CREDIT MARKET DEVELOPMENT AND RESOURCE EXTRACTION UNDER INSECURE PROPERTY RIGHTS: EVIDENCE FROM GLOBAL FISHERIES
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INTRODUCTION

THE LARGER ISSUE

- Access to credit is a necessary ingredient for economic development.

- But by reducing the cost of input use, can it have the unintended consequence of further degrading our natural resources?

MORE SPECIFICALLY HERE

- Our world fisheries have been severely degraded over the past 50 years or so.

- Access to credit has concurrently been made easier in nearly all countries.

- In the 1980s, the United Nations Convention on the Law of the Sea (UNCLOS) led to the creation of the 200 nm Exclusive Economic Zones (EEZ). This provided a tool for countries to better control their fisheries.

- Fish species differ by the geographical extent of their habitat and their mobility between marine areas. This affects the degree of effective control a country can have over the exploitation a specific fish specie.

- The authors argue that whether credit market development induces fishery conservation or degradation depends on the level of effective control. This is verified empirically.

THEORETICAL MECHANISM

THE THEORY IN A NUTSHELL

- The paper proposes a model. We will not go over it in this course. I will propose a much simpler, alternative theoretical model.

- Essentially, the theoretical argument rests on two opposite effects of reducing the discount rate:

  1. The discount rate is linked to the rental cost of capital. A lower rental cost reduces the cost of fishing equipment, thus inducing higher fishing efforts.

  2. A lower discount rate means that people put more value to future revenues. This should foster resource conservation. Distinction between fishers and regulators (politicians)…

  3. But resource conservation can only be achieved if someone controls access to the resource.

THE THEORY IN A NUTSHELL

- Prediction:

    I. Credit market development (CMD) will reduce overharvesting for fish species subject to a high level of effective control.

    II. CMD will increase overharvesting for fish species subject to a low level of effective control.

THE CONTEXT

THE DATA

- Three main measures of interest:
  1. "Resource extraction" (fish catches as % of MSY) (dependent variable)
  2. Property right security over fish stocks (explanatory)
  3. Credit market development (explanatory)
- EEZs of 142 countries
- 1960 to 2015
- The unit of observation is "species-country-year" (ijt)
- NB There is no summary stats table. Graphs are a little hard to interpret.

RESOURCE EXTRACTION RATE

- Taken from FAO and "RAM Legacy Stock Assessment Database"

- Measured as % relative to the MSY (fishing mortality – a bit vague)

- The idea is that if you <u>continuously</u> extract more than the MSY, the resource will eventually be depleted.

- Author says: "a temporary extraction rate above 100 could be economically optimal for an underexploited fish stocks, emphasizing the importance of understanding the underlying stock of fish"

- *I agree. But it is not clear what is done about it…*

- *I am not convinced about the appropriateness of that measure… Why not just use the FSS from SAU?*
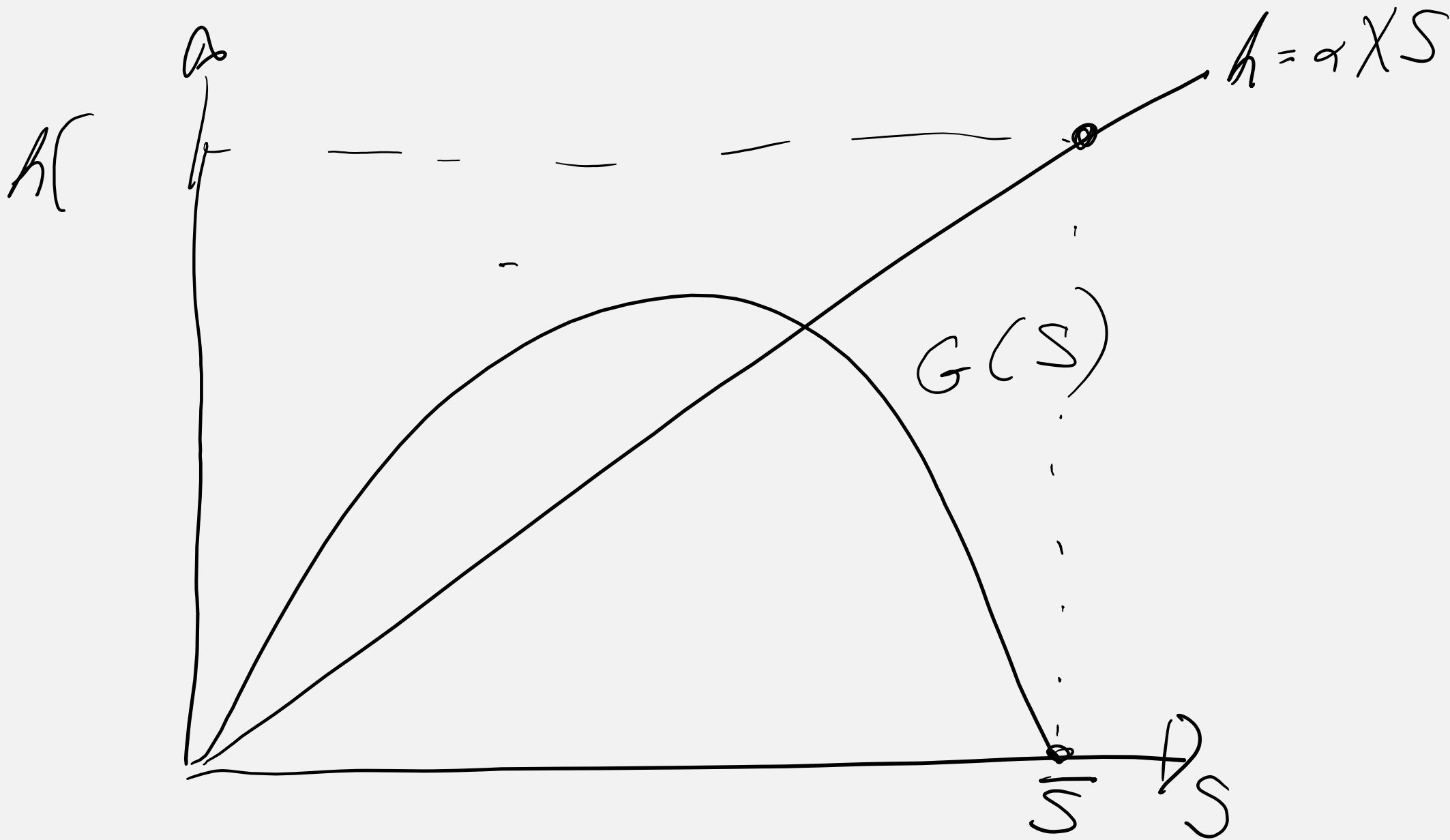
RESOURCE CONTROL

- The authors call it "property rights security over fish stocks". (I think "effective control" would be more appropriate.)

- One issue is that effective control could be endogenous. With CMD, there might be higher incentives for fishers and state to adopt better resource governance.

- EEZs were not rolled out at the same time for all countries. Source of exogeneity. Binary variable.

- RA (range): share of the species total distribution that falls into the EEZ of a country

- M: mobility parameter (0, 0.1, or 0.2)

RESOURCE CONTROL

- Effective property rights

- Main specification

- Alternative specification accounting for general governance in country

- WB rule of law indicator

- See example table 1 page 24.

$$PR := EEZ \times RA^M$$

$$PR := EEZ \times RA^M \times ROL_{WB}$$

	EEZ	ROL_{WB}	ROL_{FI}	RA	RA^M	$EEZ \times RA^M$ $\times RA$	$EEZ \times ROL_{WB}$ $\times RA^M$
Mexico							
Yellowfin tuna	1.00	0.39	0.67	0.01	0.42	0.42	0.16
Spiny lobster	1.00	0.39	0.67	0.10	1.00	1.00	0.39
United States							
Yellowfin tuna	1.00	0.83	0.78	0.01	0.39	0.39	0.32
Spiny lobster	1.00	0.83	0.78	0.16	1.00	1.00	0.83

CREDIT MARKET DEVELOPMENT

- Volume of private credit from World Bank

- Check with "lending interest rates" from IMF

- *Why not use indicators of financial development?*

EMPIRICAL STRATEGY

$$\text{Extraction}_{ijt} = \beta_1 \, \text{PR}_{ijt} + \beta_2 \, \text{Credit}_{jt} + \beta_3 \, \text{PR}_{ijt} \times \text{Credit}_{jt} + X_{jt} + \mu_{ij} + \theta_t + \varepsilon_{ijt}.$$

EQUATION TO ESTIMATE

- Interpret interaction terms

- Beta_1 (Beta_1+Beta_3) is effect of effective control under low (high) CMD

- Beta_2 (Beta_2+Beta_3) is effect of CMD under low (high) effective control

- "inverse hyperbolic sine transformation": Similar to a log transformation, without the zero problem. Leads to elasticities being estimated.

RESULTS

Table 2: Resource harvesting and the volume of credit

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline	Main	Trend	Controls	OECD	RAM	Balanced	Agriculture Credit
Credit	−0.10*	0.19***	0.22***	0.32***	0.53***	0.17**	0.09	0.06
	(0.05)	(0.07)	(0.07)	(0.10)	(0.15)	(0.08)	(0.06)	(0.05)
Property rights	−0.51***	−0.53***	−0.34***	−0.33***	−0.51***	−0.54***	−0.62***	−0.30*
	(0.09)	(0.08)	(0.07)	(0.07)	(0.09)	(0.15)	(0.13)	(0.15)
Credit × Property rights		−0.64***	−0.55***	−0.62***	−0.87***	−0.41***	−0.51***	−0.25***
		(0.12)	(0.12)	(0.14)	(0.17)	(0.10)	(0.12)	(0.09)
Stock × Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year trend			Yes					
Observations	239013	239013	239013	170256	143353	104250	131037	59198
R^2	0.53	0.53	0.55	0.53	0.49	0.73	0.61	0.64

RESULTS

- $\beta_2 > 0$: A better access to credit causes over-exploitation when effective control is low.

- $\beta_2 + \beta_3 < 0$? (must test stat. significance): If negative, CMD reduces over-exploitation when effective control is high. How could that be?

- $\beta_1 < 0$: Higher effective control reduces over-exploitation when CMD is low.

- $\beta_1 + \beta_3 < 0$: Higher effective control reduces over-exploitation even more when CMD is high. How could that be?

DISCUSSION

SOME COMMENTS

- Using habitat and mobility at the species level is a great innovation.

- Not convinced about the measure of "extraction rate" as proxy for resource overuse. Why not just use FSS from SAU?

- Estimated Beta_2+Beta_3 is not discussed in the paper. IMO, it is an interesting result. Better control has a large resource conservation effect under high CMD.

- *I believe trade openness plays an important role in the story. We need a theory.*