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Dissertation Abstract

Does Experience Rating Matter in Reducing Accident Probabilities? A Test for Moral Hazard

I examine the empirical importance of moral hazard, adverse selection and state dependence in the determination of motor vehicle accidents, using a unique longitudinal dataset on car insurance policies. I obtained the data from an Italian insurance company and it follows policy holders over the period 2000-2005. My paper builds on earlier work by Abbring *et al.* (2003) that develops a dynamic model of moral hazard in which insurance contracts are experience rated according to a proportional rule.
I extend the model to allow for adverse selection that takes the form of unobservable heterogeneity, for state dependence in accidents and for pricing schemes that are not proportional. Adverse selection and state dependence are potentially important features of the auto-insurance market, which have not adequately addressed in prior empirical work in part because of the lack of extensive longitudinal data.

My strategy for disentangling moral hazard from adverse selection makes use of the fact that policy-holders in the same experience rating class face the same pricing schedule for future accidents, whereas policy-holders belonging to different classes face different marginal costs of an accident. Under the model, in the presence of moral hazard, drivers would take into account the marginal cost of an accident in choosing their driving effort. The theoretical model yields a decision rule for driving effort that underlies my empirical specification for the probability of having an accident.

The empirical estimating equation is a discrete choice dynamic panel data model with unobserved heterogeneity, state dependence and predetermined variables. The theoretical model implies a correlation between the unobserved heterogeneity and the experience rating class, so that traditional random effect estimators that impose orthogonality between the unobserved heterogeneity and the regressors will generally be biased. Fixed effect logit estimators have the advantage of not imposing orthogonality, but they may also be biased because they consider the rating class variable to be strictly exogenous. To account for these potential sources of bias, I use a recently developed semi-parametric estimator proposed by Arellano and Carrasco (2003), which allows for correlated random effects with a non-parametrically specified mean as well as predetermined variables. My empirical results show much stronger evidence for moral hazard that has been demonstrated in the earlier literature. In particular, there is negative dependence between accident probabilities and the experience rating class, with higher marginal increases in insurance premiums at higher classes associated with larger decreases in probabilities. Thus, monetary costs are important determinants of accident probabilities. There is also evidence of negative state dependence, after controlling for adverse selection and moral hazard, suggesting that drivers who recently had accidents engage in accident avoidance behavior.