

Online Appendix

to

Different Contexts, Different Risk Preferences?

Levon Barseghyan Joshua C. Teitelbaum Lin Xu
Cornell University Georgetown University Cornell University

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1 Risk Controls

The risk controls are expected annual claims under each coverage based on separate Poisson-gamma Bayesian credibility models. More specifically, we assume that household i 's claims under coverage j in year t follow a Poisson distribution with arrival rate λ_{ijt} . We treat λ_{ijt} as a latent random variable and assume that $\ln \lambda_{ijt} = \mathbf{z}'_{ijt} \boldsymbol{\alpha}_j + \epsilon_{ij}$, where \mathbf{z}_{ijt} is a vector of observables, $\boldsymbol{\alpha}_j$ is a vector of coefficients, ϵ_{ij} is an iid error term, and $\exp(\epsilon_{ij})$ follows a gamma distribution with unit mean and variance ϕ_j . Utilizing our full dataset, we perform separate Poisson panel regressions with random effects to obtain maximum likelihood estimates of $\boldsymbol{\alpha}_j$ and ϕ_j for each coverage j . For each household i in the baseline sample, we then calculate the expected number of claims $\hat{\lambda}_{ij}$ for each coverage j , conditional on the household's ex ante characteristics \mathbf{z}_{ij} and ex post claims experience γ_{ij} , as follows: $\hat{\lambda}_{ij} = \exp(\mathbf{z}'_{ij} \hat{\boldsymbol{\alpha}}_j) E(\exp(\epsilon_{ij}) | \gamma_{ij})$, where $E(\exp(\epsilon_{ij}) | \gamma_{ij})$ is calculated assuming $\exp(\epsilon_{ij})$ follows a gamma distribution with unit mean and variance $\hat{\phi}_j$. Observe that by construction $\hat{\lambda}_{ij}$ takes into account both the systematic and idiosyncratic components of a households' risk type.¹

2 Classification of the Contexts in Einav et al. (2012)

In order to compare our results with those of Einav et al. (2012), we classify each of their contexts according to the magnitude of the stakes involved. Moreover, we apply the same criteria to classify

¹We refer to the above-described model as a Bayesian credibility model because $\hat{\lambda}_{ij}$ corresponds to the Bayesian credibility premium in the actuarial literature (Denuit et al. 2007, ch. 3).

their contexts that we use to classify our contexts. Recall that in our small-stakes contexts the values of the options and the inter-option increments range in the hundreds and thousands dollars, whereas in our large-stakes contexts the value of the options range in the hundreds of thousands and millions of dollars with inter-option increments that range in the hundreds of thousands dollars.

Based on their description of the coverage options in each context (Einav et al. 2012, pp. 2612-2616),² we conclude that none of their contexts involve large-stakes choices. Three of their six contexts—health, drug, and dental insurance—involve small-stakes choices. In health insurance, employees effectively choose among deductible options that range from zero to \$3,000 (with a mean inter-option increment of \$750) for in-network care and from \$500 to \$6,000 (with a mean inter-option increment of \$1,375) for out-of-network care. In drug insurance, employees choose among brand drug cost-sharing percentages that range from 30 percent to 50 percent for retail purchases and from 20 percent to 40 percent for mail-order purchases. The mean of the resulting annual drug claims is approximately \$1,500 and the 95th percentile is approximately \$5,500. In dental insurance, employees effectively choose between a maximum annual benefit of \$1,000 or \$2,000.

In two of the three remaining contexts—short-term disability insurance and 401(k) investments—the stakes range in the thousands and tens of thousands of dollars but not the hundreds of thousands of dollars, and so we classify them as moderate-stakes contexts. In short-term disability insurance, which replaces lost wages due to disability for up to six months, employees choose among wage-replacement rates that range from 60 percent to 100 percent.³ The mean annual wage of the employees in their baseline sample is approximately \$58,000 and the 95th percentile is approximately \$114,000. At the mean claim duration, which Einav et al. (2012) report is approximately two months, this suggests that the value of the benefit ranges approximately from \$5,800 to \$9,700 for the average employee and does not exceed \$19,000 for 95 percent of employees. Even at the maximum claim duration, the value of the annual benefit ranges approximately from \$17,000 to \$29,000 for the average employee and does not exceed \$57,000 for 95 percent of employees. In 401(k) investments, contributing employees choose how to allocate their contributions among 13 different funds whose prospective monthly returns range from -11.69 percent to 16.79 percent.⁴ The mean

²See also pp. 4-5 in their Online Appendix.

³In their Appendix Table A1, Einav et al. (2012) note that "sometimes" the wage-replacement rates in short-term disability insurance range instead from 40 percent to 80 percent.

⁴Einav et al. (2012) abstract from the employees decisions as to whether and how much to contribute, but rather focus on how contributing employees choose to allocate their contributions across the funds. The range of monthly

annual contribution is approximately \$4,600 and the maximum allowable is \$18,000,⁵ with Alcoa matching contributions up to six percent. This suggests that the stakes range approximately from $-\$2,200$ to $\$8,300$ for the average contributor and from $-\$8,500$ to $\$32,400$ for all contributors.

We also classify the remaining context—long-term disability insurance—as involving moderate-stakes choices, though the classification is less straightforward than in the other contexts. Alcoa’s long-term disability plan replaces lost wages due to disability for durations longer than six-months, subject to a six-month elimination period.⁶ Employees choose among three wage-replacement rates: 50 percent, 60 percent, or 70 percent. At the mean claim duration, which Einav et al. (2012) report is approximately one year,⁷ this suggests that the value of the benefit ranges approximately from $\$29,000$ to $\$41,000$ for the average employee and does not exceed $\$80,000$ for 95 percent of employees. At the maximum claim duration, which we assume could be as long as 45 years,⁸ the present value of the benefit could range into the hundred of thousands of dollars; but even in this extreme case the present value of the inter-option increments would range in the tens of thousands of dollars.⁹ All things considered, we conclude the stakes are best classified as moderate.

returns is taken from Appendix Table A2 in Einav et al. (2012), which reports summary statistics of the funds’ monthly returns from August 2005 to December 2007.

⁵Einav et al. (2012) state that the choices were made in 2004. We assume they reflect benefit elections for 2005. In 2005, the annual contribution limit was $\$14,000$ for employees under age 50 and $\$18,000$ for older employees.

⁶The elimination period is the period of time between the onset of disability and the time at which the employee is eligible to receive benefits.

⁷Einav et al. (2012) note that their claims data are truncated at about two years, which suggests the mean claim duration may be longer than one year. In a recent study of employer-provided long-term disability insurance, Autor, Duggan, and Gruber (2014) report a mean claim duration of 1.55 years and a median of one year. Their sample consists of approximately 8 million quarterly observations from nearly 10,000 unique employers, and their claims data span eight years.

⁸Einav et al. (2012) do not report the maximum claim duration (or the 95th percentile) in their data, nor do they report the maximum benefit period under Alcoa’s long-term disability plan. The maximum benefit period under many long-term disability plans is 2, 5, or 10 years, but under the most generous plans it runs until the employee’s social security full retirement age, which is 67 for employee’s born in 1960 or later. Assuming that Alcoa’s plan has the most generous maximum benefit period and that its youngest eligible employee is 22 years old, we arrive at the assumption that the maximum claim duration could be as long as 45 years.

⁹We are assuming annual discount rates well in excess of 10 percent, which is consistent with the preponderance of the empirical evidence on time preferences (Frederick, Lowenstein, and O’Donohue 2002, pp. 377-380). For instance, Warner and Pleeter (2001) estimate the personal discount rates of approximately 66,000 U.S. military personnel who were offered separation benefits that consisted of a choice between a lump sum or an annuity, where the break-even discount rate was at least 17.5 percent. They find that "over half of the officers and over 90 percent of enlisted personnel chose the lump-sum payment, implying that the vast majority of personnel had discount rates of at least 18 percent" (p. 33). Based on regression analysis, they report mean discount rates of between 10 percent and 19 percent for officers and between 35 percent and 54 percent for enlisted personnel, depending on the model specification (p. 48, tbl. 6). As Frederick, Lowenstein, and O’Donohue (2002, p. 385) note, this field study "is particularly compelling in terms of credibility of reward delivery, magnitude of stakes, and number of subjects."

References

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