Firm discounting

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Discouting in ergodicity

Utility as a growth optimizing function

Discounting as a utility function without uncertainty

Microfoundations of discounting approach: Equalize the growth rate

Utility as a growth optimizing function

Discounting as a utility function without uncertainty

The results of that paper were that dependend on horizon and dynamics

Dynamics are relaivly straightfoward

Horizon was left unspecified

Technically the discount rate can only exist when the growth rate is the same.

This idea

What are some measurable observavles that can determine your horizon?

In brief

The number of employees a company has can affect the optimal discount function

Firm has to specialize, to either accept projects of type a or projects of type b.

this isn't the only way to get this effect, one could simply imagine a fixed cost for being able to accept a different variety of projects

Setup

Payout	Task Length	Employees required	Monthly Arrivals
X_a	t_a	n_a	r_a
X_b	t_b	n_b	r_b

Useful measures

A worker can complete $\frac{T}{t_i}$ projects in T time

The required number of workers to accept all projects of type i is: $t_i * r_i * n_i$

The maximum number projects of type i than can be accepted: $T * r_i$

Payment per unit of time per project $\frac{X_i}{t_i}$

Payment per employee per unit of time $\frac{X_i}{t_i * n_i}$

General results

So if there is an infinite(or unconstrained) arrival per month, but finite employees maximize payment per employee

if there is finite arrival per month, but infinite(or unconstrained) employees maximize payment per unit of time

Finite arrival and finite employees

Case 1: The growth rates are equal

Case 2: One of the growth rates is more binding

Finite arrival and finite employees

Depending on the constraints we might equalize growth rate per project with the growth rate per employee.

So the discount rate could take one of the four forms

Technically the discount rate can only exist when the growth rate is the same.

$\frac{x_a}{x_b}$

Types of discounting

1	Constrained A	Not constrained A
Constrained B	$\delta = \frac{t_a n_a}{t_b n_b}$	$\frac{t_a}{t_b n_b}$
Not Constrained B	$\frac{t_a n_a}{t_b}$	$\frac{t_a}{t_b}$

Motivating example

Payout	Task Length	Employees req	Monthly Arr
100	2 m	1	3
600	10 m	2	5

Useful metrics

Average projects a worker can complete in a year, long(short): $\frac{\text{period under consideration}}{\text{average completion rate}} = \frac{12}{10}(\frac{12}{2}) = 1.2(6)$

Required number of employees to accept all projects of type long(short): $10 * 2 * 5(1 * 2 * 3) = 100(6)$

Maximum possible acceptance of projects per year: $5 * 12 = 60(3 * 12 = 36)$

Cash per month per project: $600/10 = 60(100/2 = 50)$

Cash per month per employee: $600/(10 * 2) = 30(100/(2 * 1) = 50)$

Result

So one has a higher cash amount per project$(60 > 50)$

The other has a higher amount per employee $30 < 50$

We can compute at how many employees this occurs, here at $n = 10$

Result

Thank you for listening