

Earthquake and Public Finance
in Japan
by

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Impact on Factors of Production

Aggregate output is produced from

private share (McGrattan-Prescott)

labor	64%
tangible capital	28%
intangible capital	8%
social capital	

Tangible capital is relatively fast to recover

Labor, intangible & social capital takes longer to recover

Impact on the world economy

Direct impact on downstream (supply) and upstream (demand) is large but local

Impact on energy is large but substitutable

Financial effect is limited due to low leverage, (unless government fails to regain long-run fiscal balance)

	Value Loss	Leverage	Macro Impact
1998 Russian crisis	small	Large	Large
2000 Tech bubble burst	Large	small	small
2007-10 Financial crisis	Large	Large	Huge
2011 Japan earthquake	Large	small	small

A potential danger: Japanese public finance

IMF Fiscal Monitor: April 2011

Fiscal balance %GDP	2008	2009	2010	2011	2012
Japan	- 4.2	-10.3	- 9.5	- 10.0	- 8.4
US	- 6.5	- 12.7	- 10.6	- 10.8	- 7.5
UK	- 4.9	- 10.3	- 10.4	- 8.6	- 6.9
Euro	- 2.1	- 6.4	- 6.0	- 4.4	- 3.6
Emerging market	- 0.6	- 4.9	- 3.8	- 2.6	- 2.2
World	- 2.0	- 6.7	- 5.7	- 4.7	- 3.5

$$\Delta \left(\frac{\text{Gov't Debt}}{\text{GDP}} \right) = (\text{interest rate} - \text{GDP growth}) \cdot \frac{\text{Gov't Debt}}{\text{GDP}} + \frac{\text{Primary Deficit}}{\text{GDP}} - \frac{\text{Seigniorage}}{\text{GDP}}$$

Gov't Debt = (financial asset - liability) of (general govt + central bank - social security) = 160% of GDP at 2010

Primary balance = $\begin{matrix} +1.7 \\ 1986-90 \end{matrix}, \begin{matrix} -1.6 \\ 91-95 \end{matrix}, \begin{matrix} -4.4 \\ 96-00 \end{matrix}, \begin{matrix} -4.6 \\ 01-5 \end{matrix}, \begin{matrix} -4.2 \\ 06-10 \end{matrix} \% \text{ of GDP}$

Interest rate - GDP growth = 1%, average of advance economy

Seigniorage is negligible

→ Needs primary surplus of 1.6% for sustainability

Risk of delaying fiscal reform: Interest rate risk

Suppose nominal interest rate \uparrow by 1.5%, due to rise of spread and/or expected inflation

Fiscal balance worsen by 2.4% of GDP (\$150bil)

Bank of Japan cannot buy bonds if inflation is expected

Price of long-term bond with coupon rate 1.5%

Maturity	0 year	3 years	5 years	10 years
	100	95.8	93.1	87.2

Direct impact of 1.5% interest rate hike

B/S of Private Banks		⇒	B/S of Private Banks	
Loan&Bond 11.5	C & Dep 12.5		L&B 11.0	C & D 12.5
Other 1.8	Net Worth .76		Other 1.8	Net Wor .26

B/S of Pensions and Insurance		⇒	B/S of Pens and Insurance	
L&B 4.0	Ins & pen res 5.2		L&B 3.7	Ins & p res 5.2
Other 1.7	Net Worth .39		Other 1.7	Net Worth .11

Trillion dollar (1\$=80Yen), Computed from Bank of Japan Flow-of-fund. Assume average maturity of L&B = 3 years for banks, = 5 years for insurance

→ Balance-sheet of financial intermediaries worsen further by fall in general asset prices

Balance-sheet contagion

present

interest rate hike



net worth of financial intermediaries falls



asset demand falls



required return rises



asset prices fall

future

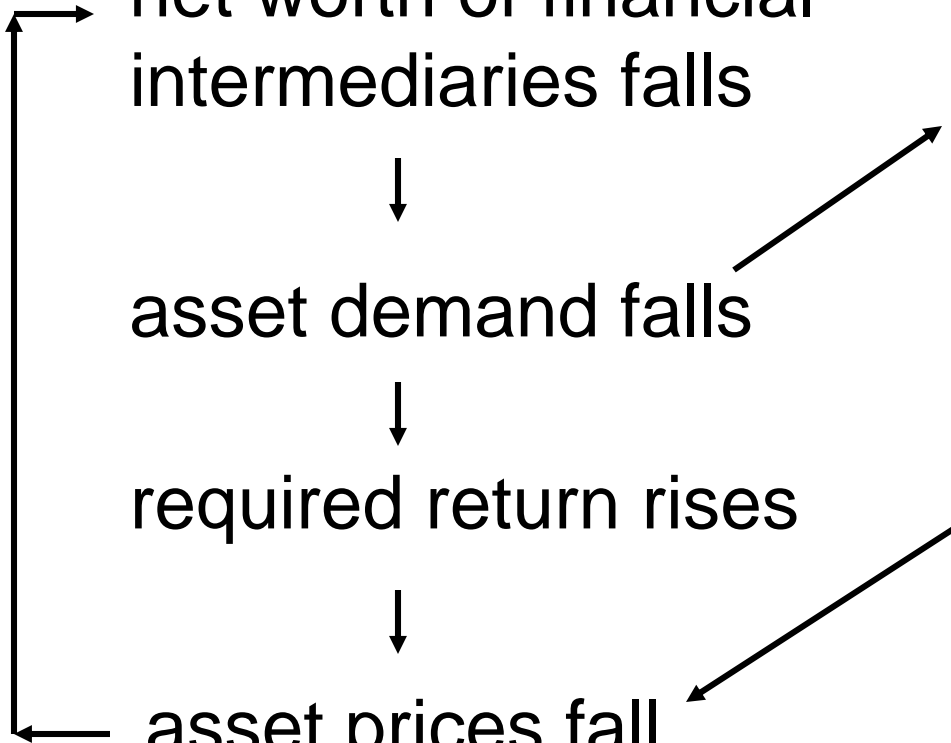
net worth of intermediaries falls



asset demand falls

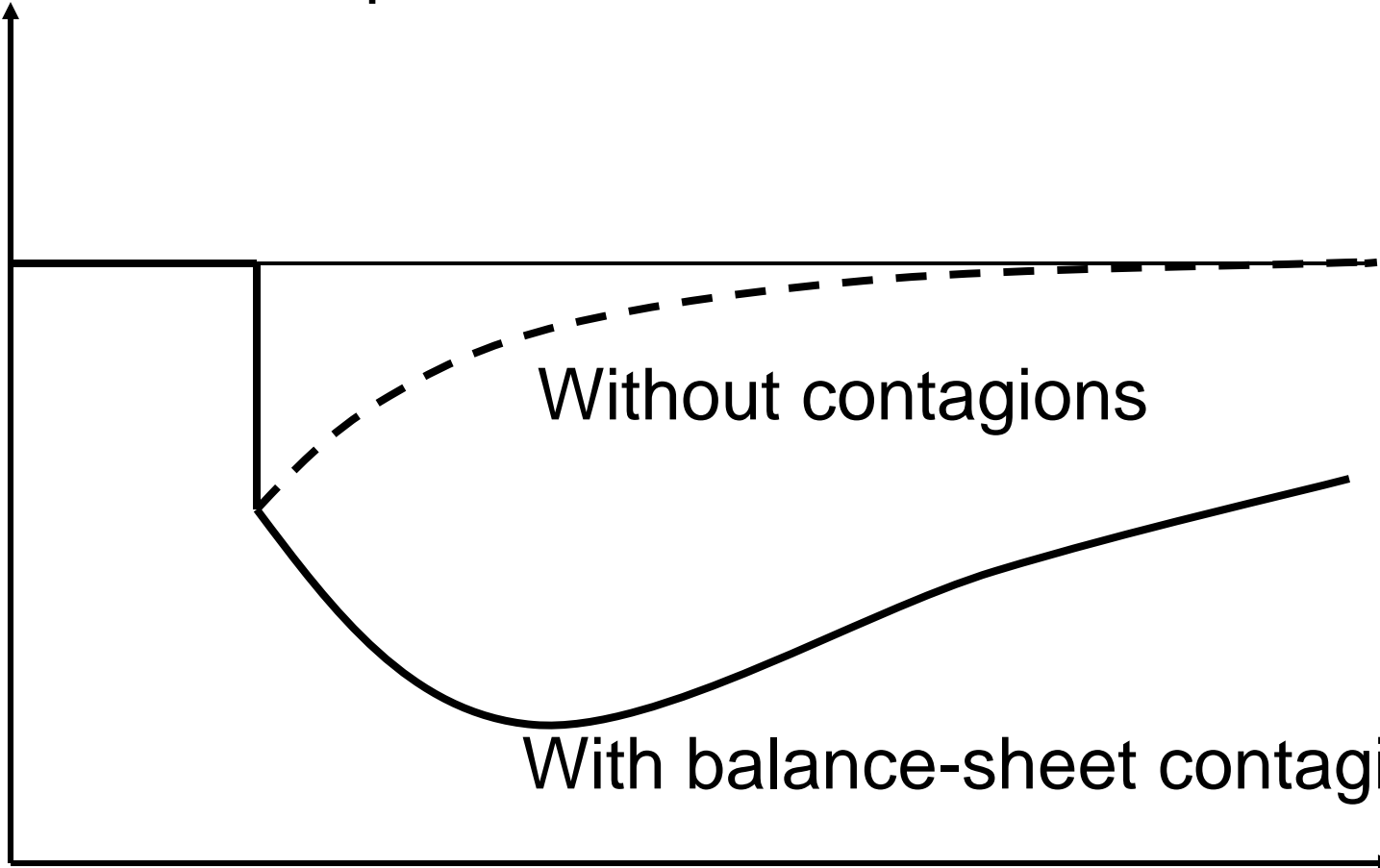


required return rises



Reaction to Loss of Capital

Capital stock, output



Without contagions

With balance-sheet contagion

Time

Future direction:

Government must reform social insurance,
raise retirement age and increase
consumption tax gradually

Bank of Japan needs to stop deflation while
controlling inflation

Firms should invest more on intangible
capital, including on-the-job training of
young workers

We all have to contribute more to the society