low effort. Low effort by firm i can be interpreted as the decision to economize on the cost of producing firm i's intermediate good, and to divert the resulting cost saving to alternative uses that result in private benefit, but is detrimental to the success of the final output.[5]

Denote by p_i the per-period payment received by firm i from firm $i-1$ for delivery of the intermediate good. In turn, firm i pays p_{i+1} to its own supplier, firm $i+1$. By exerting low effort, firm i enjoys per-period private benefit of

$$bw_i \tag{1}$$

where $b > 0$ is common to all firms. If firm i exerts low effort today, the probability of obsolescence increases to π^L once the final good goes on sale $i+1$ periods ahead. When firm i has exerted high effort at every date in the past, the expected payoff from exerting high effort at all subsequent dates is

$$(p_i - p_{i+1} - w_i) \sum_{\tau=0}^{\infty} \left(1-\pi^H\right)^{\tau} \tag{2}$$

The payoff to deviating to low effort today for one period is

$$bw_i + (p_i - p_{i+1} - w_i)\left(\sum_{\tau=0}^{i} \left(1-\pi^H\right)^{\tau} + \left(1-\pi^L\right)\sum_{\tau=i}^{\infty}\left(1-\pi^H\right)^{\tau}\right) \tag{3}$$

[5] See Holmstrom and Tirole (1997) and Tirole (2005) for developments of such models in the bilateral contracting context.