Online Appendix
to
Are Risk Preferences Stable Across Contexts? Evidence from Insurance Data

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A Empty Test Intervals

Here we discuss the conditions under which the test intervals are empty and the household's deductible choice implies that it is risk loving. For ease of exposition, we restrict our attention to three deductible options—\$100, \$250 and \$500. However, the claims we make here apply to choices among any three deductible options. Many of the claims we make are illustrated in Figure A.1.

The test interval identified by a deductible choice of \$250 is empty if $r^{100,250} < r^{250,500}$, which holds if and only if $\lambda r^{100,250} < \lambda r^{250,500}$ (recall that $\lambda > 0$). Note that $\lambda r^{100,250}$ and $\lambda r^{250,500}$ can be represented as linear functions of λ with the intercepts determined by the respective price ratios:

$$\lambda r^{100,250} = \frac{1}{175}\frac{(p^{100} - p^{250})}{150} - \frac{1}{175}\lambda; \tag{A.1}$$

$$\lambda r^{250,500} = \frac{1}{375}\frac{(p^{250} - p^{500})}{250} - \frac{1}{375}\lambda. \tag{A.2}$$

It immediately follows that $\lambda r^{100,250}$ has a steeper slope than $\lambda r^{250,500}$.

If the pricing menu is such that $\frac{(p^{100}-p^{250})}{175\cdot 150} < \frac{(p^{250}-p^{500})}{375\cdot 250}$, then $r^{100,250} < r^{250,500}$ for all λ; that is, there does not exist a claim rate λ and a coefficient of absolute risk aversion r that rationalizes a deductible choice of \$250. The intuition is that if a household is sufficiently risk averse to prefer \$250 to \$500, then it also prefers \$100 to \$250. This is because the cost of switching from \$250 to \$100—i.e., the increase in premium per unit increase in coverage—is smaller than the cost of switching from \$500 to \$250. Conversely, if the household is sufficiently risk loving to prefer \$250 to \$100, then it also prefers \$500 to \$250.

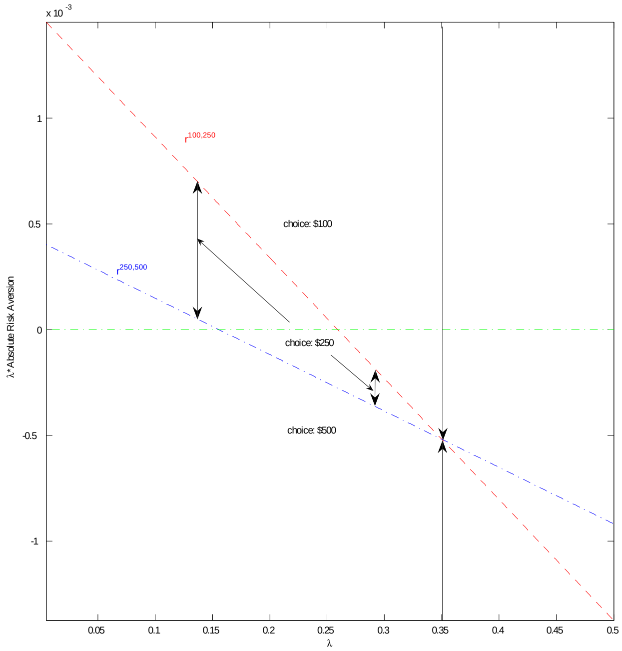

Figure A.1: Indifference Curves

If the pricing menu is well-behaved in that $\frac{(p^{100}-p^{250})}{175\cdot 150} > \frac{(p^{250}-p^{500})}{375\cdot 250}$, then for small values of λ the test interval is nonempty, i.e., $r^{100,250} > r^{250,500}$. For values of λ greater than $\frac{(p^{100}-p^{250})}{150}$, however, $r^{100,250}$ becomes negative. That is, if a household's claim rate is sufficiently high (in that it exceeds the increase in premium per unit increase in coverage at $250), then it prefers $100 to $250 for any positive coefficient of absolute risk aversion. In this case, therefore, a deductible choice of $250 implies that the household is risk loving.

Even if the pricing menu is well-behaved in the foregoing sense, for very high values λ, the test interval identified by a deductible choice of $250 is empty. That is, there exists $\bar{\lambda} > \frac{(p^{100}-p^{250})}{175\cdot 150}$ such that for all $\lambda > \bar{\lambda}$, $\lambda r^{100,250} < \lambda r^{250,500}$. Note that at $\bar{\lambda}$, the upper and lower bound of the test interval coincide, and for all $\lambda > \bar{\lambda}$, the household is risk loving and its preferences are convex. Consequently, its optimal deductible choice is in the corner; i.e., there does not exist a coefficient of risk aversion that rationalizes a deductible choice of $250.

B Descriptive Statistics

Tables B.1 and B.2 provide descriptive statistics for the Auto and Home samples, respectively. Each table also provides comparable statistics for the Test sample. Definitions of variables that are not self-explanatory appear below the tables.

Table B.1: Descriptive Statistics – Selected Auto Covariates

	Auto Sample (1689 obs)				Test Sample (702 obs)			
Variable	Mean	Std Dev	Min	Max	Mean	Std Dev	Min	Max
Bench Prem Coll ($)	223.26	119.13	13.27	1087.91	198.83	99.90	24.58	809.41
Bench Prem Comp ($)[a]	108.72	63.45	8.38	555.70	92.55	59.62	8.38	369.74
Prior Accident	0.701	0.458	0	1	0.613	0.488	0	1
Prior Second Accident	0.119	0.323	0	1	0.152	0.360	0	1
Prior Third Accident	0.047	0.211	0	1	0.065	0.248	0	1
Vehicle 1 Age (years)	5.71	3.67	0.01	23.76	5.38	3.43	0.01	18.83
Work Use	0.597	0.491	0	1	0.568	0.497	0	1
Personal Use	0.391	0.488	0	1	0.417	0.493	0	1
Business Use	0.012	0.108	0	1	0.014	0.119	0	1
Second Vehicle	0.370	0.483	0	1	0.417	0.493	0	1
Third Vehicle	0.111	0.314	0	1	0.121	0.326	0	1
Driver 1 Male	0.580	0.494	0	1	0.591	0.492	0	1
Driver 1 Female	0.420	0.494	0	1	0.410	0.492	0	1
Driver 1 Age (years)	47.29	14.59	18.41	92.76	50.54	13.94	17.49	95.31
Driver 1 Married	0.464	0.499	0	1	0.620	0.486	0	1
Driver 1 Divorced	0.024	0.154	0	1	0.011	0.106	0	1
Driver 1 Single	0.494	0.500	0	1	0.353	0.478	0	1
Driver 1 Widowed	0.017	0.130	0	1	0.016	0.124	0	1
Driver 2	0.561	0.496	0	1	0.678	0.468	0	1
Driver 2 Male	0.307	0.459	0	1	0.292	0.455	0	1
Driver 2 Female	0.693	0.462	0	1	0.708	0.455	0	1
Driver 2 Age (years)	46.10	14.67	15.41	103.84	46.31	13.67	16.27	82.23
Young Driver	0.076	0.266	0	1	0.098	0.298	0	1

[a]1661 observations.

Table B.2: Descriptive Statistics – Selected Home Covariates

	Home Sample (1298 obs)				Test Sample (702 obs)			
Variable	Mean	Std Dev	Min	Max	Mean	Std Dev	Min	Max
Owner Occupied	0.794	0.404	0	1	0.738	0.440	0	1
Primary Residence	0.921	0.269	0	1	0.932	0.253	0	1
Insured Value ($000,000)	2.00	1.10	0.04	11.63	1.80	0.79	0.73	6.74
Home Age (years)	49.52	38.66	0.18	196.85	48.74	37.23	0.34	196.85
Multi-Unit	0.012	0.107	0	1	0.009	0.092	0	1

Variable Definitions

- *Benchmark Premium Coll*—The household-specific premium associated with a $200 auto collision deductible.
- *Benchmark Premium Comp*—The household-specific premium associated with a $200 auto comprehensive deductible.
- *Prior Accident*—A dummy variable that equals one if the household reported on its auto insurance application that it had an accident in the past three years.
- *Prior Second Accident*—A dummy variable that equals one if the household reported on its auto insurance application that it had a second accident in the past three years.
- *Prior Third Accident*—A dummy variable that equals one if the household reported on its auto insurance application that it had a third accident in the past three years.
- *Work Use*—A dummy variable that equals one if the household primarily uses the vehicle to commute to work.
- *Personal Use*—A dummy variable that equals one if the primary use of the vehicle is personal (excluding commuting to work).
- *Business Use*—A dummy variable that equals one if the household primarily uses the vehicle for business.
- *Second Vehicle*—A dummy variable that equals one if the household's auto insurance policy covered a second vehicle.
- *Third Vehicle*—A dummy variable that equals one if the household's auto insurance policy covered a third vehicle.
- *Young Driver*—A dummy variable that equals one if the household's auto insurance policy covered a driver under the age of 21.
- *Owner Occupied*—A dummy variable that equals one if the household occupies that home covered by the home insurance policy.
- *Primary Residence*—A dummy variable that equals one if the household's primary residence is the home covered by the home insurance policy.
- *Insured Value*—The insured value of the home covered by the home insurance policy.
- *Multi-Unit*—A dummy variable that equals one if the home covered by the home insurance policy has multiple units.

C Claim Rate Regressions

Tables C.1 and C.2 report the results of the claim rate regressions for auto and home, respectively. For the sake of brevity, the tables omit certain variables: (i) in the auto regressions, we do not report coefficients for the constant, company controls, interactions between company controls and benchmark premium, and territory controls; and (ii) in the home regression, we do not report the coefficients for the constant and territory controls. For auto comprehensive and home, we report the estimates from negative binomial regressions. For auto collision, however, we report the estimates of a Poisson regression, because a likelihood ratio test fails to reject the null hypothesis of equidispersion (i.e., $\alpha_L = 0$). In each regression, the dependent variable is the number of claims and we control for variation in exposure (i.e., policy duration).

The regression results indicate that auto claim rates (collision and comprehensive) are greater for households with a prior accident or a second vehicle. In addition, collision claim rates are greater for households in which the primary driver is married, the primary or secondary driver is female, or any driver is below age 21. Finally, home claim rates are greater for homes that are not owner occupied and increase with the insured value and age of the home.

One additional variable in the auto regressions—benchmark premium—deserves special mention. In our discussions with the agent, we learned that several insurance companies consider a household's credit rating in determining the household's benchmark premium for auto collision and comprehensive coverage. For privacy reasons, we could not obtain the credit ratings of the households in the data. However, the inclusion of benchmark premium in the auto regressions indirectly controls for this information. Conveniently, it also indirectly controls for any other household information that we do not observe but that the insurance company observes and incorporates into its auto rating function (although, to our knowledge, the only information in this category is the household's credit rating). The coefficient on benchmark premium is positive (as expected) in both auto regressions and statistically significant in the collision regression. (We do not include benchmark premium in the home regression because doing so reduces the sample size without increasing the predictive power of the model. Including it also does not significantly alter the predicted claim rates.)

Table C.1: Auto Regressions

Variable	Collision (Poisson) Coef	Collision (Poisson) Bootstrap Std Err	Comprehensive (Negative Binomial) Coef	Comprehensive (Negative Binomial) Bootstrap Std Err
Benchmark Premium	0.0019***	0.0005	0.0010	0.0014
Prior Accident	0.5351***	0.1193	0.6136***	0.1520
Prior Second Accident	0.1195	0.1393	-0.3781**	0.1827
Prior Third Accident	-0.0021	0.2019	0.0589	0.2609
Vehicle 1 Age	-0.0035	0.0113	-0.0093	0.0144
Personal Use	0.0286	0.0778	0.0043	0.1013
Business Use	0.4522	0.3093	0.3611	0.3272
Second Vehicle	0.2342**	0.0988	0.4086***	0.1268
Third Vehicle	-0.0800	0.1144	0.1257	0.1380
Driver 1 Female	0.2685***	0.0986	-0.1290	0.1195
Driver 1 Age	0.0130	0.0152	0.0047	0.0214
Driver 1 Age Squared	-0.0001	0.0001	-0.0001	0.0002
Driver 1 Divorced	-0.5429**	0.2751	0.3971	0.2918
Driver 1 Single	-0.2164*	0.1168	-0.0764	0.1453
Driver 1 Widowed	-0.4238*	0.2606	-0.4535	1.5989
Driver 2	-0.2171	0.4234	0.0507	0.4923
Driver 2 Female	0.2508*	0.1346	0.1057	0.1612
Driver 2 Age	0.0026	0.0190	-0.0030	0.0216
Driver 2 Age Squared	-0.0001	0.0002	0.0000	0.0002
Young Driver	0.3481***	0.1231	0.1024	0.1611
α			0.2171***	0.0823
Observations	1689		1661	
Pseudo R^2	0.0565		0.0386	

Table C.2: Home Regression (Negative Binomial)

Variable	Coef	Bootstrap Std Err
Owner Occupied	-0.4731***	0.1241
Primary Residence	0.1131	0.3595
Insured Value	0.1474***	0.0532
Home Age	0.0079*	0.0048
Home Age Squared	-0.0001*	0.0000
Multi-Unit	0.4887	1.8139
α	0.5876***	0.1620
Observations	1298	
Pseudo R^2	0.0180	

Notes: *Significant at 10% level; **Significant at 5% level; ***Significant at 1% level.

D Anatomy of Failure

Table D.1 reports the results of the logit regression referenced in Section 5.3.2 of the paper. The dependent variable indicates whether the household's three test intervals are nonempty and intersect. As noted in the paper, the results indicate that if we control for risk type, none of age, gender, or wealth is predictive of threewise success under the benchmark test. The results also indicate that the probability of threewise success is decreasing in the predicted claim rate for auto comprehensive and increasing in the predicted claim rate for home. This result has no obvious economic meaning under the benchmark model. Why should a household's claim rates—particularly in auto comprehensive and home, which arguably reflect force majeure risk at least as much as household behavior risk—correlate with its propensity to make consistent deductible choices? Moreover, why is the correlation negative in the case of auto comprehensive and positive in the case of home? Under the assumptions of the benchmark model, the correlation is mechanically related to the patterns of failure discussed in Section 5.3.2: for two-thirds of households with threewise failure the upper bound of the auto comprehensive test interval is less than the lower bound of the home test interval, and the bounds of a test interval decrease as the claim rate increases.

Table D.1: Logistic Regression Analysis of Threewise Success

Variable	Odds Ratio	Robust Std Err	dP/dx	Mean
$\hat{\lambda}_{iL}$ (percent)	1.0175	0.0462	0.0029	5.54
$\hat{\lambda}_{iM}$ (percent)	0.6844***	0.0630	-0.0639	3.73
$\hat{\lambda}_{iH}$ (percent)	1.1819***	0.0648	0.0282	5.82
Driver 1 Age	0.9835	0.0360	-0.0028	50.54
Driver 1 Age Squared	1.0001	0.0003	0.0000	2748.41
Driver 1 Female	1.1207	0.2288	0.0193	0.41
Insured Value	1.0110	0.1251	0.0019	1.80
Observations	702			
Wald $\chi^2(7)$	42.55***			
Pseudo R^2	0.0620			

***Significant at 1% level.

E Timing of Purchases

As noted in Section 6.2.1 of the paper, we also run the benchmark test on the subsample of Auto sample households whose policies were first written or last modified during or after 2006. Table E.1 presents the results, as well as the benchmark results for the entire Auto sample for purposes of comparison. The success rates in the Auto sample are substantially the same as the success rates in the Test sample. Moreover, restricting the Auto sample to households with policies first written or last modified during or after 2006 does not materially alter the results—the success rates remain well below the corresponding expected success rates.

Table E.1: Success Rates – Auto Sample

Deductible Choice(s)	Obs	Success Rate	Expected Success Rate	95% Conf Int	
Households with policies first written or last modified during or after 2006:					
Auto Coll	680	0.86	0.86	0.86	0.86
Auto Comp	680	0.90	0.99	0.98	1.00
Auto Coll & Auto Comp	680	0.57	0.73	0.71	0.75
All households:					
Auto Coll	1661	0.84	0.84	0.84	0.84
Auto Comp	1661	0.91	0.99	0.99	1.00
Auto Coll & Auto Comp	1661	0.54	0.71	0.69	0.72

F Prospect Theory

Table F.1 reports the success rates and expected success rates under Sydnor's (2006) prospect theory model. For comparison, it also displays the success rates and expected success rates under the benchmark model with and without probability weighting. The pairwise and threewise success rates are uniformly lower under Sydnor's model and they remain far below the corresponding expected success rates.

Table F.1: Success Rates – Prospect Theory à la Sydnor (2006)

	Prospect Theory		Benchmark Model			
	$\gamma = 0.69$		$\gamma = 0.69$		$\gamma = 1.00$	
Deductible Choice(s)	SR	ESR	SR	ESR	SR	ESR
Auto Coll	0.71	0.71	0.76	0.76	0.89	0.89
Auto Comp	0.89	1.00	0.60	0.96	0.89	0.99
Home	1.00	1.00	0.97	0.97	1.00	0.99
Auto Coll & Auto Comp	0.28	0.60	0.29	0.62	0.50	0.72
Auto Coll & Home	0.38	0.51	0.45	0.63	0.48	0.68
Auto Comp & Home	0.28	0.77	0.27	0.79	0.42	0.76
Auto Coll & Auto Comp & Home	0.11	0.41	0.15	0.49	0.23	0.50