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# Intermediaries and Asset Prices: International Evidence since 1870

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# Motivation

## Prior literature on leveraged intermediary asset pricing:

- Theory
  - Brunnermeier & Pedersen (2009), Geanakoplos (2010), He & Krishnamurthy (2013)
- Empirics
  - Cross section: Adrian, Etula, and Muir (2014), He, Kelly, and Manela (2016)
  - Time-series: Adrian, Moench, & Shin (2014), Muir (2016), Haddad & Sraer (2015)

## This paper:

1. To what extent do leveraged intermediaries matter for asset prices?
  - Just in crisis states?
  - Just for certain asset classes?
  - Just a recent phenomenon?
    - Previous work uses U.S. broker-dealer leverage 1963-2012: limited # of cycles
2. What are the channels through which leveraged intermediary balance sheets are connected to asset returns?
  - Is it simply a spurious correlation, as suggested by Gomes, Grotteria, & Wachter (2019) and Santos & Veronesi (2020)?

# This paper

Using new data on commercial banks and securities dealers in the U.S., U.K., and Japan over the period 1870-2016, we find that:

1. Past-year *asset growth* negatively predicts stock, bond, currency, and real estate returns over the subsequent 1 to 3 years.
  - a) Intermediary asset growth has a *low correlation* with standard macroeconomic & predictor variables
    - Strong predictability after controlling for macro & other variables
    - Works at different horizons from macro variables
  - b) Predictability holds outside of distress periods, in contrast to models featuring nonlinearities during distress
  - c) Intermediaries in global financial centers predict international equity returns

# This paper

2. The power of financial sector balance sheets to forecast asset returns is greater when leveraged intermediaries directly own a given asset.
  - a) New identification strategy using a new historical dataset of individual stock portfolio holdings of individual Japanese banks and securities firms, 1955-2000.
  - b) We show leveraged intermediaries affect the returns of stocks directly held.

**DATA**

# Who are the intermediaries?

- Commercial banks
  - U.S.
    - Large national banks, 1870-2016
  - U.K.
    - London and Scottish clearing banks, 1880-2016
  - Japan
    - Major Tokyo and Osaka banks, 1888-2016
- Securities dealers (securities firms that trade on their own account)
  - U.S.
    - Broker-dealers (from Fed flow-of-funds data), 1952-2016
  - U.K.
    - Bill brokers, 1880-1996
  - Japan
    - “Big 4” (or 6) securities firms, 1916-1990
    - All major domestic securities firms, 1990-2016

# Building aggregate balance sheets

Main goal: make “time-series-consistent” series

- Eliminate compositional shifts so we can compute year-over-year changes
- Chain-link across breaks caused by different data sources

Two approaches:

1. Already aggregated: national statistics covering entire sector

- U.S. National Banks (1870-2016) is already aggregated in the Fed’s historical statistics
- Same with U.S. Broker-Dealers (1952-2016), U.K. Banks (1880-1960, 1971-2016), U.K. dealers (1890-1996), Japan Banks (1888-1939, 1984-2012)

2. We aggregate from individually-collected balance sheets of the largest banks or securities dealers

- e.g. Japan securities dealers (1916 – 1990)
  - “Big 4” (or 6) are Nomura, Yamaichi, Nikko, & Daiwa (plus Fujimoto & Koike pre-1939)
- For mergers: include all major predecessor institutions

# New Historical Data

## 2.1 ALL MEMBER BANKS

### A. TOTAL ASSETS AND NUMBER OF BANKS

[Assets in millions of dollars]

Call date	Total assets	Loans and investments					Reserve with F. R. Banks	Currency and coin	Balances with—		Cash items	Bank premises, etc.	Other real estate	Customers' liability on acceptances	Other assets	Number of banks
		Total	Loans	Investments		Domestic banks			Foreign banks							
				Total	U.S. Govt. securities					Other securities						
1939—Mar. 29	49,645	32,095	13,047	19,048	13,351	5,697	9,112	777	4,403	46	1,481	942	461	107	220	6,331
June 30	51,908	32,603	13,141	19,462	13,777	5,685	10,011	712	4,674	43	2,183	934	452	102	194	6,330
Oct. 2	54,401	33,075	13,470	19,605	13,810	5,794	11,617	774	5,304	40	1,921	932	443	81	215	6,339
Dec. 30	55,361	33,941	13,962	19,979	14,328	5,651	11,604	841	5,506	24	1,807	924	418	108	188	6,362
1940—Mar. 26	56,233	34,163	13,939	20,224	14,421	5,803	12,279	862	5,634	23	1,562	922	404	98	286	6,377
June 29	57,846	34,451	13,969	20,482	14,722	5,761	13,751	789	5,751	16	1,523	917	371	79	199	6,398
Dec. 31	62,658	37,126	15,321	21,805	15,823	5,982	13,992	991	6,185	11	2,784	914	339	83	231	6,486
1941—Apr. 4	63,088	38,983	15,878	23,104	16,988	6,116	13,531	837	6,340	7	1,796	919	331	81	263	6,528
June 30	64,857	40,659	16,729	23,930	18,078	5,852	12,959	999	6,293	10	2,429	913	319	79	198	6,556
Sept. 24	66,497	41,943	17,546	24,397	18,338	6,059	13,246	1,061	6,562	7	2,147	915	305	65	246	6,596
Dec. 31	68,121	43,521	18,021	25,500	19,539	5,961	12,396	1,087	6,246	11	3,383	911	278	72	216	6,619
1942—Apr. 4	67,458	44,287	17,834	26,453	20,449	6,004	12,725	884	6,271	11	1,806	913	268	62	231	6,629
June 30	66,800	46,800	16,928	29,872	24,098	5,774	12,295	1,022	5,770	12	2,622	913	255	39	198	6,647
Dec. 31	84,917	59,263	16,088	43,175	37,346	5,629	13,072	1,019	6,147	13	4,030	904	228	41	201	6,679
1943—June 30	90,821	67,155	14,823	52,332	46,980	5,353	12,093	1,142	5,579	19	3,477	883	194	54	226	6,703
Oct. 18	102,085	78,112	17,716	60,397	55,255	5,142	12,128	1,150	5,789	18	3,508	880	177	49	275	6,724
Dec. 31	99,372	74,258	16,288	57,970	52,948	5,022	12,835	1,132	5,450	20	4,353	861	158	44	261	6,738
1944—Apr. 13	101,943	78,027	16,135	61,892	56,771	5,121	12,497	1,265	5,266	19	3,542	855	146	54	271	6,764
June 30	108,584	83,587	18,084	65,503	60,339	5,164	12,813	1,143	5,799	18	4,025	842	133	51	274	6,773
Dec. 30	118,706	91,569	18,676	72,893	67,685	5,208	14,261	1,271	6,354	17	3,958	817	111	62	286	6,814
1945—Mar. 20	117,081	90,524	17,219	73,305	67,915	5,389	14,605	1,365	5,772	17	3,570	813	106	47	263	6,823
June 30	126,436	99,426	20,588	78,838	73,239	5,599	14,807	1,150	6,486	24	3,299	801	93	41	309	6,840
Dec. 31	138,304	107,183	22,775	84,408	78,338	6,070	15,811	1,438	7,117	23	5,456	788	84	66	338	6,884
1946—June 29	131,400	102,032	23,302	78,729	72,272	6,458	16,001	1,141	5,772	34	5,133	787	80	91	331	6,887
Sept. 30	128,781	99,706	24,775	74,931	68,232	6,699	15,792	1,382	5,660	61	4,870	795	80	96	338	6,898
Dec. 31	127,241	96,362	26,696	69,666	63,042	6,625	16,015	1,576	5,936	56	6,005	789	75	117	311	6,900
1947—June 30	124,797	94,802	28,655	66,146	59,198	6,948	16,040	1,409	5,521	34	5,690	798	74	86	342	6,928
Oct. 6	128,290	97,328	30,738	66,590	59,288	7,302	16,946	1,496	5,993	25	5,135	808	77	119	362	6,929
Dec. 31	132,060	97,846	32,628	65,218	57,914	7,304	17,797	1,672	6,270	25	7,081	820	70	141	338	6,923
1948—Apr. 12	126,675	95,896	33,062	62,834	55,364	7,471	16,750	1,563	5,374	19	5,637	837	72	156	371	6,932
June 30	127,297	95,449	33,871	61,578	54,139	7,439	17,356	1,606	5,419	23	5,899	847	73	192	434	6,925
Dec. 31	131,392	95,616	36,060	59,556	52,154	7,402	20,406	1,486	5,674	29	6,608	872	72	180	450	6,918
1949—Apr. 11	126,350	93,835	34,905	58,930	51,362	7,568	19,186	1,609	5,057	21	5,105	888	74	149	426	6,913
June 30	127,259	95,315	34,456	60,859	53,132	7,727	17,808	1,568	5,065	18	5,965	893	81	135	412	6,903
Nov. 1	131,605	100,888	35,565	65,323	57,052	8,271	16,150	1,538	5,635	49	5,720	911	84	137	493	6,901
Dec. 31	134,431	101,528	36,230	65,297	56,883	8,414	16,429	1,521	6,194	41	7,133	907	84	170	425	6,892
1950—Apr. 24	131,032	101,521	36,785	64,736	55,575	9,161	15,643	1,653	5,288	36	5,313	923	86	147	422	6,891
June 30	133,742	102,745	37,658	65,087	55,759	9,328	15,864	1,358	5,478	50	6,629	925	97	171	424	6,885
Oct. 4	136,176	104,367	41,612	62,755	52,618	10,137	16,536	1,686	5,718	142	6,029	946	99	233	421	6,885
Dec. 30	144,660	107,424	44,705	62,719	52,365	10,355	17,459	1,643	6,868	142	9,413	957	100	209	447	6,873

# New Historical Data

資産	第24期 昭36.9.30	第25期 昭37.9.30	第26期 昭38.9.30	第27期 昭39.9.30
(資産の部)				
流動資産				
現金	160,992	197,620	157,585	138,495
預け金	10,074,513	12,100,344	13,230,276	17,490,570
短期貸付金	1,567,011	6,116,893	4,532,075	11,067,857
関係会社短期貸付金	3,658,391	6,757,448	7,060,176	7,822,246
立替金	2,260,530	3,000,237	3,324,774	2,975,611
顧客への立替金	2,255,245	2,995,816	3,318,971	2,969,555
社内立替金	5,285	4,421	5,803	6,056
顧客への貸残高	9,384,117	7,599,972	4,865,365	6,335,119
前払金	1,411,624	980,526	362,621	507,713
法人税等仮払金	565,056	0	—	—
前払費用	80,513	176,543	333,050	712,400
未収入金	2,700	0	4,400	30,600
未収収益	1,079,782	956,129	773,059	1,174,100
商品有価証券	26,514,522	22,262,643	26,570,926	19,230,672
株券	17,285,943	16,756,736	18,195,034	15,946,912
国債証券	1,240	12	558	2,245
地方債証券	24,110	26,671	21,784	29,865
特殊債証券	925,533	805,257	3,062,093	1,474,028
社債証券	182,351	1,792,569	4,423,277	1,089,970
受益証券	8,095,345	2,881,398	868,180	687,652
信用買証券	289	1,977	1,062	0
発行日取引勘定	25,346	45,144	26,702	22,086
保管有価証券	51,821,999	53,221,284	59,310,031	49,169,121
事故証券支払金	105	425	182	24
有価証券引渡票支払金	18,152	21,402	3,178	3,297
短期差入保証金	3,422,341	2,698,419	2,623,970	2,945,254
現金	575,092	511,238	890,640	451,678
代用有価証券	2,847,249	2,187,181	1,733,330	2,493,576
貸倒引当金	△ 234,489	△ 263,095	△ 137,613	△ 282,908
流動資産計	111,813,494	115,873,911	123,041,819	119,342,257

Nomura Securities,  
Assets, 1961-64

# New Historical Data

## *Balance-Sheet, 31st December, 1883.*

*Dr.*

Capital—200,010 shares £6 each, £3. 10s. paid . . . . .	£700,035	0	0
Reserve . . . . .	104,000	0	0
Short drafts on current accounts . . . . .	8,287	14	0
Liabilities on deposits, loans and re-discounts . . . . .	5,581,566	12	1
Current accounts . . . . .	88,622	8	5
Unclaimed dividend and return of capital . . . . .	2,102	19	10
Rebate on bills on hand . . . . .	11,385	3	0
Balance of profit and loss account as shown below, £45,788. 18s. 3d.; less interim dividend paid in July, £17,500. 17s. 6d. . . . .	28,288	0	9
	<u>£6,524,287</u>	<u>18</u>	<u>1</u>

*Cr.*

Cash at bankers and in hand . . . . .	£234,164	0	5
Bills discounted . . . . .	4,925,642	16	4
Government, Indian, Colonial, Metropolitan Board of Works and Corporation of London securities . . . . .	524,164	2	2
Other investments . . . . .	32,919	14	8
Loan on industrial property and land (freehold), as per last balance-sheet . . . . .	41,372	8	5
Short loans on securities . . . . .	737,963	14	0
Current accounts . . . . .	2,561	2	1
Freehold premises . . . . .	25,500	0	0
	<u>£6,524,287</u>	<u>18</u>	<u>0</u>

Union Discount Company (U.K.), 1883

# New historical data

Three countries (U.S., U.K., Japan):

- Aggregate balance sheets (annual) of:
  - Commercial Banks and Securities Dealers
  - Main variable: **Asset growth** = year-over-year % change total assets
    - Can decompose into: loan growth, securities holdings growth, other asset growth
- Asset returns (real total returns, annual, 1870-2016):
  - Stock index, 10-year government bond, currency carry trade, international equity, residential real estate

Full historical data and code available at:  
[www.financialhistorylab.org](http://www.financialhistorylab.org)

# RESULTS

# Time-series predictability

	Commercial Banks						Securities Firms					
	Stock total real returns			Bond total real returns			Stock total real returns			Bond total real returns		
	1yr ahead	2yrs	3yrs	1yr	2yrs	3yrs	1yr ahead	2yrs	3yrs	1yr	2yrs	3yrs
Asset growth	-0.037**	-0.077***	-0.074***	-0.036***	-0.050***	-0.043**	-0.005	-0.016	-0.045*	-0.017**	-0.033**	-0.044**
	[-2.384]	[-3.376]	[-2.704]	[-3.311]	[-2.904]	[-2.149]	[-0.369]	[-1.074]	[-1.715]	[-2.230]	[-2.162]	[-2.281]
Hjalmarsson <i>t</i> -stat.	[-2.336]	[-3.112]	[-1.758]	[-3.567]	[-2.571]	[-1.917]	[-0.020]	[-0.376]	[-2.018]	[-2.397]	[-0.205]	[-2.331]
Constant	0.052***	0.101***	0.151***	0.021***	0.041***	0.062**	0.054***	0.108***	0.162***	0.024**	0.047**	0.074***
	[4.477]	[4.801]	[5.099]	[2.613]	[2.588]	[2.567]	[3.690]	[4.003]	[4.357]	[2.380]	[2.466]	[2.760]
Adj. R <sup>2</sup>	0.028	0.064	0.045	0.105	0.089	0.041	-0.003	0.000	0.015	0.017	0.033	0.038
N	374	374	374	377	377	377	265	265	265	265	265	265

\* 10%, \*\* 5%, \*\*\* 1% with Driscoll-Kraay standard errors

$$Real\ returns_{i,t+K} = \alpha_i + \beta' x_{i,t} + \varepsilon_{i,t}$$

# **COMPARISON WITH MACROECONOMIC VARIABLES**

# Low correlation of intermediary & macro variables

## Correlations between intermediary and macro variables (after de-meaning each variable by country)

	Banks' asset growth <sub>t</sub>	Securities firms' asset growth <sub>t</sub>
Log real consumption growth <sub>t</sub>	0.203*	0.116
Log real GDP growth <sub>t</sub>	0.289*	0.100
Nonfin. asset growth <sub>t</sub>	0.476*	0.312*
Dividend yield <sub>t</sub>	0.011	0.009
Inflation <sub>t</sub>	0.379*	0.161*
Term spread <sub>t</sub>	-0.066	0.042
Daily volatility <sub>t</sub>	-0.044	-0.143*
Net equity expansion <sub>t</sub>	0.101	0.118
Total mutual fund net inflows <sub>t</sub>	0.137	0.236*
Equity mutual fund net inflows <sub>t</sub>	0.077	0.169
Bond mutual fund net inflows <sub>t</sub>	0.031	0.144
Baker-Wurgler sentiment <sub>t</sub>	-0.108	0.196*

In robustness tests, we show these correlations are even smaller across lags and leads.

# Controlling for macro and nonfin variables

	Stock total real returns						Bond total real returns					
	1yr ahead		2yrs ahead		3yrs ahead		1yr ahead		2yrs ahead		3yrs ahead	
Asset growth	-0.036**	-0.027	-0.072***	-0.073***	-0.093***	-0.094***	-0.040***	-0.047***	-0.060***	-0.067***	-0.062***	-0.070***
	[-2.338]	[-1.435]	[-3.181]	[-2.757]	[-3.095]	[-3.028]	[-3.235]	[-3.543]	[-2.896]	[-3.112]	[-2.720]	[-2.969]
Hjalmarsson <i>t</i> -stat.	[-2.152]	[-1.511]	[-2.267]	[-2.237]	[-2.909]	[-4.783]	[-3.324]	[-3.705]	[-2.598]	[-2.533]	[-2.551]	[-3.082]
Log real consumption growth		-0.036*		-0.027		-0.046		-0.012		-0.009		0.003
		[-1.725]		[-0.665]		[-1.155]		[-0.740]		[-0.286]		[0.066]
Log real GDP growth		0.005		0.016		0.020		0.015		0.002		-0.022
		[0.310]		[0.561]		[0.636]		[1.344]		[0.095]		[-0.966]
Nonfin. asset growth		-0.002		0.001		0.011		0.008		0.018		0.034
		[-0.121]		[0.029]		[0.296]		[0.541]		[0.836]		[1.284]
Constant	0.056***	0.058***	0.110***	0.110***	0.168***	0.170***	0.027***	0.027***	0.053***	0.055***	0.080***	0.085***
	[3.384]	[3.432]	[3.665]	[3.736]	[4.159]	[4.207]	[2.970]	[2.729]	[2.904]	[2.819]	[2.998]	[3.104]
Adj. R <sup>2</sup>	0.026	0.020	0.059	0.045	0.072	0.062	0.150	0.150	0.142	0.135	0.097	0.103
N	178	178	178	178	178	178	178	178	178	178	178	178

\* 10%, \*\* 5%, \*\*\* 1% with Driscoll-Kraay (1998) standard errors

$$Real\ returns_{i,t+K} = \alpha_i + \beta' x_{i,t} + \varepsilon_{i,t}$$

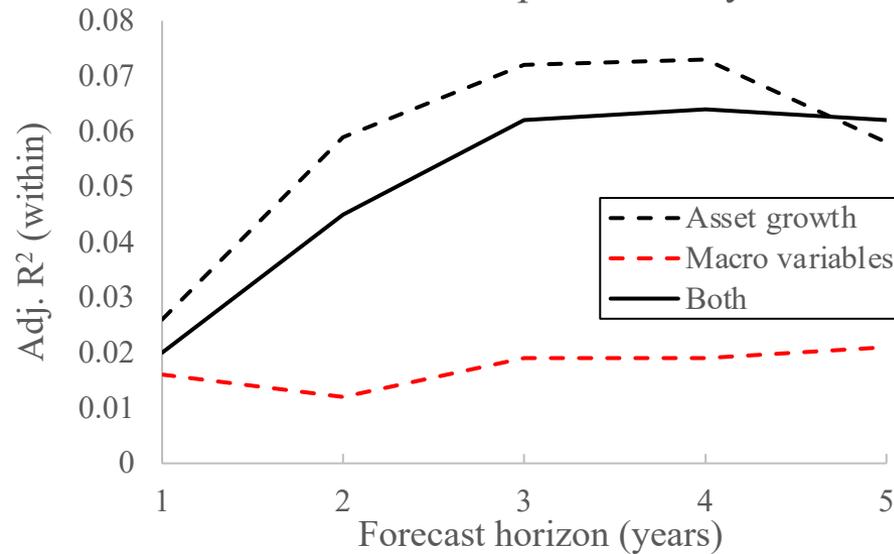
Similar results:

- Using securities firms' asset growth
- When controlling for additional variables (div yield, ... , all the Goyal-Welch variables)

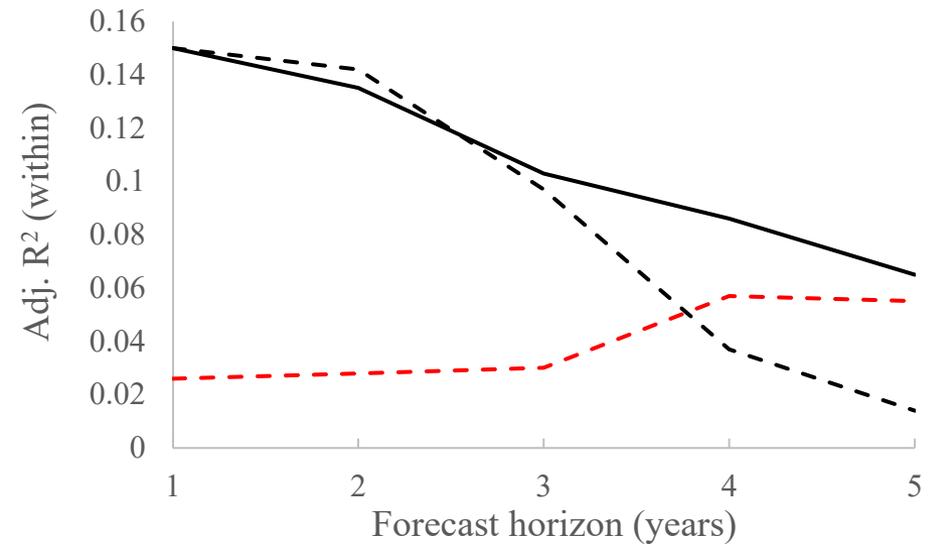
# Intermediary vs. macro variables

Adjusted  $R^2$  from predictability regressions  
at various horizons

Stock return predictability



Bond return predictability



**ROBUSTNESS**

# Robustness

1. Alternative measures of the credit cycle
2. Controlling for lagged asset returns and/or lagged asset returns
3. Subsample analysis
4. Tests for potential small-sample bias
5. Out-of-sample forecasting
6. Other potential channels?
  - a) Equity sentiment?
  - b) Margin debt?
  - c) Forecasting future corporate bankruptcies and distress?

# **EXPANSIONS VERSUS CONTRACTIONS**

# Asset expansion vs. contraction

	Stock index real total returns						Bond real total returns					
	1yr ahead		2yrs		3yrs		1yr ahead		2yrs		3yrs	
Asset growth (below trend)	0.000	0.012	-0.031	-0.025	-0.035	-0.023	-0.026**	-0.025*	-0.027*	-0.022	-0.032	-0.025
	[-0.011]	[0.538]	[-1.051]	[-0.675]	[-0.923]	[-0.529]	[-2.086]	[-1.828]	[-1.666]	[-1.189]	[-1.450]	[-0.967]
Asset growth (above trend)	-0.063***	-0.056**	-0.109***	-0.109***	-0.101**	-0.149***	-0.043***	-0.065***	-0.066**	-0.102***	-0.051	-0.105***
	[-2.965]	[-2.372]	[-3.397]	[-3.245]	[-2.608]	[-3.936]	[-2.768]	[-3.524]	[-2.508]	[-3.138]	[-1.593]	[-2.775]
Log real consumption growth		-0.041**		-0.032		-0.054		-0.015		-0.014		-0.003
		[-2.202]		[-0.843]		[-1.420]		[-0.997]		[-0.490]		[-0.069]
Log real GDP growth		0.000		0.010		0.012		0.012		-0.004		-0.027
		[0.028]		[0.346]		[0.342]		[1.346]		[-0.262]		[-1.252]
Nonfin. asset growth		0.001		0.006		0.017		0.010		0.023		0.038
		[0.064]		[0.158]		[0.471]		[0.641]		[0.948]		[1.327]
Constant	0.072***	0.081***	0.126***	0.140***	0.172***	0.214***	0.026***	0.041***	0.054***	0.082***	0.068***	0.113***
	[5.525]	[4.552]	[5.479]	[4.269]	[5.529]	[4.831]	[3.105]	[3.474]	[3.290]	[3.782]	[2.873]	[3.766]
<i>Diff: above minus below trend</i>	-0.063**	-0.068**	-0.078*	-0.085*	-0.066	-0.126**	-0.017	-0.040*	-0.039	-0.080*	-0.019	-0.080
	[-2.144]	[-2.348]	[-1.722]	[-1.717]	[-1.178]	[-2.132]	[-0.894]	[-1.791]	[-1.237]	[-1.927]	[-0.469]	[-1.514]
Adj. R <sup>2</sup>	0.035	0.030	0.070	0.055	0.050	0.086	0.102	0.167	0.092	0.170	0.038	0.126
N	374	178	374	178	374	178	377	178	377	178	377	178

\* 10%, \*\* 5%, \*\*\* 1% with Driscoll-Kraay standard errors

Robust to other definitions of expansions and contractions (e.g., Reinhart-Rogoff banking crises, NBER/OECD recessions, GDP expansions and contractions)

# **OTHER ASSET CLASSES & INTERNATIONAL ASSET PRICING**

# Other asset classes' predictability

	1yr ahead		2yrs ahead		3yrs ahead	
<b>Dep. var.: Currency carry trade real returns</b>						
Bank asset growth (reserve country)	-0.031*** [-2.849]	-0.029*** [-2.885]	-0.065*** [-3.146]	-0.064*** [-3.304]	-0.085*** [-3.143]	-0.084*** [-3.390]
Log real consumption growth		0.029*** [3.732]		0.053*** [2.914]		0.065*** [3.066]
Log real GDP growth		0.014 [1.241]		0.020 [1.130]		0.007 [0.331]
Nonfin. asset growth		-0.016 [-0.720]		-0.004 [-0.125]		0.006 [0.134]
Constant	0.019* [1.906]	0.020** [2.204]	0.035* [1.814]	0.036** [2.117]	0.050* [1.714]	0.051* [1.954]
Adj. R <sup>2</sup>	0.106	0.106	0.161	0.161	0.162	0.162
N	107	107	107	107	107	107
<b>Dep. var.: Residential real estate real returns</b>						
Bank asset growth	-0.001 [-0.183]	-0.005 [-0.900]	-0.006 [-0.584]	-0.016* [-1.674]	-0.011 [-0.740]	-0.027* [-1.865]
Log real consumption growth		0.018 [1.372]		0.024 [1.080]		0.027 [0.972]
Log real GDP growth		0.000 [-0.033]		0.014 [0.713]		0.030 [1.234]
Nonfin. asset growth		0.007 [0.945]		0.012 [0.886]		0.013 [0.687]
Residential real estate real returns <sub>t-1</sub>	0.362*** [3.253]	0.310*** [2.893]	0.440*** [2.768]	0.354** [2.381]	0.394** [2.051]	0.282 [1.611]
Postwar Japan indicator	0.060*** [3.530]	0.046*** [3.010]	0.142*** [4.803]	0.116*** [4.612]	0.224*** [5.382]	0.191*** [5.343]
Constant	0.001 [0.116]	0.002 [0.350]	0.000 [-0.021]	0.002 [0.203]	-0.001 [-0.069]	0.001 [0.069]
Adj. R <sup>2</sup>	0.227	0.227	0.186	0.186	0.175	0.175
N	233	233	233	233	233	233

# International asset pricing

- Do U.S. and U.K. balance sheet quantities predict international asset returns?
  1. Augment data set with real returns for 32 countries (1920 – 2016)
    - Stock index, government bond, currency carry trade real returns from *Global Financial Data*
  2. Compare U.S. and U.K. balance sheet quantities to “local loan growth”
    - data from BIS, World Bank, and IMF
- Test of the international intermediary asset pricing model of Gabaix and Maggiori (2015)

# International asset pricing

## Stock index returns (32 countries)

	1-year ahead		2-year ahead		3-year ahead	
Local loan growth × PRE-1939	-0.007	-0.008	-0.037***	-0.040***	-0.050***	-0.052***
	[-0.635]	[-0.753]	[-2.665]	[-2.873]	[-2.966]	[-3.117]
× POST-1950	-0.024***	-0.016**	-0.045***	-0.031***	-0.076***	-0.063***
	[-3.320]	[-2.258]	[-4.710]	[-3.244]	[-6.706]	[-5.506]
U.K. banks' loan growth × PRE-1939		-0.052*		-0.103***		-0.200***
		[-1.821]		[-2.726]		[-4.240]
× POST-1950		-0.015**		-0.028***		-0.056***
		[-2.054]		[-2.946]		[-4.878]
U.S. banks' loan growth × PRE-1939		-0.006		-0.011		0.014
		[-0.644]		[-0.839]		[0.907]
× POST-1950		-0.038***		-0.071***		-0.037**
		[-3.459]		[-4.853]		[-2.087]
Constant	0.066	0.032	0.11	0.045	0.153*	0.043
	[1.170]	[0.558]	[1.457]	[0.579]	[1.659]	[0.460]
<i>Diff:</i> post-1950 minus pre-1939 for U.K.		0.038		0.075*		0.144***
		(0.204)		(0.054)		{0.003}
<i>Diff:</i> post-1950 minus pre-1939 for U.S.		-0.032**		-0.060***		-0.050**
		(0.031)		(0.002)		(0.030)
<i>Diff-in-diff:</i> U.K. diff minus U.S. diff		0.070*		0.135***		0.194***
		(0.070)		(0.007)		(0.002)
Adj. R <sup>2</sup>	-0.007	0.004	0.010	0.032	0.030	0.052
N	2565	2565	2581	2581	2529	2529

Similar results for government bond returns in 32 countries

**PREDICTABILITY IS STRONGEST WHEN  
INTERMEDIARIES DIRECTLY HOLD THE ASSETS**

**EVIDENCE FROM INDIVIDUAL JAPANESE EQUITIES  
AND INTERMEDIARIES, 1955-2000**

# Potential channels

1. Direct channel
  - Intermediaries affect returns of stocks directly held
2. Broad channel
  - Intermediary “risk transformation” broadly lower risk premia across all asset classes (not just those directly held)
3. Barometer of investor risk-taking
  - Intermediary balance sheets are simply a good barometer of investor sentiment or underlying investor risk-taking
    - Baron and Xiong (2017), Pflueger, Siriwardane, and Sundaram (2020)
4. Passive view
  - Intermediary balance sheets simply correlated with macroeconomic variables
    - Gomes, Grotteria, and Wachter (2019), Santos and Veronesi (2020)
  - Reverse causality: low discount rates drive asset expansion

# Data on individual Japanese stocks

New database of:

**1. Annual Japanese stock returns (1955-2000)**

- 170 stocks for which we have 20+ years of returns and ownership data

**2. Individual banks & securities firms' individual stock holdings**

- Data available roughly every 4 years (1955-2000) for 23 entities

**3. Total asset (and securities) growth of these 23 major banks and securities dealers**

$$r_{t+h, stock} = \alpha +$$

$$\sum_{bank} [\beta_1 asset\_gr_{t,bank} + \beta_2 ownership_{t,stock,bank} + \beta_3 (asset\_gr \times ownership)] +$$
$$\sum_{secfirm} [\gamma_1 asset\_gr_{t,secfirm} + \gamma_2 ownership_{t,stock,secfirm} + \gamma_3 (asset\_gr \times ownership)]$$



# Ownership by banks and securities firms

Chemicals—249

## Nissan Chemical Industries

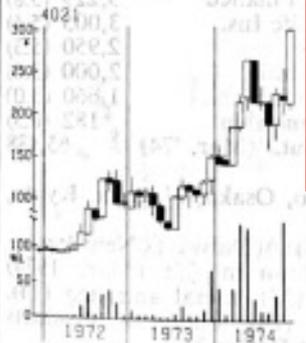
4021  
日産化学工業

Est.: April, 1921 Fiscal (Half) Year Ended: April, October  
 Head Office: 3-7-1, Kanda-Nishikicho, Chiyodaku, Tokyo 101  
 Tel.: 03-295-2311 Telex: 02223071  
 Factory(ies): Toyama (Tel. 07646-6-4111), Sodegaura, Nagoya, Onoda  
 President: Aritsune Kimura  
 Reference(s): Industrial Bank, Fuji, Norin Chukin, Yasuda Trust, Chuo Trust

Capital Change:		
Month & Year	Allotment Ratio	New Capital (¥ mil.)
(May '49	R	230)
Oct. '54	1:1G¥10	2,000
July '57	1:25G	2,080
Jan. '58	1:25G	2,163
May '69	1:1G¥5	4,326
*2nd '75	1:1,PO	

Capital: (¥50 par value) 4,326.4  
 Total Assets: (Oct. '74) 88,549  
 Stockholders' Equity: (Oct. '74) 7,570  
 Employees: (Oct. '74) 2,143  
 Average Age: 39  
 Monthly Starting Pay: (1974) 87,900

No. Stockholders: (Oct. '74)	19,029
Major Stockholders:	(1,000) %
Japan Sec. Finance	8,325 (9.6)
Industrial Bank	4,104 (4.7)
Nomura Securities	2,980 (3.4)
Daiwa Securities	2,217 (2.5)
Nissan M. Life Ins.	2,017 (2.3)
Fuji Bank	2,000 (2.3)
Foreign Ownership	130 (0.2)
No. Shares Out.: (Oct. '74)	86,528



Listed: All markets  
 Underwriter(s): Yamaichi, Nikko

Sales Breakdown in %: (Oct. 1974)  
 Chemicals (30), petrochemicals (32), fertilizers (22), agricultural chemicals (16), Export Ratio: 18%

	Business Results: (¥ mil.)					
	Sales	Current Profit	Profit	Earnings Per Share	Dividend Per Share	Equity
Apr. 1972	22,319	(-)1,090	(-)694	¥(-)8.1	¥—	¥59.7
Oct. 1972	21,945	(-)791	(-)39	(-)0.5	—	59.2
Apr. 1973	26,348	(-)221	86	1.0	—	60.2
Oct. 1973	27,742	806	709	8.2	—	68.1
Apr. 1974	43,168	1,638	1,040	12.0	—	80.1
Oct. 1974	43,455	1,719	641	7.4	2.5	87.5
Apr. 1975*	50,000	1,600	1,000	11.6	2.5	

Dep. var.: Real total return $_{St+h,stock}$	1yr ahead	2yrs	3yrs	1yr ahead	2yrs	3yrs
Asset growth $_{t,bank}$	0.017 [0.41]	0.062 [1.24]	0.046 [0.64]			
Ownership $_{t,stock,bank}$	0.001 [0.07]	-0.010 [-1.11]	-0.030** [-2.31]	-0.004 [-0.57]	-0.018** [-2.04]	-0.038*** [-2.96]
Asset growth $_{t,bank} \times$ Ownership $_{t,stock,bank}$	-0.055 [-0.89]	-0.154** [-2.18]	-0.156** [-2.01]	-0.051 [-1.19]	-0.136** [-2.00]	-0.156** [-1.98]
Asset growth $_{t,secfirm}$	0.191 [1.38]	0.164 [0.93]	0.298 [1.25]			
Ownership $_{t,stock,secfirm}$	-0.018 [-0.53]	-0.039 [-0.85]	-0.033 [-0.57]	0.000 [0.00]	-0.012 [-0.30]	-0.008 [-0.18]
Asset growth $_{t,secfirm} \times$ Ownership $_{t,stock,secfirm}$	-0.346* [-1.87]	-0.605*** [-2.53]	-0.897*** [-3.26]	-0.128 [-1.14]	-0.277* [-1.67]	-0.386** [-2.04]
Constant	-0.057 [-1.05]	0.024 [0.28]	0.152 [1.39]	-0.065 [-1.02]	0.003 [0.03]	0.123 [0.94]
Year fixed effects	No	No	No	Yes	Yes	Yes
Adj. R <sup>2</sup>	0.231	0.275	0.309	0.355	0.357	0.403
# Banks and Securities Firms	23	23	23	23	23	23
# Stocks	170	170	170	170	170	170
N	5131	5131	5131	5131	5131	5131

*Ownership* is an indicator variable of positive ownership by intermediary *i* in stock *s* in year *t*. Also robust to using a continuous ownership indicator.



# Conclusions

- Leveraged intermediary frictions are an important and *universal* driver of time-varying discount rates
  - Intermediary balance sheet variables pick up discount rates in a very general way
    - Not just a U.S. thing
    - Not something that depends on the last 30 years where the financial sector has grown a lot
    - Not just certain asset classes
    - Not just crisis times
  - Intermediary frictions should be a central part of mainstream asset pricing theories

