Companies' Participation in OSS Development – An Empirical Study of OpenStack

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APPENDIX A
MORE STATISTICAL RESULTS TO RQ3.2

A.1 Random Effects Model

Considering the variation of projects and its possible impact on volunteer participation, we fit a random effects model including project id. We remove the predictor project *Type*, because it can be explained by the coefficient added for each project in the random effects model. The final regression equation is:

$$\log(nVltr) \sim CMEntropy + \log(nTotal\_dvpr) + \log(nTotal\_cmt) + Release + (1 \mid ProjectID)$$

The results of the fitted model are shown in Table 1. We can see that the diversity of commercial participation still has a positive and significant (at < 0.01 level) association with volunteer participation.

TABLE 1
Coefficients of the Model (1,553 Observations).

	Estimate	Std.Err	Pr(>|z|)
(Intercept)	-0.77	0.16	0
CMEntropy	0.11	0.040	0.0065
log(*nTotal_dvpr*)	0.58	0.033	0
log(*nTotal_cmt*)	0.051	0.023	0.027

A.2 Negative Binomial Generalized Linear Model

The number of volunteers who participated in any project is a low count, and its distribution across projects is skewed. Thus we fit a negative binomial generalized linear model to explore the association between the diversity of commercial contribution models and the volunteer participation. The regression equation is:

$$nVltr \sim CMEntropy + \log(nTotal\_dvpr) + \log(nTotal\_cmt) + Release + Type$$

The results of the fitted model are shown in Table 2. We can see that the effects of entropy, participation, and activity are still pointing in the same direction with the results in Section 3, and are as significant.

TABLE 2
Coefficients of the Model (1,553 Observations).

	Estimate	Std.Err	Pr(>|z|)
(Intercept)	-1.35	0.20	0
CMEntropy	0.36	0.044	0
log(*nTotal_dvpr*)	0.52	0.036	0
log(*nTotal_cmt*)	0.21	0.025	0
Documents	0.24	0.082	0.0033
Community Build	0.71	0.14	0

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