Online Appendix for

"Strategic Underreporting and Optimal Deductible Insurance"

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A Additional numerical results

We conducted a detailed sensitivity analysis on the insured's equilibrium deductibles and the amount of hidden losses in Section 4 of the main paper. A key assumption in the numerical study there is that the continuous part of the per-period loss $\tilde{Z}$ follows a Gamma distribution. To test the robustness of our findings in Section 4, we assume $\tilde{Z}$ follows a $Pareto(\alpha = 2, \kappa = 10)$ distribution, with probability density function f of $\tilde{Z}$ given by

$$f(z) = \frac{\alpha\,\kappa^{\alpha}}{(z+\kappa)^{\alpha+1}}, \quad z > 0.$$

Note that we now have $\mathbb{E}Z = (1-p_0)\mathbb{E}\tilde{Z} = (1-p_0)\frac{\kappa}{\alpha-1} = 9$, the same expectation of Z as in Section 4, but $\mathrm{Var}Z = \infty$. Because of the infinite variance, we set $c = 105$ but keep all other parameters the same as in Table 2 of the main paper, which we reproduce below for selfcontainedness.

Parameter	Symbol	Value
Insured's per-period income	c	35
Insured's risk aversion	γ	0.1
Risk loading for rate class 1	θ_1	20%
Risk loading for rate class 2	θ_2	50%
Gamma distribution	(κ, λ)	$(2, 5)$
$\mathbb{P}(Z = 0)$	p_0	0.1
$\mathbb{P}(\tau > 1)$	p	0.8

Table A.1: Parameter values in the base case

In this case, we obtain

$$(d_1^*, d_2^*) = (5.2064, 8.9687) \quad \text{and} \quad b_1^* - d_1^* = b_2^* - d_2^* := b^* - d^* = 0.1165.$$

Compared to the Gamma distributed loss in Section 4, the amount of hidden losses $b^* - d^*$ slightly increases from 0.0486 to 0.1165, and the insured will choose smaller deductibles for both rate classes. The impact of model parameters on d_1^*, d_2^*, and $b^* - d^*$ is the same as in Section 4, which is demonstrated in Figures A.1 - A.6. Therefore, the key findings obtained in Section 4 are robust to the choice of loss distribution, at least between two models—one with finite variance and the other with infinite variance.

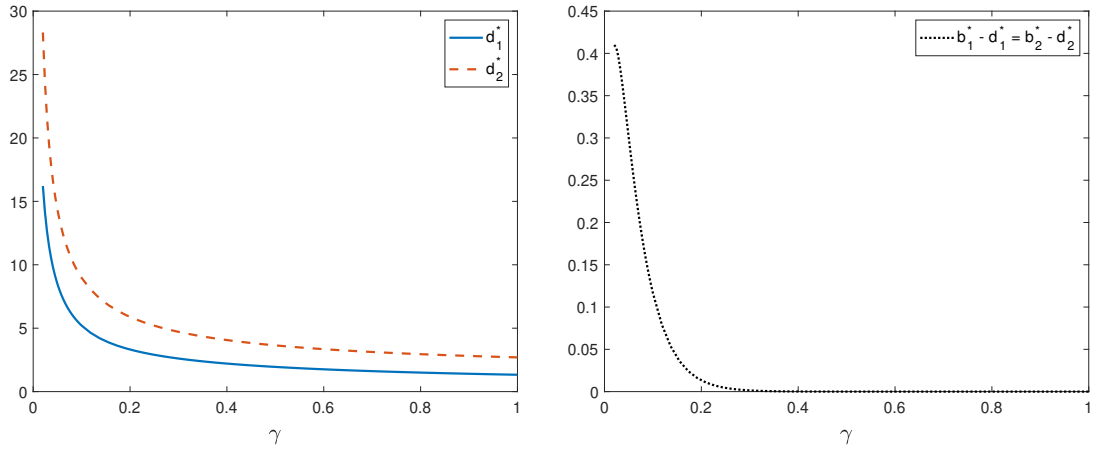

Figure A.1: Impact of insured's risk aversion γ on equilibrium deductibles and hidden losses

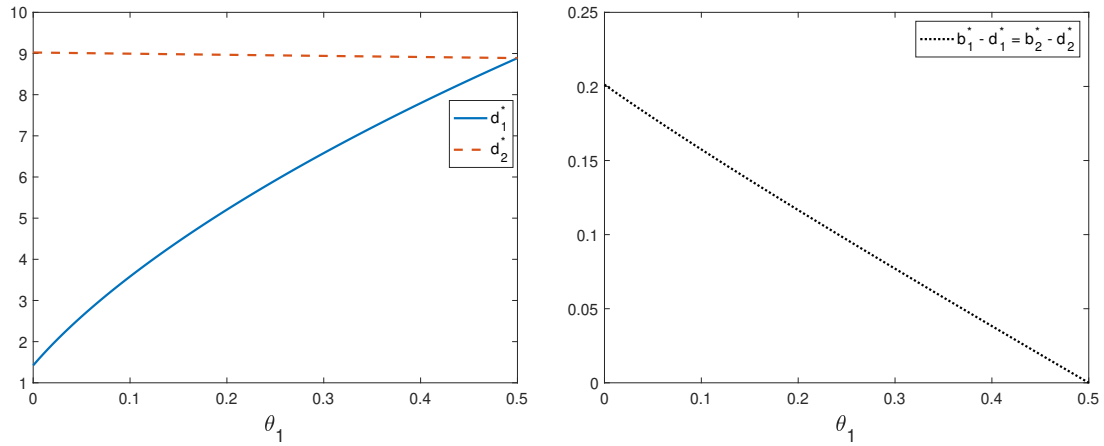

Figure A.2: Impact of premium loading θ_1 on equilibrium deductibles and hidden losses

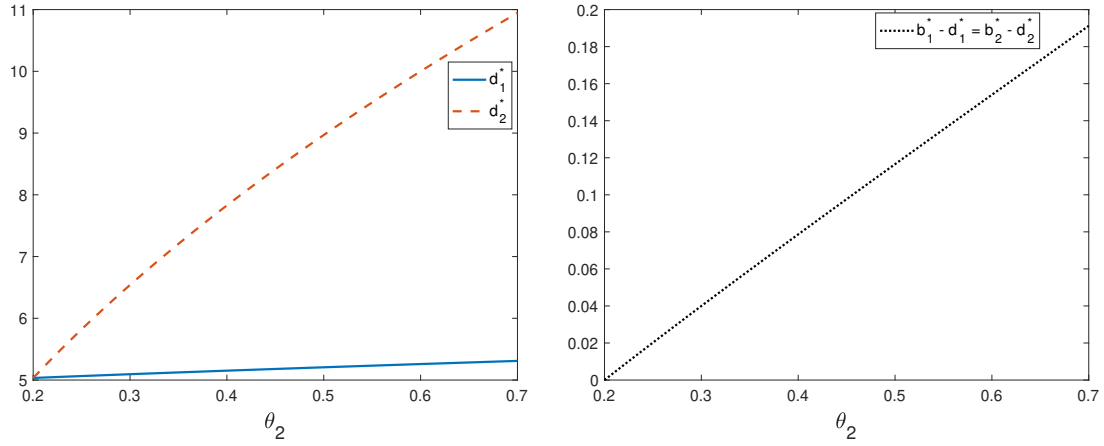

Figure A.3: Impact of premium loading θ_2 on equilibrium deductibles and hidden losses

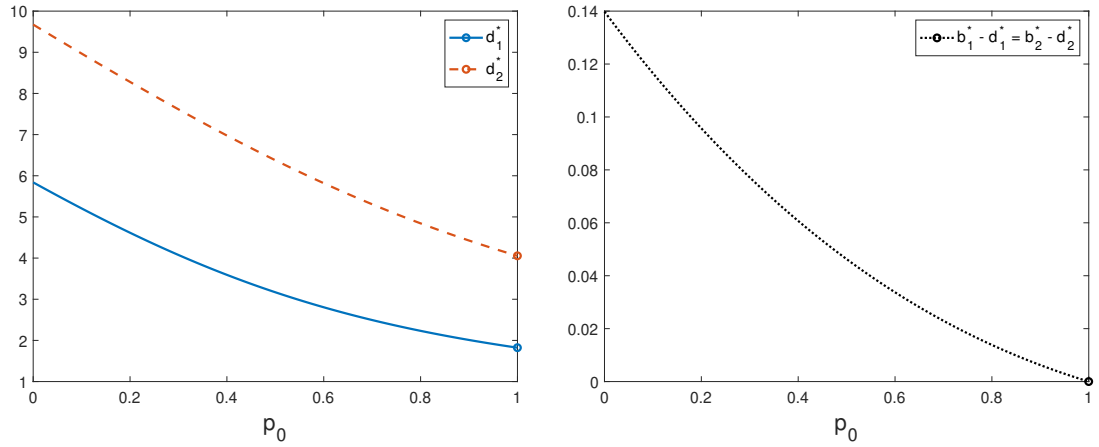

Figure A.4: Impact of probability mass at zero p_0 on the equilibrium deductibles and hidden losses

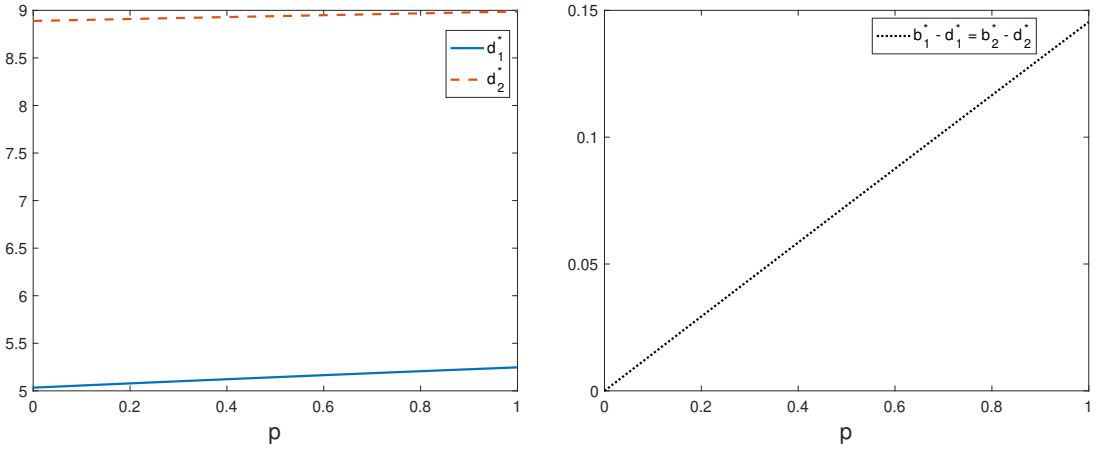

Figure A.5: Impact of renewal probability p on the equilibrium deductibles and hidden losses

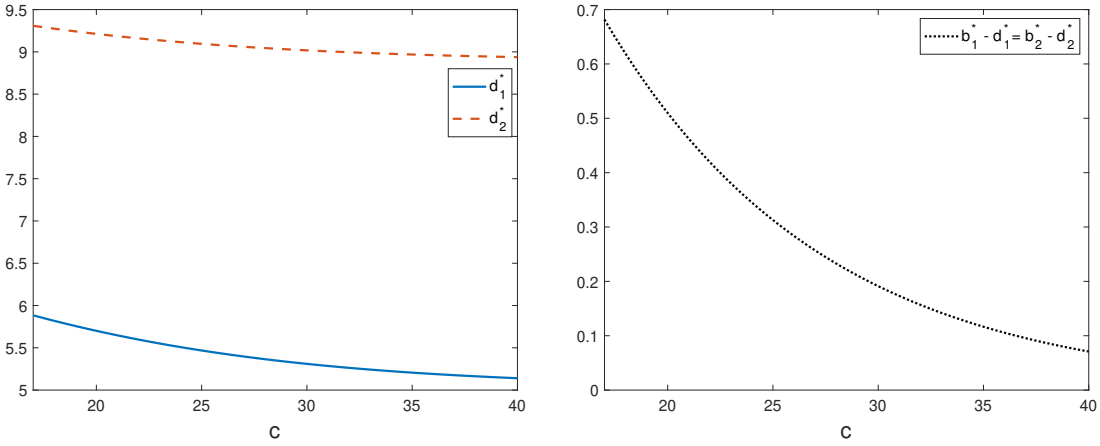

Figure A.6: Impact of income rate c on the equilibrium deductibles and hidden losses