

第4回防災計画研究発表会
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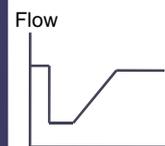


Longer-run Economic Impacts of Disasters: Where Does It Affect How to Measure?

Kazuyoshi Nakano, Kyoto University
Hirokazu Tatano, Kyoto University



Impact?



Longer run

Hypothesis:
Longer-run negative impact:
Increase in external debt

Flow

Production(GDP/GRP)

Stock

External debt

Longer-run effect

How can increase in debt affect?

- Worsening credit rating in country level
- Rising interest rate?
- -> Crowding out of future investments to new project
 - (Cochrane, 1994)
- Cost of future repayment costs?
 - Benson and Clay (2004)
- Still insufficient empirical evidence

Research questions

- Focusing only on variable of production (GDP/ GRP) is enough ?
- WHEHE disaster gives longer-run impact to the economy?
 - External debt?
- Development situation in the countries affects the longer-run impacts? How?

Methodology and data

- Case Studies – Regional / Country level
- Regression analysis – Country level-
 - Data
 - Economic variable: World Development Indicator(WDI), World bank
 - Disaster losses: EM-DAT(CRED)etc

Case Study – Regional level- Kobe EQ 1995

GDP in Hyogo Prefecture

Increase, as investment

Expenditure Account in Hyogo prefecture (million JPY)
(Data Source: SNA data in Hyogo prefecture)



Total Damage affects in the longer-run significantly

Independent Variables	Dependent Variables <i>ln(External Debt)</i>		
	LI group (N=46)	MI group (N=67)	HI group (N=28)
<i>Constant</i>	19.932*** (26.015)	15.194*** (13.171)	18.904*** (12.511)
<i>ln(Total Damage)</i>	0.166** (2.673)	0.555*** (6.597)	0.520*** (5.100)
R-Square:	0.140	0.401	0.620

Significance of Total damage

Findings (1)

- Regardless of the development situation, **larger observed disaster losses** in the past
||
more external debt in the longer-run.

Still problems...

- Other variables should be incorporated
 - Assuming that the effect of variable in the past is the same as recent one
 - Possibility of correlation in adverse direction
 - Quality of data
 - etc..
- But want to start to discuss...

Discussion (1)

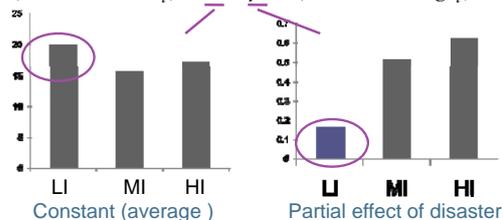
- Focus not only on GDP but also **external debt** in understanding the longer-run economic impact.

Research questions

- Focusing only on GDP is enough?
- WHEHE disaster gives longer-run impact to the economy?
- Development situation in the countries affects the longer-run impacts? How?
- How reduce longer-run impact? Ex-ante/ex-post financing measure?

Findings (2) Development situation affects

$$\ln(\text{ExternalDebt}_i) = \alpha + \beta \ln(\text{TotalDamage}_i) + \varepsilon_i$$



- LI countries: higher levels of external debt on average
- relatively not affected as much by disasters.

Discussion (2)

Low Income countries



Summary

- Focusing only on GDP is enough ?
- **Not enough**
- WHEHE disaster gives longer-run impact to the economy?
- **External debt**
- Development situation in the countries affects the longer-run impacts? How?
- **Yes. External debt in LI countries relatively not affected by disaster.**

Future Research

- **“How disaster impacts can be measured including change in stock side?”**
 - Tatano et al(2000, 2006);
- **->in terms of welfare,**
 - Tatano and Nakano(2008), Mechler (2009),
- Loss Accounting
- How can increase in debt affect?