- wage cost $-w_i$ per period, starting immediately
- revenue $(1+a_i)\,p_i$ per period, starting with a delay of d_i periods
- input cost $-(1+a_{i+1})\,p_{i+1}$ per period, starting with a delay of $d_{i+1}-1$ periods.

Thus, the expected net present value of firm i's cash flows is

$$V_i \equiv -\frac{w_i}{\pi^H} + \left(1-\pi^H\right)^{d_i} \frac{(1+a_i)\,p_i}{\pi^H} - \left(1-\pi^H\right)^{d_{i+1}-1} \frac{(1+a_{i+1})\,p_{i+1}}{\pi^H} \quad (10)$$

The participation constraint for firm i requires that $V_i \geq 0$. Letting (9) hold with equality and substituting into the expression for V_i, the participation constraint can be expressed as:

$$b_i \geq \gamma_i\,(d_i, d_{i+1}) \quad (11)$$

where $\gamma_i\,(d_i, d_{i+1})$ is defined as:

$$\gamma_i\,(d_i, d_{i+1}) \equiv \left(1-\pi^H\right)^{-d_i} - 1 + \left[\left(1-\pi^H\right)^{d_{i+1}-d_i-1} - 1\right] \frac{\sum_{k=i}^{N}(1+b_k)\,w_k}{w_i}$$

γ_i is increasing in d_i and decreasing in d_{i+1}. The optimal pattern of delays $\{d_i\}_{i=1}^{N}$ can be solved recursively, starting with firm N. The optimal contract solves for longest delay d_i which satisfies (11) given d_{i+1} for its upstream firm. If b_i is strictly larger than γ_i, this is due to the discrete time nature of our model and the fact that $\{d_i\}$ are integers. If we neglect the integer constraint, the participation constraints (11) hold with equality. For values of π^H close to 0, this approximation is a good one.

3 Empirical Implications

We now explore the implications of our model for the cross-section elasticity of receivables with respect to payables. Neglecting the integer constraints