

Budget Uncertainty and Faculty Contracts: A Dynamic Framework for Comparative Analysis

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Building research universities: opportunities and threats

- ❑ A recently surge in attempts to create research universities outside the developed world;
 - ❑ In Brazil, China, India, and Russia governments announced ambitious programs of reforming old universities, and building new ones.

- ❑ Research university
 - ❑ An institution that requires a higher level of human capital of their faculty than a teaching university;
 - ❑ An institution that is able to select and attract able students;

How incentive contracts for faculty are affected by budgetary issues that a university faces?

How does the budget uncertainty affect hiring decisions?

Employment policy: why tenure?

Incentives:

- Optimal incentive contracts for younger (non-tenured) faculty (Holmstrom (1982))
- Proper incentives for senior (tenured) faculty (Carmichael (1988), McPherson, Shapiro (1999))

Property rights:

- Non-profit nature (Alchian (1959), Glaezer (2002))

The reason for general acceptance of tenure is not that the search for truth has some special characteristics which distinguish it from other products, but that, instead, its acceptance springs from special ownership arrangement and financial structure of our colleges (Alchian (1959))

Model setup

There are two infinitely-lived universities who hire professors with heterogeneous ability, and heterogeneous students who choose a university for their studies.

□ Faculty

There are two types of professors, able $\theta = \theta_H$ and mediocre $\theta = \theta_L$
there are n_H able and n_L mediocre professors in the university

□ Students

Students have heterogeneous abilities $s \in \{s_H, s_L\}$
A student who has ability s , if matched with a professor of ability θ , gets from this matching $s\theta$.

□ University

university has to allocate a budget B to hire a mix of two types of professors,
The balance condition is $B = n_H w_H + n_L w_L$.

University

□ Maximization problem

$$U = s_H M_H \frac{Bm}{n_H + n_L} + s_L M_L \frac{Bm}{n_H + n_L} + \mu (M_H + M_L)$$

□ Professor-student ratio

professor-student ratio is fixed;

$$M_H + M_L = \lambda (n_H + n_L)$$

□ Hiring policy: tenure

If a university wants to fire some professors in period t , it has bear a cost.

The cost of firing a mediocre professor is normalized to zero.

Firing an able professor costs the university $C > 0$.

a professor enjoys the return on her research efforts only if she remains as faculty in the next period.

Timing of the stage game in the dynamic game

1. Universities simultaneously and independently learn and allocate their budgets, and make hiring/firing decisions.
2. Payoffs from the research efforts of the faculty who remained are received.
3. New students enter the university of their choice, if there is enough capacity.
4. Students are matched to professors, and one-period payoffs are received. The period ends.

We focus on symmetric Markov perfect equilibria

we assume that able students make their choice before the rest of the students
corresponds to entrance exams

Static analysis

- ❑ An increase in university budget B might actually force it to abandon a high standard
- ❑ A decrease in the student-teacher ratio makes high standard more likely

Dynamic analysis $B_i \in \{B_B, B_S\}$, with $B_B > B_S$.

- ❑ For a range of parameters, the uncertainty of the budget forces universities to hire normal-quality professors in a dynamic equilibrium, even if a higher level of high-quality faculty is optimal for any possible budget.

Results and implications

- Budget increase might force university to switch from high-standard (research) to normal (teaching) strategy
- Budget linked to a student body: additional pressure to follow “teaching” strategy
- A good department needs to have special arrangements within the university
- Controlling for the size of the student/teacher ratio makes hiring high-quality faculty a more attractive strategy
- More budget uncertainty makes research strategy less attractive for the university

- Path-dependence
 - A university that starts as a «teaching university» with a large number of students and no research-oriented faculty is unlikely to switch to the «research mode» if its expansion depends on the increase of the number of students, as is the case for many government-financed programs
 - A university that starts as a small research-oriented unit is likely to retain its orientation.

Example: Two universities

❑ Both created in 1992

- ❑ By 2007, both schools claimed major successes, offering undisputed top programs in economics in Russia (NES as an MA, HSE as a BA program)
- ❑ in 2007, annual cost of education per student is \$16,000 in both

❑ New Economic School

- ❑ A two-year MA program with number of graduates increased from 30 in 1992 to 70 in 2007
- ❑ up to 90% of the economics curricula was taught by visitors from Top Western economics departments until 1999
- ❑ in 1999, the first Assistant Professor was hired for a tenure-track position, followed by one more in 2000 and two in 2001

❑ Higher School of Economics

- ❑ A state university relying heavily on government support less than 1,000 students in 1993, now has over 10,000
- ❑ In 2006, more than 400 faculty members (with 300 more working part-time).
- ❑ (as in the model) HSE initiated formation of several internal institutions

Conclusions

- We considered a university's development strategy in a dynamic competitive environment
- Universities choose whether or not to hire high-quality, expensive professors in order to attract able students
- In the static environment, with a fixed teacher-student ratio, an increase in the budget of a university might result in switching from a high-standard to a low-standard strategy.
- In a dynamic equilibrium, in the presence of budget uncertainty, universities might prefer to hire inexpensive, mediocre professors in the short-term even if they would have hired high-quality professors in either states of the world.
- Huge financial support is not enough to create a research university
- Long-term commitment is important