Determinants of contract renewals in university–industry contract research:

Going my way, or good Sam?

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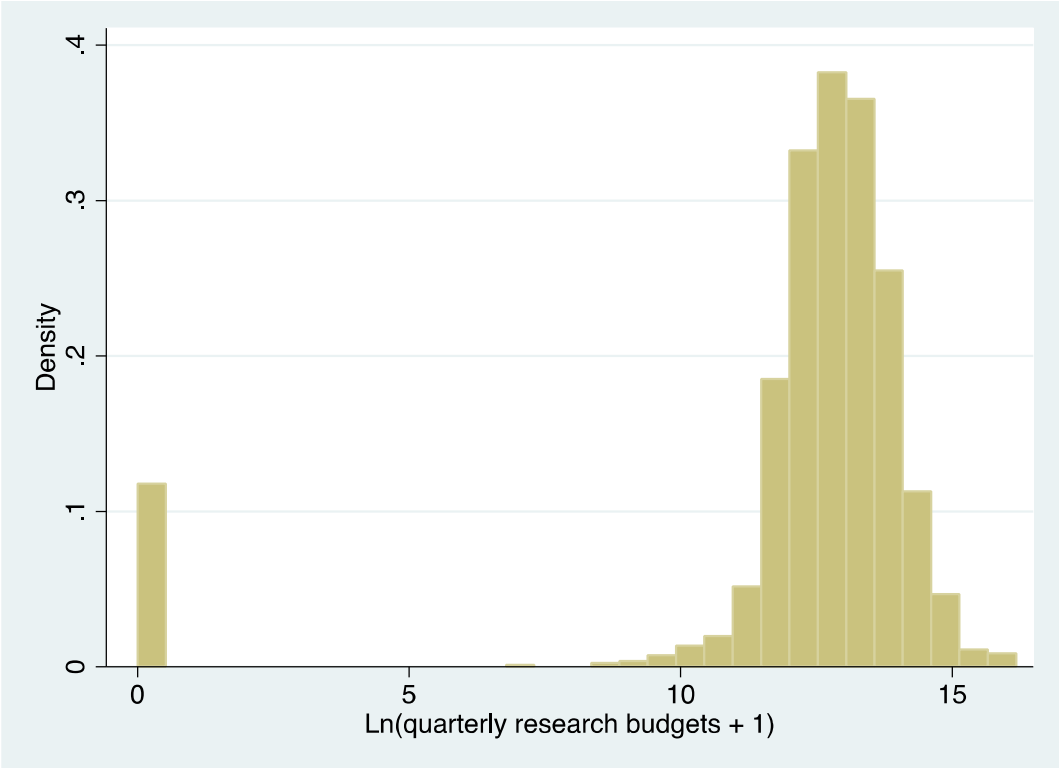
Supplemental material

Cross-tabulation of renewal and extension by initial contract terms

	Proportion of a subsequently renewed or extended contract	# Contracts
1 year and less	63%	1,214
More than 2 years	56%	348
2 years	47%	164
3–4 years	50%	105
5–7 years	86%	63
8+ years	69%	16

Distribution of the dependent variable of Analysis 1



Robustness check for Analysis 1: OLS regression results for quarterly research budgets without zero budget contracts

For the robustness check of our Analysis 1, we excluded 96 contracts that concluded with 0 budgets. The results of our dependent variable are almost the same as our main results. The effect of the time elapsed from the first contract hit the peak at 2.3 years (whereas our main result shows at 2.2 years).

	Ln (quarterly research budgets + 1)	
	Model 1	Model 2
Time elapsed from the first contract	0.016(0.027)	0.089*(0.031)
squared		−0.019**(0.004)
Extension	0.197***(0.027)	0.203***(0.025)
Initial contract periods (quarters)	−0.027***(0.004)	−0.026***(0.004)
On-site industry researchers	0.064(0.061)	0.066(0.060)
PIs' U–I linkages	−0.023***(0.001)	−0.024***(0.001)
Position (baseline: Lecturer/assistant professor)		
Professor	0.503***(0.034)	0.503***(0.034)
Associate Professor	0.376***(0.055)	0.375***(0.058)
Department (baseline: Humanities/social sciences)		
Medical/Pharmaceutical	−0.033(0.044)	−0.030(0.044)
Biology/Other Medical	−0.230**(0.046)	−0.228**(0.047)
Science/Engineering	0.079***(0.012)	0.082***(0.013)
Constant	12.635***(0.033)	12.601***(0.039)
Year dummies	Yes	Yes
Observations	1,466	1,466
R-squared	0.042	0.044

Cluster robust standard errors in parentheses (clustered by PI's department).
***: $p < 0.001$, **: $p < 0.01$, *: $p < 0.05$

Robustness check for Analysis 2:

Logit regression results of the probability of extension or renewal (sampling bias test and estimations with a control variable of objective-outcomes matching)

First, we checked a sampling bias in our observation. As explained in the Methodology section, a total of 18 firms refused to respond to outcome-related question items. We prepared a dummy variable that represents whether the counterparty responded to these questions and used it as an independent variable. Its result is shown in Model 0 in the table below. The coefficient of the dummy variable is not statistically significant. We reject the concern of sampling bias.

Next, we inserted an additional control variable. In our empirical test, we do not test an influence of differences on goal specificity. As the available data are limited, the construct is not directly operationalized. But assuming that the matching between the initial primary objective and primary outcome is correlated highly with goal specificity, we construct a dummy variable that takes a value of one if the most high-impact outcome category (ranked as one among ten) is matched to initial primary objectives (ranked as one among ten). The mean of the variable is 0.47.

The results are shown in Models 1 and 2 in the table below. We found that the coefficient of the variable is significantly negative. The odds ratios of some coefficients are different from our main results, but their signs and significance levels are consistent with our main results.

	Subsequent extension or renewal		
	Model 0 Sampling bias test	Model 1 With additional control variable	Model 2 With additional control variable
Response to outcome-related questions	1.069(0.119)		
Satisfaction with outcomes		1.366**(0.210)	1.685***(0.338)
Outcomes			
Technological knowledge acquisition			7.388***(2.811)
Patent application			0.849(0.531)
Academic paper publication			4.666***(1.518)
Valuable data acquisition			0.844(0.203)
Building human capital			0.210***(0.088)
Creating social ties with faculty			2.070***(0.491)
New project establishment			1.640(1.283)
Contribution to R&D/NPD			0.353***(0.044)
Matching between the primary objective and outcome		0.588**(0.132)	0.207***(0.070)
Time elapsed from the first contract	2.088***(0.505)	1.737(0.657)	1.942*(0.755)
squared	0.889**(0.043)	0.934(0.070)	0.872*(0.064)
On-site industry researchers	0.906(0.153)	0.831(0.113)	0.775**(0.085)
Ln(research budgets + 1)	1.140***(0.055)	1.360***(0.143)	1.404***(0.017)
Contract periods (quarters)	1.074**(0.031)	1.073(0.067)	1.111**(0.049)
PIs' U–I linkage	1.117(0.089)	1.041(0.051)	1.157*(0.101)
Baseline: Lecturer/Assistant Professor			
Professor	0.620(0.603)	0.173(0.296)	0.270(0.397)
Associate Professor	0.655(0.847)	0.175(0.328)	0.226(0.390)
Baseline: Humanities/Social Sciences			
Medical/Pharmaceutical	3.644***(0.275)	3.188***(0.283)	3.402***(0.791)
Biology/Other Medical	4.437***(0.557)	3.575***(0.328)	4.074***(1.037)
Science/Engineering	5.362***(0.410)	5.953***(0.489)	10.062***(1.177)
Constant	0.040***(0.012)	0.006*(0.018)	0.000***(0.001)
Observations	155	137	137
Pseudo R-squared	.082	.117	.234

Odds ratio. Cluster robust standard errors in parentheses (clustered by PI's department).
***: $p < 0.001$, **: $p < 0.01$, *: $p < 0.05$.