What About Japan?

YiLi Chien, Hal Cole and Hanno Lustig

FRB St. Louis, University of Pennsylvania and Stanford University

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Why Japan? Relevant and Puzzling

- Japan is relevant:
  - Large fiscal deficit caused by aging population `Aging Population` `Fiscal Deficit`
  - High debt-to-GDP ratio and near zero GDP growth
  - A situation that is likely to be faced by many countries going forward

- Puzzling: Japan has no debt crisis, inflation remains low and is not the $r < g$ case. `Not r < g`

- How did Japan do it?
  - Consolidated government balance sheet: Risky investment on assets and cheap borrowing on liabilities
  - Financial repression
  - Evaluate the implications of financial repression.

Road Map

Road Map

Expansion of General Gov't Balance Sheet

% of GDP, Year End	1997	2010	2023
Assets			
Deposits	5.7%	7.5%	18.7%
Domestic Loans	6.5%	6.3%	3.4%
Other Domestic Securities	5.7%	26.7%	14.1%
Domestic Equities	**11.6%**	**26.3%**	**34.7%**
Foreign Securities	**6.8%**	**22.9%**	**56.1%**
FILF Deposits	29.0%	8.5%	4.0%
Others	4.4%	4.8%	6.5%
Sum	69.6%	103.0%	137.3%
Liabilities			
Loans	25.2%	32.8%	25.7%
Bonds & T-Bills	**67.8%**	**163.7%**	**201.1%**
Others	6.3%	11.4%	14.3%
Sum	99.3%	207.9%	241.2%
Net Liabilities	29.7%	104.9%	103.9%

- General gov't = central gov't + local gov't + social security funds

- Expansion on both assets and liabilities

- Risky investment, mostly from social security funds SSF Asset Position

Expansion of BoJ's Balance Sheet

% of GDP, Year End	1997	2010	2023
Assets			
Gold, SDRs and Deposits	0.7%	0.5%	1.7%
Domestic Loans	4.2%	8.6%	17.1%
Bonds & T-Bills	**9.6%**	**15.5%**	**99.2%**
Equities	**0%**	**0.4%**	**10.7%**
Others	1.0%	1.9%	1.7%
Liabilities			
Currency	10.8%	17.2%	21.6%
Bank Reserves	**0.6%**	**4.5%**	**90.9%**
BoJ Loans	3.0%	3.0%	0.7%
Others	0.1%	0.4%	10.3%

- 1 GDP of debt is held by BOJ due to QE and yield curve control policy. BOJ Balance Sheet

Public Financial Institutions Used to Borrow Heavily

% of GDP, Year End	1997	2010	2023
Assets			
Deposits	0.3%	0.7%	1.6%
Domestic Loans	**92.2%**	**53.2%**	**40.3%**
Other Domestic Securities	5.4%	0.7%	0.3%
Bonds & T-Bills	13.3%	1.2%	0.1%
Domestic Equities	2.2%	1.2%	2.9%
Others	1.1%	0.4%	1.4%
Sum	114.5%	57.4%	46.5%
Liabilities			
Loans	26.9%	13.1%	9.5%
Domestic Securities	5.5%	29.4%	21.6%
Deposits FILF	**75.4%**	**9.4%**	**5.8%**
Domestic Equities	1.7%	5.5%	6.4%
Others	0.9%	0.3%	0.7%
Sum	110.4%	57.7%	44.0%

- PFIs include the Fiscal Investment and Loan Fund (FILF), a government-run lending program.
- FILF borrowed from postal savings bank and social security funds

Consolidated Balance Sheet (BoJ + Gen Gov't + PFIs)

% of GDP, Year End	1997	2010	2023	97 to 23 Diff
Assets				
Gold, SDRs, and Deposits	6.6%	8.3%	19.1%	12.6%
Domestic Loans	102.8%	68.2%	60.7%	-42.1%
Other Domestic Securities	5.7%	22.9%	0.7%	-4.9%
Domestic Equities	12.1%	22.4%	41.9%	29.7%
Foreign Securities	6.8%	22.9%	56.1%	49.3%
Sum	133.9%	144.7%	178.5%	44.6%
Liabilities				
Currency	10.8%	17.2%	21.6%	10.9%
Bank Reserves	0.6%	4.5%	90.9%	90.3%
Bonds & T-Bills	44.9%	172.0%	117.3%	72.3%
Loans	55.1%	48.9%	35.9%	-19.2%
Deposits FILF	46.4%	0.9%	1.9%	-44.6%
Sum	158.6%	248.1%	273.0%	114.4%
Net Liabilities	24.7%	103.3%	94.5%	69.8%

- Cumulative primary fiscal deficit of General Gov't: 131% of GDP

- Net liabilities only increased 69.8% of GDP

Road Map

Past Returns and Profits on Consolidated Balance Sheet

| | Rates of Return | | | Returns |
Periods	Liabilities	Assets	Difference	% of GDP
1997-2023	**0.73%**	**2.85%**	**2.12%**	**2.16%**
2000-2009	0.91%	0.89%	−0.02%	−1.29%
2010-2019	1.07%	4.36%	3.30%	3.13%
2020-2023	−0.63%	4.32%	4.94%	9.35%

- The spreads really started to increase between 2010 to 2019.
  - ▸ High asset return: Starting in 2013, the social security fund increased in its risky asset position significantly. SSF Asset Position
  - ▸ Low liability return: BoJ's QE, YCC, and low rate policy ensure low return.

- Japan's excess return strategy hinges on financial repression.

Road Map

How Can the Government Earn Excess Returns?

- Without financial frictions, this excess return should be reflected in the pricing of the government debt, unless the government's surpluses absorb the risk.

- Let P_t^{T-G} denote the present value of primary surplus. Then the government budget constraint:

$$D_t = P_t^{T-G} + A_t,$$

which implies

$$\mathbb{E}_t R_{t+1}^D \approx \left(1 - \frac{A_t}{D_t}\right) \mathbb{E}_t R_{t+1}^{T-G} + \frac{A_t}{D_t} \mathbb{E}_t R_{t+1}^A.$$

- The return on A_t must be reflected in return on debt. But the data shows $\mathbb{E}_t R_{t+1}^A \uparrow$ and $\mathbb{E}_t R_{t+1}^D$ remain low, why?

Our Answer: Financial Repression

- Financial repression occurs when governments implement policies to channel themselves funds that, in a deregulated market environment, would go elsewhere. (Reinhart, Kirkegaard, and Sbrancia, 2011).

- Some examples
  - ▸ Directed lending by public pension funds, public financial institutions, central banks etc.
  - ▸ Caps on interest rates
  - ▸ Government ownership of banks
  - ▸ Regulations such as capital control and hedging requirement

- Historical evidence supports our view on Japanese financial repression.
  Cheap Funding   Cheap Funding

Trapped Household Deposits

	Japan		U.S.	
% of GDP, Year End	1997	2023	1997	2023
Assets				
Currency and Deposits	128%	189%	42%	61%
Other Securities	16%	5%	30%	22%
Equities	16%	46%	125%	199%
Insurance & Pension	63%	90%	110%	118%
Liabilities				
Loans	65%	62%	62%	69%

- The deposit-to-GDP ratio has been historically high since the 80s (Hoshi and Kashyap (1999)).

- Most households are financially unsophisticated and face limited saving/investment options (Hoshi and Kashyap (2004)).

Trapped Private Financial Assets

- Japan's financial sector has to intermediate about 3x GDP in households' deposits, insurance, and pensions

- Financial intermediaries cannot replicate the government's strategy of foreign investments; they have to hedge at least part of the currency risk.

  - To hedge the currency risk exposure, the banks will demand synthetic dollars, creating upward pressure on the synthetic USD LIBOR rate.
  - Since the great recession, a large CIP deviation has emerged, especially in the USD/Yen market CIP Deviation .

- Hedging requirements effectively trap the assets managed by private financial intermediaries domestically.

Quantify Financial Repression: The Return Wedge

- The return wedge of the government balance sheet

$$\omega_t^{FR} \equiv \left(1 - \frac{A_t}{D_t}\right) \mathbb{E}_t R_{t+1}^{T-G} + \frac{A_t}{D_t} \mathbb{E}_t R_{t+1}^A - \mathbb{E}_t R_{t+1}^D$$

- We view this return wedge to be a result of financial repression
- Assume $(T - G)/Y$ is a-cyclical then $\mathbb{E}_t R_{t+1}^{T-G} = \mathbb{E}_t R_{t+1}^Y$

$$\omega_t^{FR} \approx \left(1 - \frac{A_t}{D_t}\right) \mathbb{E}_t R_{t+1}^Y + \frac{A_t}{D_t} \mathbb{E}_t R_{t+1}^A - \mathbb{E}_t R_{t+1}^D$$

- $\omega_{2023}^{FR} = 2\%$ according to the data Calculation
- The government bond return should be 2% higher without financial repression

Road Map

Financial Repression and Fiscal Space

- Assumed TVC. The present value government budget constraints:

$$NetDebt = \mathbb{E}_0 \sum_t R^{-t}(T_t - G_t).$$

- The implication of real rate declines on the government's spending possibilities: `Duration Algebra`
  - if $D^{ND} < D^{T-G}$, then the government's spending possibilities expand;
  - if $D^{ND} > D^{T-G}$, then the government's spending possibilities contract.
- Measure duration mismatch on the government balance sheet
  - Long surplus duration, 52 years `D^{T-G}`
  - Short (negative) net debt duration, -47 years `D^{ND}`

Financial Repression Expands Fiscal Capacity

- Large duration mismatch on Gov't Balance Sheet.

- $D^{ND}(-47yrs) < D^{T-G}(52yrs) \rightarrow$ the gov't's spending possibilities expand when R falls,

$$NetDebt \searrow << \sum_t R^{-t}(T_t - G_t). \nearrow$$

- Rate decrease generates lots of extra fiscal capacity:
  1. PDV of future surpluses increases by 52% in response to a permanent decrease in real rates of 100 bps.
  2. Net Debt decreases by 47%, because the net debt has negative duration.

- On the other hand, rate increases destroy lots of extra fiscal capacity.

Road Map

Financial Repression and Household Welfare

- The present value household budget constraint

$$w_t = \mathbb{E}_t \sum_{j=0}^{\infty} R^{-j}(c_{t+j} - y_{t+j}).$$

- When R falls, if $D^w > D^{c-y}$ ($D^w < D^{c-y}$), then the household's consumption possibilities expand (contract)

- The welfare gain, denoted by Ω, in response to change in R can be approximated as

$$\Omega \approx (D^{c-y} - D^w) \times w \times d \ln R.$$

Household Type and Duration Mismatch

- Classify households (HHs) into three types according to their asset market participation.
  - ▸ Hand-to-mouth: No financial asset, 10% of HHs
  - ▸ Participants: Hold all securities (equity, bond and deposit), 23% of HHs
  - ▸ Non-Participants: Hold only time and/or demand deposits, 67% of HHs

- Duration mismatch of HHs
  - ▸ Asset duration: Participants $>>$ Non-Participants
  - ▸ Net consumption duration: Young $>$ Old
  - ▸ Financial repression hurts majority of HHs, especially young non-participants

# Welfare Cost of 1% of R Decline
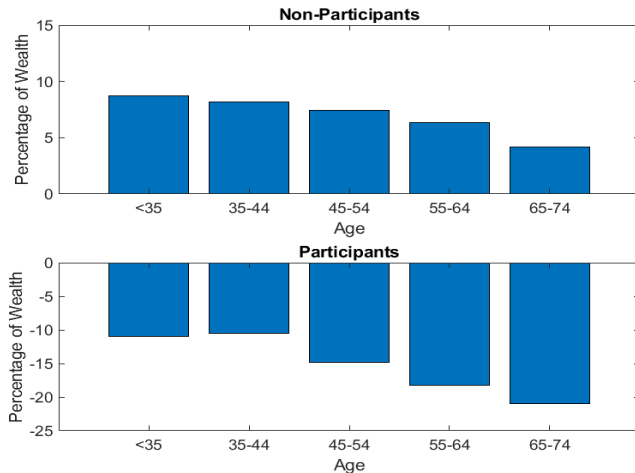
- Young and low income non-participants suffer the most.

Conclusion

- The Japanese government has earned significant excess returns that help explain why it can sustain a high amount of debt.

- In order to earn excess returns, the government implements financial repression, which lowers the real rate by 2%.

- Because of duration mismatch, a decline in real rate
  - expands fiscal capacity greatly
  - causes a large welfare loss for younger non-participants of security markets.

Aging Population Leads to Fiscal Deficit
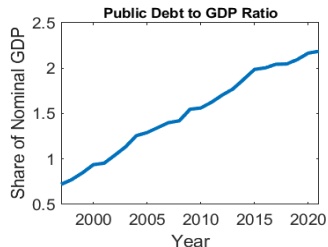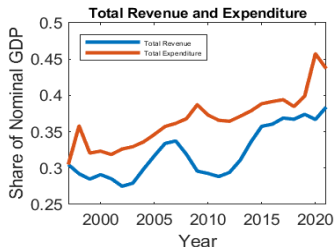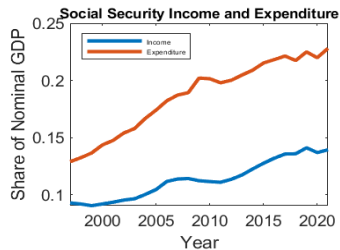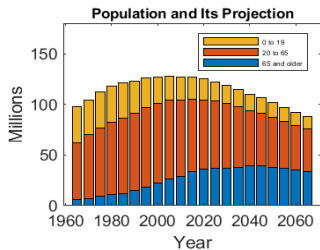
General Government Fiscal Deficits

| % of GDP	Fiscal Deficits	
Periods	Primary Deficits	Total Deficits
1998-2022	5.2%	6.0%
1998-2010	5.6%	6.5%
2011-2022	4.8%	5.4%
Cumulative	**131.0%**	**149.4%**

Main1

Japan is **NOT** in the $r < g$ region

- When $r < g$, the government can run steady-state deficits with constant debt-to-GDP ratios, Blanchard (2019).

$$\frac{G_t - T_t}{Y_t} + \frac{B_t}{Y_t}(1 + r_t) = \frac{B_{t+1}}{Y_{t+1}}(1 + g_{t+1})$$
$$\frac{G - T}{Y} = \frac{B}{Y}(g - r)$$

- Japan is **NOT** in the $r < g$ region. The debt interest rate is low, but the growth rate is even lower.
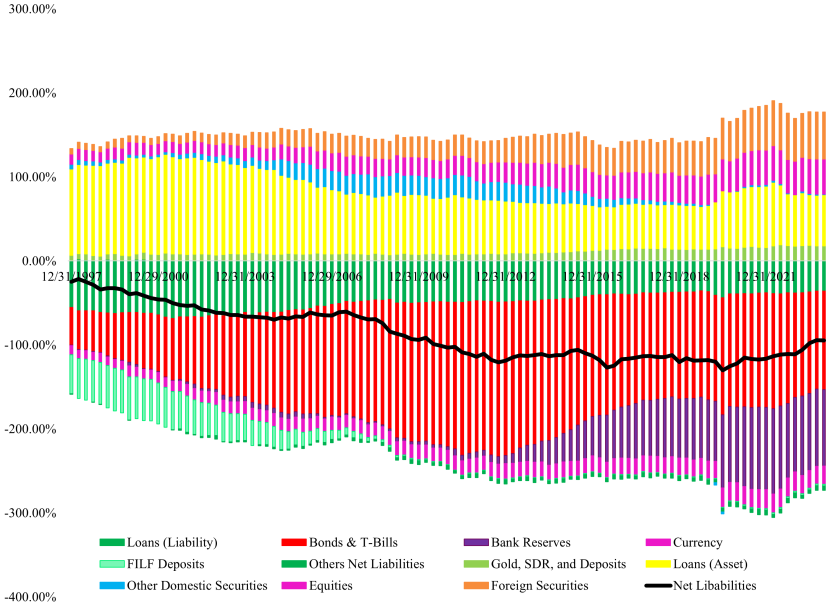
	g	π	r	$r - g$
1997-2023	**0.03%**	**0.20%**	**1.30%**	**1.27%**
2000-2009	-0.33%	-0.26%	1.96%	2.29%
2010-2019	0.56%	0.48%	1.41%	0.84%
2020-2023	0.75%	1.38%	-1.85%	-2.60%

Social Security Funds
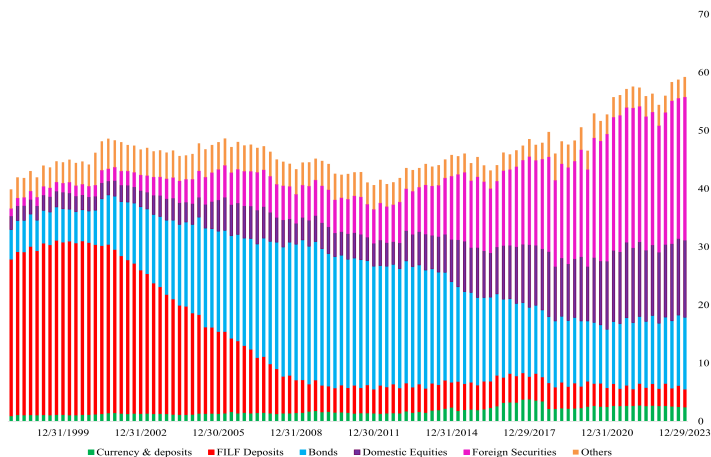
- The 2023 asset position is around 60% of GDP. Portfolio: 25% domestic bond, 25% domestic equity, 25% foreign bond, and 25% foreign equity. (Main1) (Main2)

Consolidated Japanese Government Balance Sheet

Japanese Financial Repression

- Prior to 2001: Cheap funding for government
  - Participation by HHs in capital markets was expensive (Hoshi and Kashyap, 1999)
  - Household savings trapped in deposits:
    - Interest rate ceilings on deposits.
    - Household deposits at Japan Post and pension fund reserves required to fund FILF (Fiscal Investment and Loan Program, a government lending program)

- Post-2001 liberalization: Alternative sources of cheap funding.
  - HH participation rates still low.
  - Replacing FILF deposits with bank reserves at BoJ: BoJ starts large-scale QE (2001) and YCC (2016).
  - Domestic market segmented by large CIP deviations caused by hedging requirement

Main

Measuring the Return Wedge in 2023

- The asset-to-debt ratio in 2023 is around 0.65. The average return numbers suggest that

$$
\begin{aligned}
\mathbb{E}_t R^A_{t+1} &= 3.75\% \\
\mathbb{E}_t R^Y_{t+1} &= 0.45 \times \mathbb{E}_t R^E_{t+1} \\
\mathbb{E}_t R^E_{t+1} &= 5.37\% \\
\mathbb{E}_t R^D_{t+1} &= 0.64\%
\end{aligned}
$$

- The implied return wedge

$$
\begin{aligned}
\omega^{Alt}_t &\approx \left(1 - \frac{A_t}{D_t}\right) \mathbb{E}_t R^Y_{t+1} + \frac{A_t}{D_t} \mathbb{E}_t R^A_{t+1} - \mathbb{E}_t R^D_{t+1} \\
&= (1 - 0.65) \times 0.45 \times 5.37\% + 0.65 \times 3.75\% - 0.64\% \\
&= 2.64\%.
\end{aligned}
$$

Main

Duration Algebra

- Given a sequence of cash flows z_t and a valuation

$$Z_0 = \sum_t R^{-t} z_t$$

- % Change in the valuation is given by:

$$\frac{\partial \log Z_0}{\partial \log R} = -D \equiv \frac{\sum_t R^{-t} z_t \times t}{Z_0}$$

where D is the asset's duration

Long Duration of Surpluses: 53 years

- Fiscal projection by Japan Cabinet Office: Run primary deficits until 2033 and debt-to-GDP ratio in 2033 will be 208%.

- Assume steady-state starting in 2033 with steady-state debt and net debt position unchanged.

- Calculate the required steady-state surplus, S/Y

$$
\begin{aligned}
\left(\frac{D}{Y}\right)_{2033} &= 94.5\% = pd_Y \times \frac{S}{Y}, \\
&= \frac{1}{r^Y - g} \times \frac{S}{Y} = \frac{1}{(0.3\% + 2\% - (0.5\%))} \times 1.7\%.
\end{aligned}
$$

- Then calculate duration for the surplus claim:

$$
D_{2023}^{T-G} = \frac{\mathbb{E}_0 \sum_t R^{-t} t \times (T_{2023+t} - G_{2023+t})}{\mathbb{E}_0 \sum_t R^{-t} (T_{2023+t} - G_{2023+t})} = 52.
$$

- Fully hedged: Net debt would have a duration of 53 years.

Back

Short (Negative) Duration of Net Debt: -43 Years

- Duration of financial instrument: Equity is 76 years, bond is 7 years, loan is 3 years, and deposit (cash and bank reserves) is 1 year (0 year).

- In 2023, the duration of government balance sheet:
  - The duration of its risky asset position is around 29 years. The high duration is mostly due to the equity position.
  - The duration of its liabilities is only 3.6 years.

- The negative duration of net debt (liability - asset):
  - The smaller risky asset position contributes more negative duration than the positive duration contributed by its larger debt.
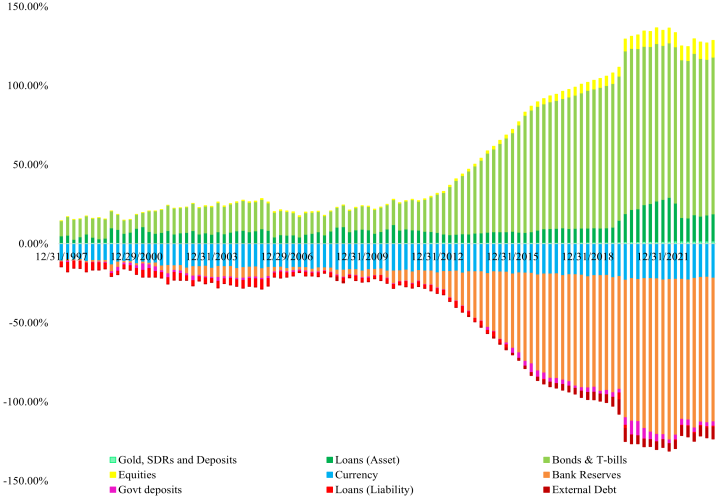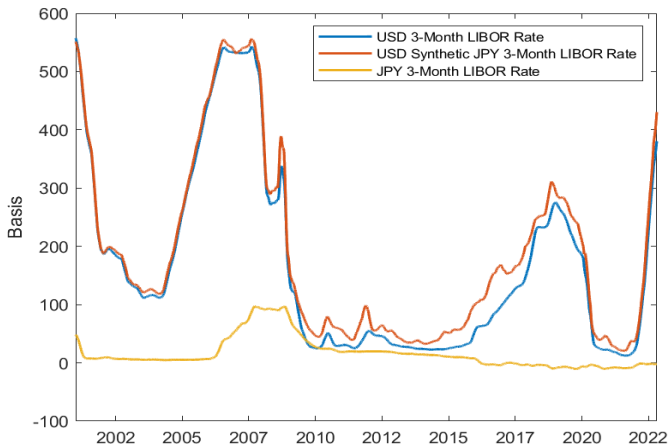
Back

Liabilities of the Public Sector Balance Sheet
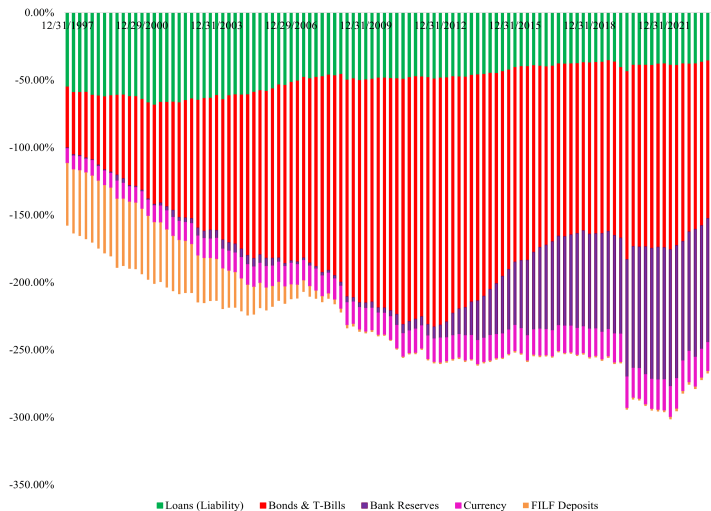
BoJ Balance Sheet

Covered Interest Parity (CIP) Deviation

# Asset Durations and Household Participation Rates

Table: Asset Market Participation Rates (%)

Income Quintile	1st	2nd	3rd	4th	5th	Avg
Financial Assets	80	88	91	94	97	**90**
Demand Deposits	65	74	76	81	86	**76**
Time Deposits	46	55	58	59	70	**57**
Securities (stocks, bonds and trust)	12	19	22	26	37	**23**

- Securities have long durations while deposits do not.
  - The average durations (1997-2021) of stocks and bonds are 76 and 7 years.
  - The durations of demand and time deposits are short (0 and 1 year).

- Limited participation in security markets then implies asset durations are low for the majority of households

D^{c-y} and D^w for Non-participants and Participants
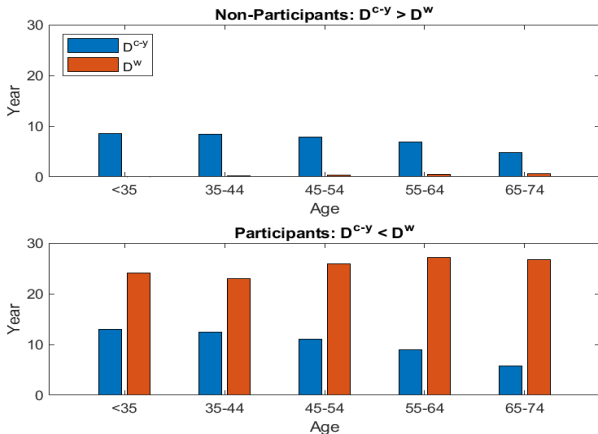
- D^{c-y} declines in age and participation while invariant across incomes
- D^w critically depends on security market participation.