Introducing and Using the Distributional Financial Accounts (of the United States)

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Federal Reserve Board

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Acknowledgements and Disclaimer

This project reflects the combined efforts of the Flow of Funds and Microeconomic Surveys sections at the Federal Reserve Board.

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Wealth inequality is large and contributes to macroeconomic outcomes

- Wealth inequality increased over the past 30 years
- Increased focus on distributional analysis due to rising wealth inequality and the heterogeneity of the economic recovery.

The Distributional Financial Accounts (DFAs)

- Cross-sectional measures of household balance sheets for four wealth percentile groups each quarter from 1989 to the present.
  - Disaggregated assets, liabilities, and net worth for each group.
  - Levels consistent with FA and distribution consistent with SCF.
  - Present bottom 50, next 40, next 9, and top 1.
- Available for download on FRB website with interactive visualization tool.
- Expanded the DFAs to include the distribution of wealth across income and demographic groups.
- A new resource to (quantitatively) study the evolution of the distribution of household balance sheets at low and high frequencies.

Overview

- Construction
- Results
- Evaluation
- Excess savings exercise

Construction

- Combine two existing FRB data products
  - Financial Accounts (FA): quarterly aggregate household wealth
  - Survey of Consumer Finances (SCF): triennial survey of household balance sheets
- Apply the distributional information contained in the SCF to aggregate wealth in the FA
  - Match each component of FA wealth to an analogous SCF measure (Reconciliation)
  - For each part of the wealth distribution, interpolate and forecast the SCF analog in between SCF waves
  - In each quarter, apply the distribution of the SCF analog to the FA component

Construction: Reconciliation

- For 30% of assets and liabilities (by amount), the SCF "Bulletin" measure aligns well with the FA (e.g. real estate, mortgages, DC pensions, checking accounts)
- Half require significant adjustments to the SCF measure (e.g. assets in trusts and IRAs, valuation of non-publicly traded businesses)
- 20% are not directly measured in the SCF and instead are imputed using related SCF information (e.g. DB pensions, annuities, and insurance)
- The SCF is re-weighted to incorporate the wealth of the Forbes 400

Construction: Reconciliation

Category	Conceptual/practical differences	FA-SCF difference (2019Q3)	Solution
Pensions	FA includes defined benefit (DB) pensions, SCF does not	$16.0T	Estimate DB pension wealth in SCF
Noncorporate Business	FA is book value. SCF is market value.	$-2.5T	Approximate book value in SCF
Real Estate (incl. business)	SCF is self-reported and includes rentals. FA is based on Zillow valuations and excludes rentals	$-4.1T	Move rentals to noncorporate business
Insurance	SCF does not measure asset value of certain types of insurance	$1.7T	Impute insurance holdings in SCF
Liquid deposits	SCF is lower.	$4.5T	Scale SCF assets to match FA aggregate
Consumer durables	FA measure from BEA. Categories don't align but SCF lower, in general.	$2.0T	Scale SCF assets to match FA aggregate
Consumer Credit	FA measures credit card balances, SCF measures revolving debt (i.e. excludes convenience use)	$1.4T	Impute convenience use to SCF by income

Reconciliation - Pensions

- Individual Retirement Accounts and Defined Contribution plans are measured in both data sets, only the latter is included in pension entitlements.
- SCF does not measure asset value of Defined Benefit (DB) pensions, but FA does.

- Use updated methodology from Sabelhaus and Volz (2021)
- Utilize SCF data to impute DB pension reserves to SCF households.
  - SCF collects details of pensions (1) being collected, (2) from past jobs, and (3) associated with current job.
  - For pensions being collected and from past jobs, assume survival and discount rates and directly estimate present value.
  - For pensions associated with current job, use age, years in plan, and wages (plus survival and discount rates) to estimate value.

Reconciliation - Noncorporate Business Equity

- The FA and SCF measure noncorporate business value differently.
  - FA measures businesses at book value, rental properties at market value.
  - SCF measures businesses and rental properties at market value.

- The SCF also captures cost basis, which is valued at about $9.5T in 2019, compared to $19T for net worth of noncorporate businesses.
- The distribution of cost-basis and market values are very similar in the SCF, until the top of the distribution in recent surveys, and their average closely tracks the FA level, so we use their average as our baseline.

Table 2: The Ratio of the Reconciled SCF Household Balance Sheet to B.101.h

	Ratios in SCF Years												Recent Levels ($ billion)	
	1989	1992	1995	1998	2001	2004	2007	2010	2013	2016	2019	Average	FA 2019Q3	SCF 2019
Total Assets	98	91	91	97	108	104	102	106	102	108	101	101	123320	124905
Nonfinancial assets	97	92	91	99	97	105	113	117	115	110	106	104	35323	37416
Real estate (1)	107	105	101	110	105	113	123	131	127	119	114	114	29612	33718
Consumer durable goods (2)	60	48	58	58	64	67	63	62	63	66	65	61	5711	3699
Financial assets	98	91	91	97	114	103	96	100	98	107	99	99	87997	87489
Checkable deposits and currency	65	45	50	85	136	194	809	240	130	145	191	190	807	1545
Time deposits and short-term investments	60	63	59	65	58	63	51	54	42	47	45	55	9761	4436
Money market fund shares	83	80	76	59	72	101	71	93	133	128	102	91	1964	2006
U.S. government and municipal securities	70	53	54	54	106	95	94	72	81	101	77	78	4380	3388
Corporate and foreign bonds	88	51	27	31	69	61	60	45	64	108	95	64	806	765
Other loans and advances	333	123	186	63	62	43	34	52	71	54	62	98	788	485
Mortgages	110	94	91	84	97	97	102	96	177	275	155	125	81	126
Corporate equities and mutual fund shares	144	120	121	132	187	142	112	128	111	128	110	130	27010	29812
Life insurance reserves**	100	100	100	100	100	100	100	100	100	100	100	100	1719	1719
Pension entitlements (3)	101	100	100	100	100	100	100	100	100	100	100	100	27166	27145
Equity in noncorporate business (5)	106	93	80	86	99	93	99	125	115	134	121	105	12259	14799
Miscellaneous assets**	101	101	100	100	101	100	100	100	101	100	100	100	1257	1263
Total Liabilities	79	80	79	86	81	88	83	88	87	88	92	85	15305	14028
Home mortgages (5)	81	84	84	93	89	94	87	92	95	95	103	91	10415	10743
Consumer credit	59	57	55	60	52	59	65	69	59	68	66	61	4117	2727
Depository institution loans n.e.c.	1897	3134	278	210	470	-3153	216	89	95	36	33	300	256	85
Other loans and advances	99	99	99	97	99	99	98	90	98	99	91	97	480	437
Deferred and unpaid life insurance premiums	102	102	99	100	99	99	99	98	98	99	98	99	37	36
Net worth	100	93	93	99	112	107	106	109	105	111	103	103	108015	110877

Notes:
(1) All types of owner-occupied housing including farm houses and mobile homes, as well as second homes that are not rented, vacant homes for sale, and vacant land. At market value.
(2) At replacement (current) cost.
(3) Includes public and private defined benefit and defined contribution pension plans and annuities, including those in IRAs and at life insurance companies. Excludes social security.
(4) Net worth of nonfinancial noncorporate business and owners' equity in unincorporated security brokers and dealers.
(5) Includes loans made under home equity lines of credit and home equity loans secured by junior liens.

Estimation

- Challenge:
  - SCF provides measures of wealth distribution, but only observed at a low frequency.
- Goal:
  - Measures of wealth distribution at quarterly frequency.
- Solution:
  - Estimate SCF balance sheets for each wealth group in quarters when SCF is not observed using standard temporal disaggregation techniques.

Construction: interpolation and forecasting

- We employ the "temporal disaggregation" method of Fernandez (1981) to construct quarterly DFA data:
  - Extension of Chow and Lin (1971)
  - Estimate the relationship between the triennial SCF and quarterly indicator series (currently 11 overlapping observations)
  - Use these relationships to fill in distributions between SCF waves for each asset and liability, for each wealth and demographic group
  - Indicator series: relevant FA series level, SP 500, Fed Funds rate, home prices and ownership, etc.
- Allows consistent methodology for all estimated quarters (i.e. not 3rd quarter of SCF survey year)

Indicator Series

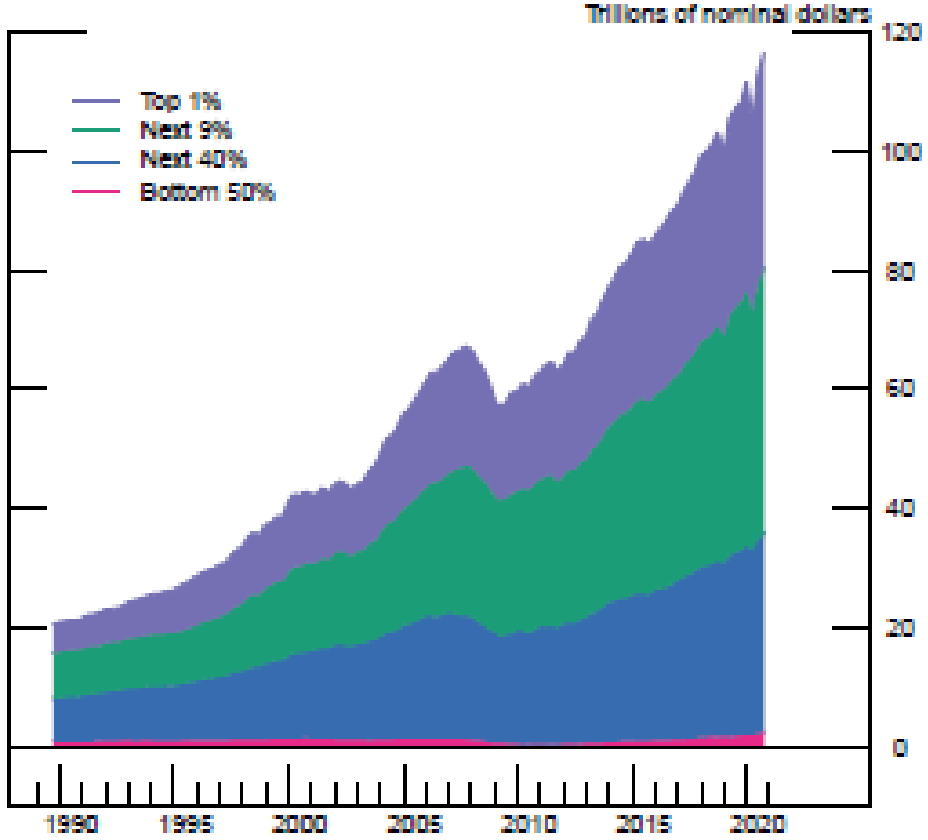
Indicator Series Used in Estimating Household Balance Sheets

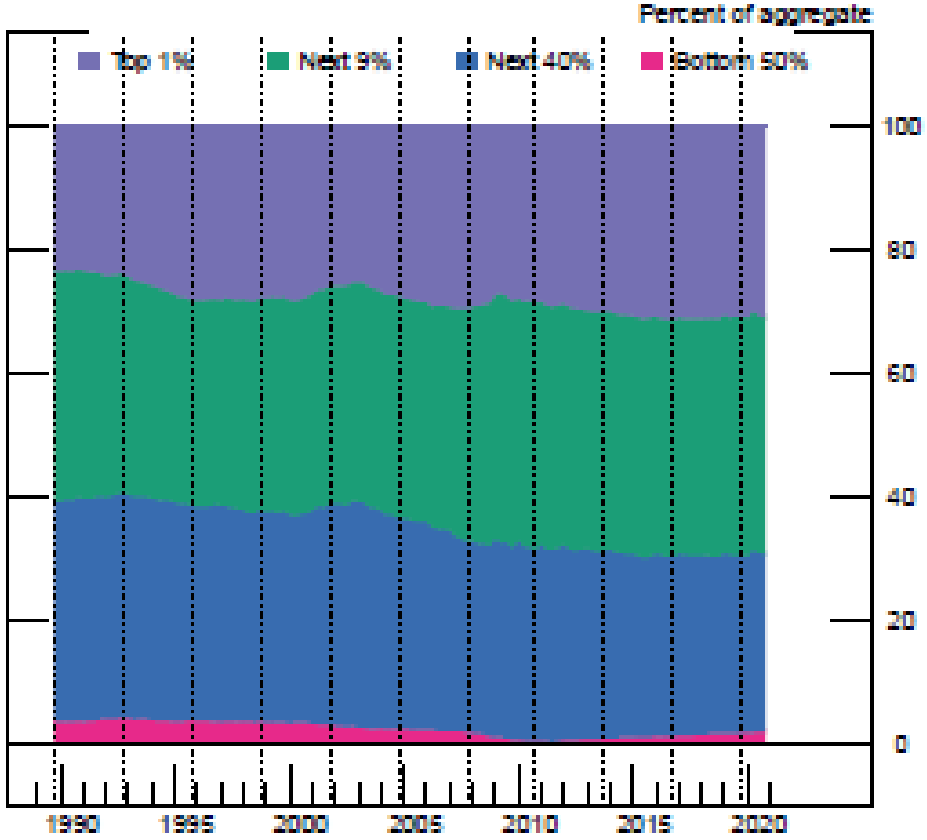
Balance Sheet Item	FA Series	S&P 500	FHFA Index	Home Ownership Rate	DB-DC Ratio	Fed Funds Rate	Vehicle Loans	Student Loans	DTI Ratio	NYSE Volume
Real Estate	X		X	X						
Consumer Durable Goods	X	X		X						
Financial Assets	X	X								
Checkable Deposits and Currency	X	X				X				
Time Deposits	X					X				
Money Market Fund Shares	X					X				X
US Government and Municipal Securities	X	X				X				
Corporate and Foreign Bonds	X	X				X				
Loans	X	X								
Other Loans and Advances	X	X				X				
Mortgages	X	X				X				
Corporate Equities and Mutual Fund Shares	X					X				X
Life Insurance Reserves	X	X				X				
Pension Entitlements	X	X			X	X				
Equity in Noncorporate Business	X	X				X				
Miscellaneous Assets	X	X				X				X
Home Mortgages	X			X					X	
Consumer Credit	X	X					X	X	X	
Depository Loans N.E.C.	X	X					X			
Other Loans and Advances	X	X							X	
Deferred and Upaid Life Insurance Prem.	X	X							X	

Final step: Scale to match FA aggregates

- We apply the above procedure to each balance sheet line for each wealth group.
- Recover levels of each balance sheet item in each quarter from 1989Q3 to present.
- Calculate share of each balance sheet item for each wealth group.
- Multiply shares by aggregate balance sheet line from FA to generate holdings for each group that are consistent with aggregate measure.

Results – Net Worth





Results – Selected Assets

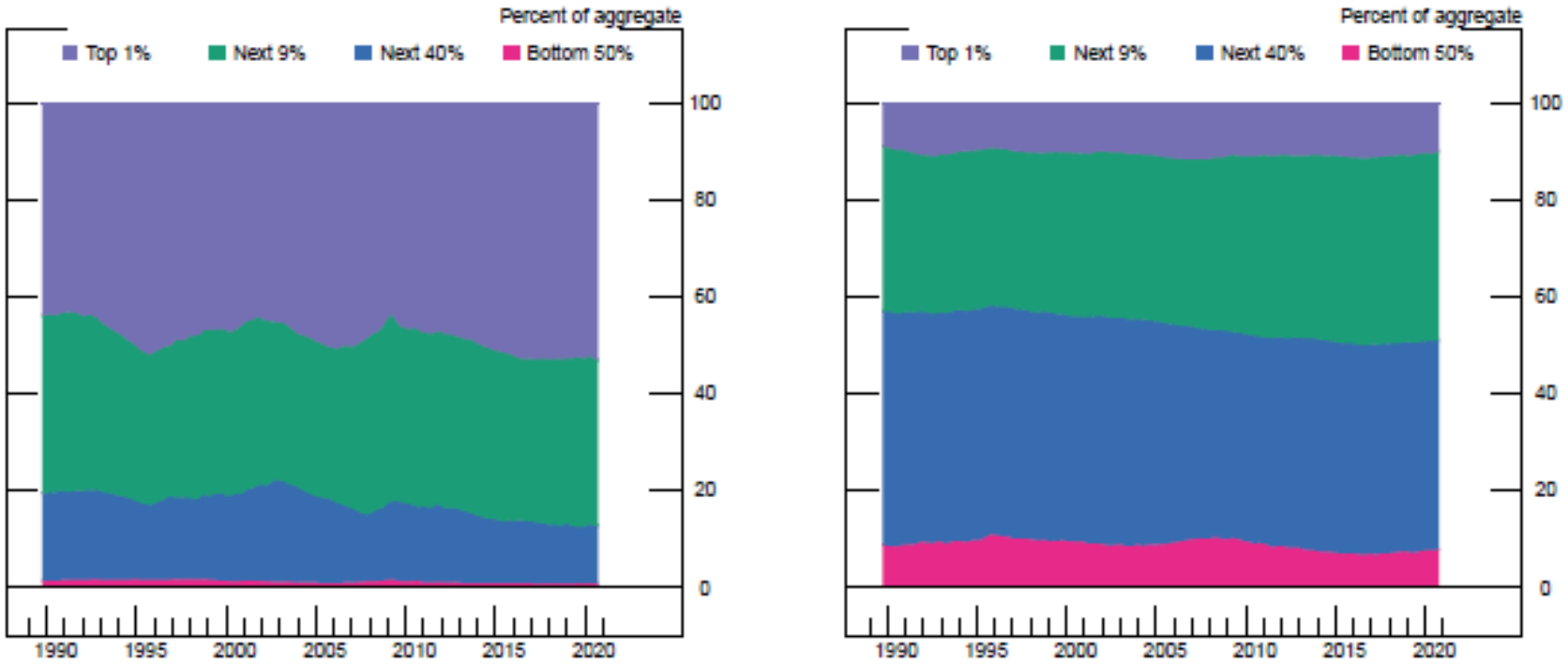


Figure 2: Business Equity (left), Pensions and Real Estate (right)

Evaluation: Temporal Disaggregation

Table 3: Deviation from DFA Wealth Distribution

SCF Year	Method	Top 1	Next 9	Next 40	Bottom 50
2001	Excluding this SCF	27.45%	34.60%	34.76%	3.19%
	Baseline	25.95%	35.20%	35.71%	3.14%
2004	Excluding this SCF	27.01%	36.86%	33.52%	2.61%
	Baseline	27.67%	35.80%	34.08%	2.45%
2007	Excluding this SCF	30.67%	37.49%	30.81%	1.03%
	Baseline	29.68%	37.62%	30.80%	1.90%
2010	Excluding this SCF	27.27%	38.62%	33.05%	1.07%
	Baseline	28.79%	39.81%	30.84%	0.56%
2013	Excluding this SCF	31.11%	38.30%	29.97%	0.61%
	Baseline	30.43%	38.52%	30.17%	0.88%
2016	Excluding this SCF	30.65%	38.54%	29.29%	1.52%
	Baseline	31.74%	38.32%	28.70%	1.24%

Notes: This table shows the DFA wealth shares for SCF periods and the wealth share predicted when that SCF is omitted.

Evaluation: SCF Comparison

				SCF Wealth Breakdown	
		Baseline	SCF Levels	Directly Measured	Indirectly Measured
Years	Wealth Group	(1)	(2)	(3)	(4)
1989-1999	Bottom 50	4.0	4.4	3.5	7.6
	Next 40	35.0	34.8	34.7	38.0
	Next 9	34.8	34.6	34.9	33.6
	Top 1	26.3	26.1	26.9	20.8
2000-2009	Bottom 50	2.4	3.5	1.8	7.3
	Next 40	33.2	32.8	32.0	42.6
	Next 9	36.7	36.2	36.5	35.6
	Top 1	27.7	27.4	30.0	14.6
2010-2019	Bottom 50	1.0	2.1	0.2	5.9
	Next 40	29.7	29.3	28.4	39.6
	Next 9	38.4	37.6	38.8	38.7
	Top 1	31.0	30.9	32.6	15.8

Indirectly Measured: DB pensions, annuities, life insurance, misc. assets, other loans and advances, unpaid life insurance premiums

Evaluation: DFA-SCF crosswalk

Table D.1: SCF to DFA Steps

	Top 1	Next 9	Next 40	Bottom 50
2016 SCF Bulletin	38.6%	40.1%	20.2%	1.0%
Add DB assets	33.5%	39.6%	25.3%	1.6%
Average cost basis and market value for noncorp bus	32.3%	40.1%	26.0%	1.6%
Add life insurance and annuities	31.6%	40.4%	26.3%	1.7%
Remove SCF misc assets	31.3%	40.2%	26.6%	1.9%
Scale DC assets to FA, include CC convenience use	30.6%	40.6%	27.0%	1.8%
Scale remaining categories to FA levels	30.0%	41.3%	27.6%	1.1%
Add wealth of the Forbes 400	31.6%	40.4%	26.9%	1.1%

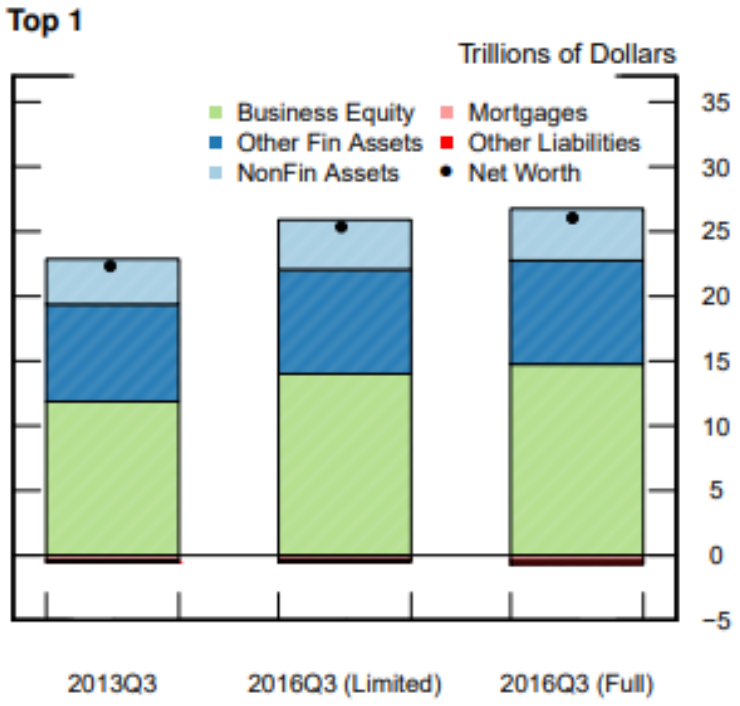
Evaluation: Standard Errors

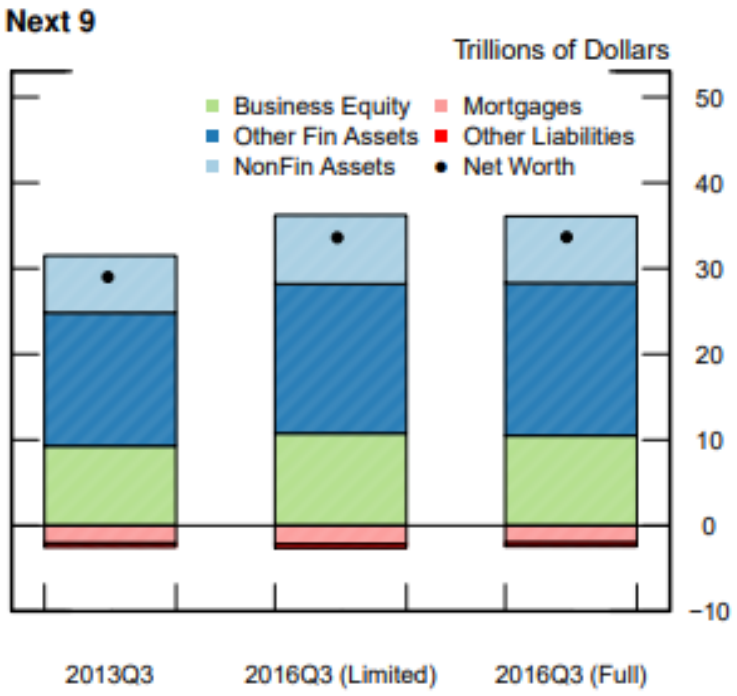
- Only incorporates SEs from SCF sampling and imputations

Table 3: Average Net Worth Shares and Standard Errors from 999 Bootstrap Samples for Each Wealth Group in Selected SCF Years

		Wealth Groups			
Year		Top 1% (1)	Next 9% (2)	Next 40% (3)	Bottom 50% (4)
1989	Share (%)	23.2	37.4	35.6	3.7
	s.e.	1.7	2.1	2.5	0.4
1998	Share (%)	27.4	34.5	34.7	3.4
	s.e.	0.9	0.7	0.8	0.2
2007	Share (%)	29.3	38.4	30.8	1.4
	s.e.	0.9	0.7	0.6	0.2
2016	Share (%)	31.0	39.3	28.7	1.0
	s.e.	0.8	0.8	0.6	0.1

Evaluation: out of sample prediction (2016)





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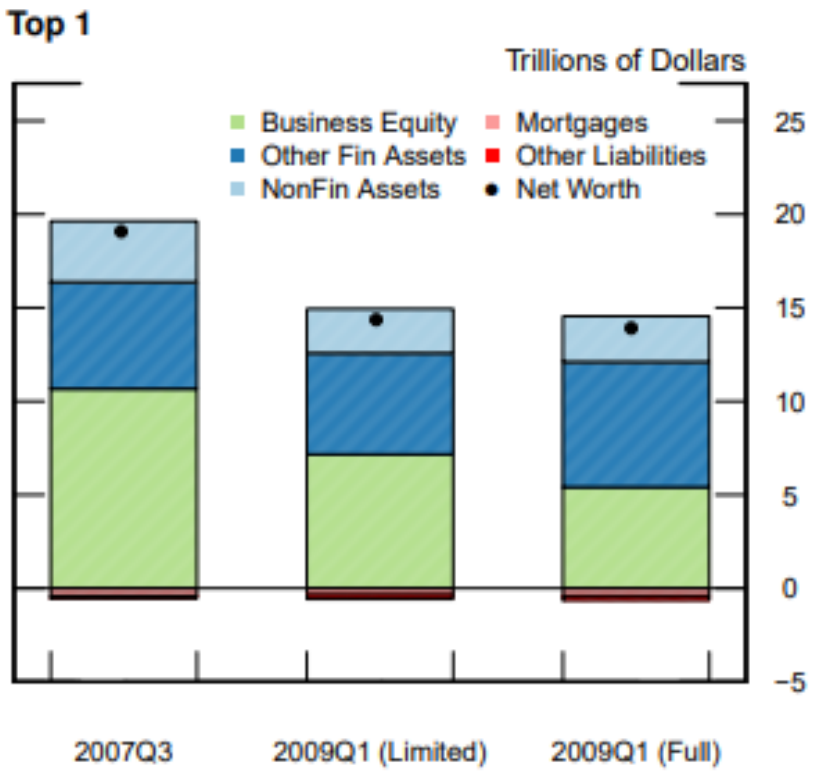
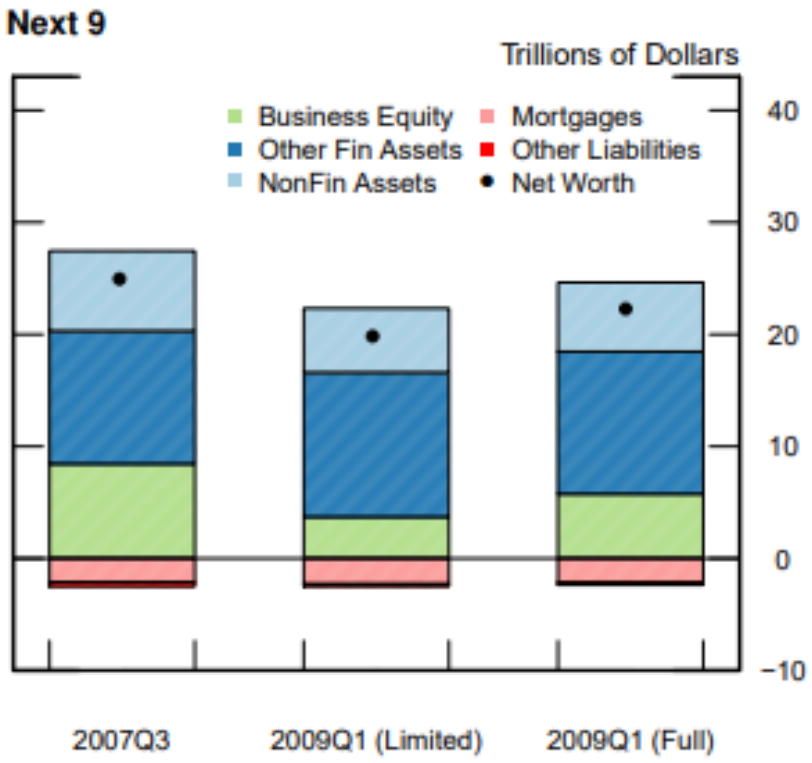




Comparison: World Income Database

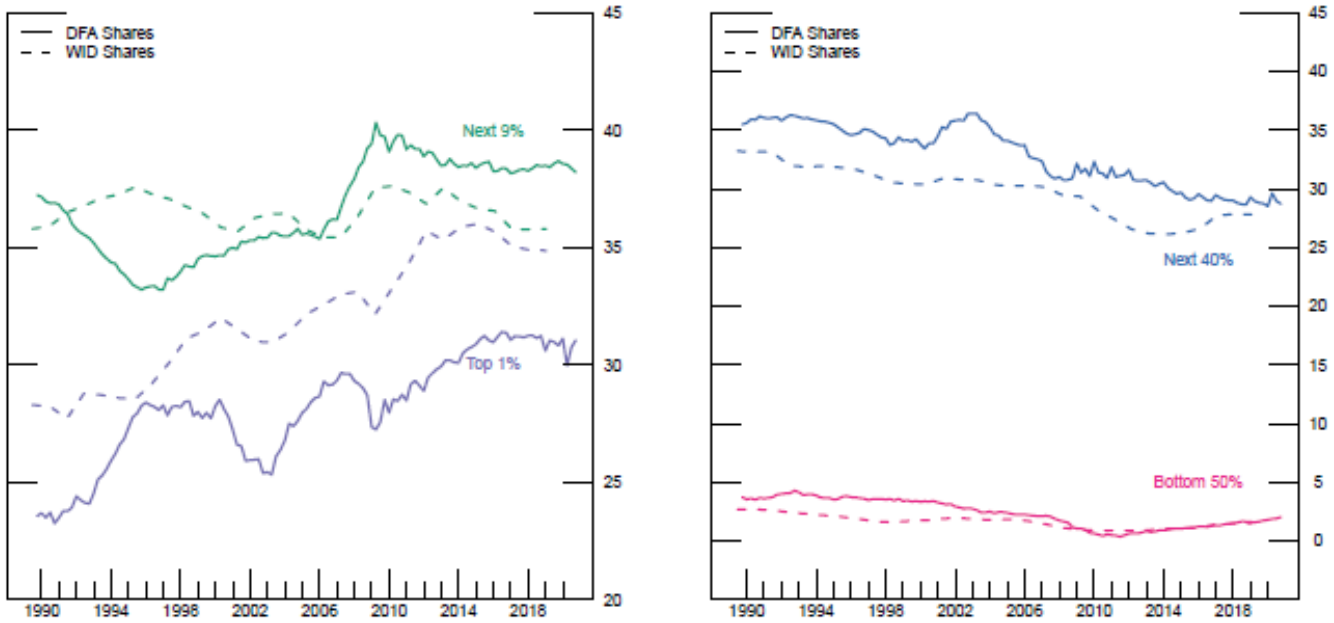
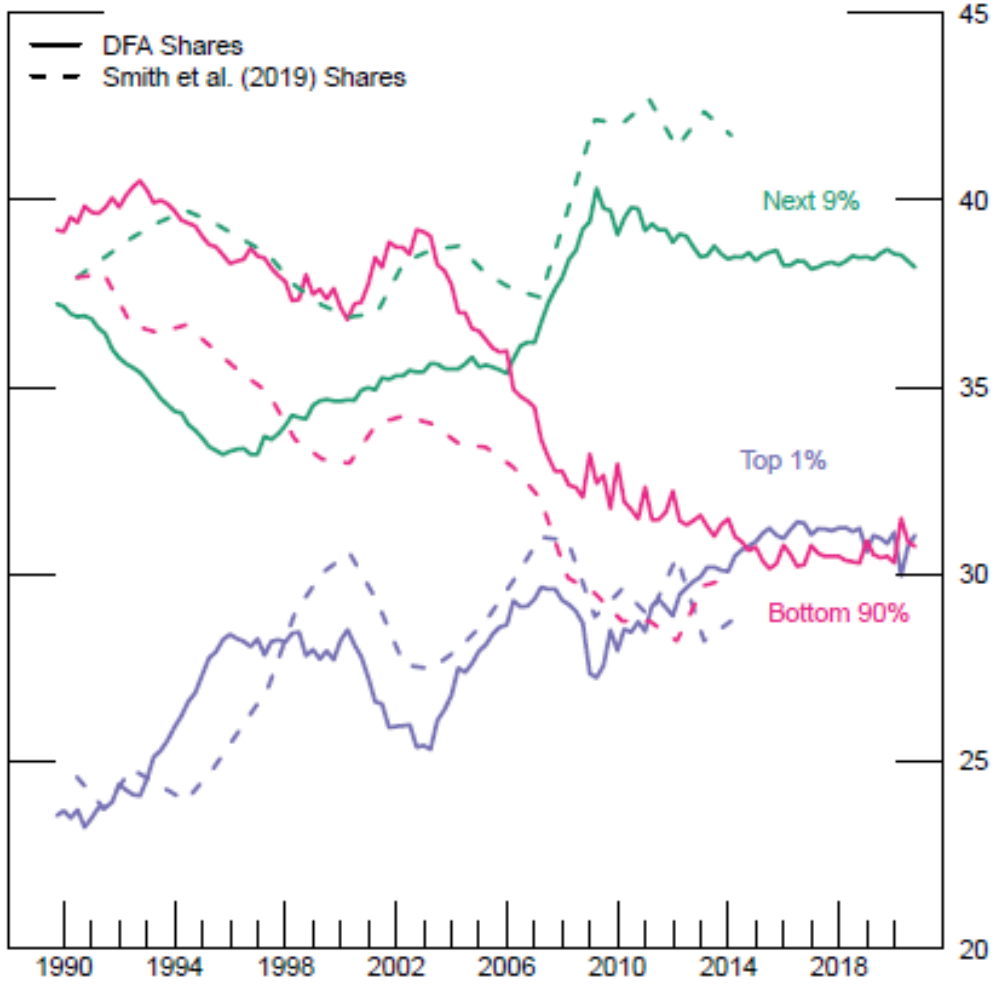
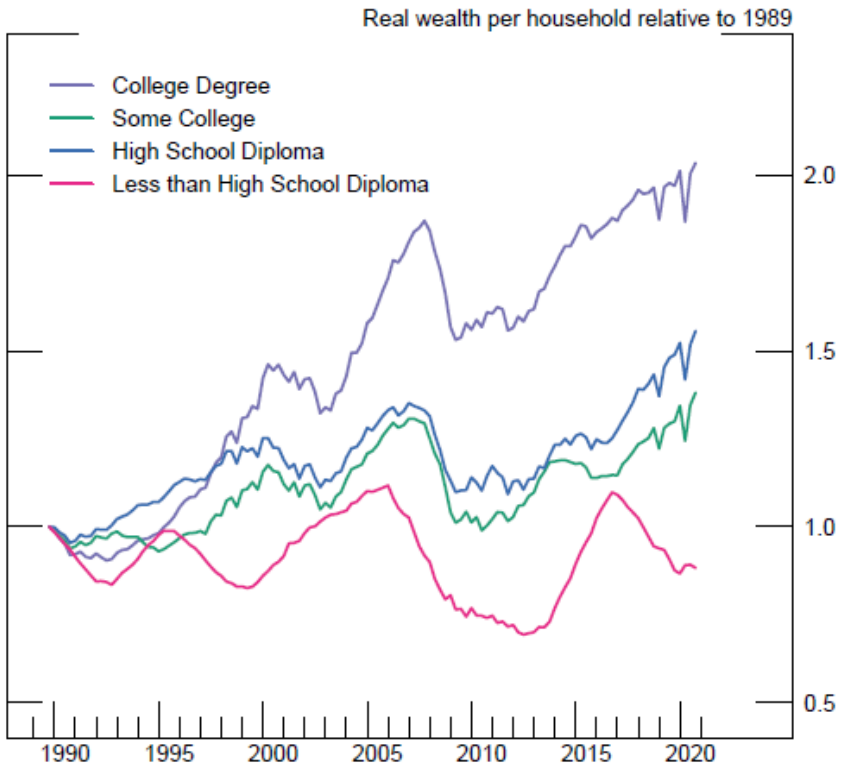


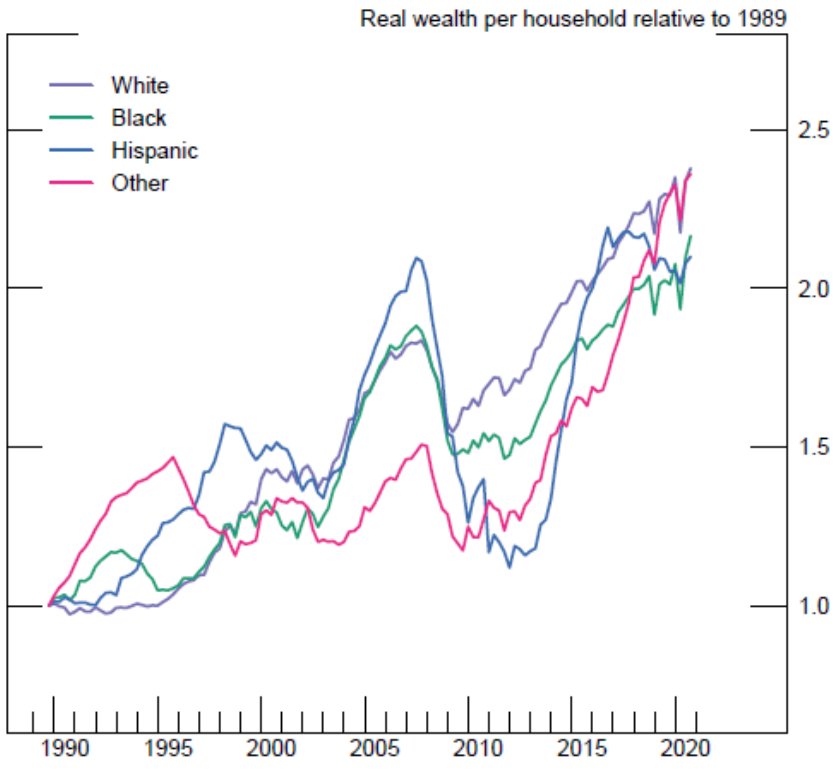
Figure 3: Wealth Shares from the DFA and WID

Comparison: Smith, Zidar and Zwick (2019)

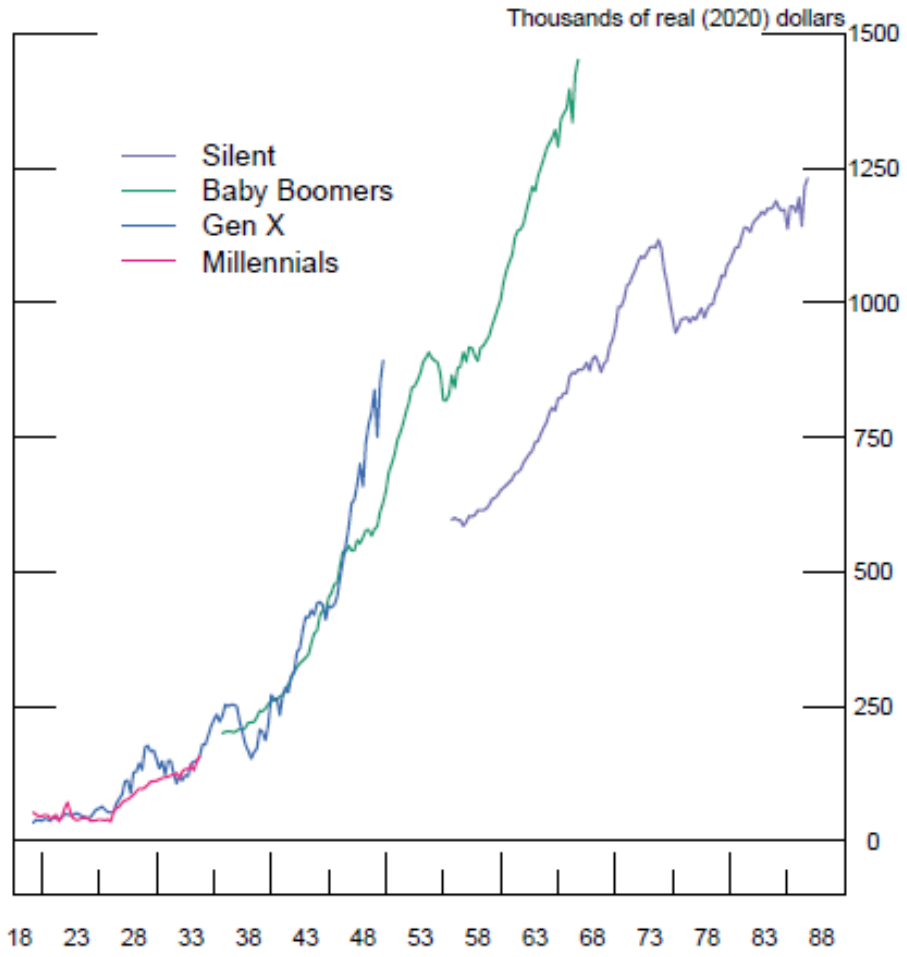


Results: by Education and Race





Results: by Generation



Recent activity

- Release top 0.1 wealth share
- Release public version of code
- Model testing – choice of indicator series
  - For example, house price indexes for big cities or where prices appreciated the most (or where wealthy households live) to better capture dynamics of the mid-00s. Of course, challenge is whether ideal identifier series is notably different in pandemic.

Comparison with DWA of ECB

- Higher coverage of wealthiest households in SCF – so minimal adjustment in DFA. In each year, wealthiest in SCF is greater than minimum for *Forbes* inclusion in Top 400.
- DFA have more surveys with which to create an interpolation
- Small, miscellaneous assets assigned using household characteristics (full household balance sheet from FA is allocated)

Comparison with DWA of ECB

- Currently only reporting group shares and thresholds that divide groups (for income and wealth rankings)
- We have not shocked the source data or changed chosen parameters
- DWA adjustments for notable underreporting of liquid assets more advanced
- Housing much more straight-forward than DWA. Much improved comparison between SCF and FA due to recent shift of FA to estimating owner-occupied housing based on Zillow rather than perpetual inventory

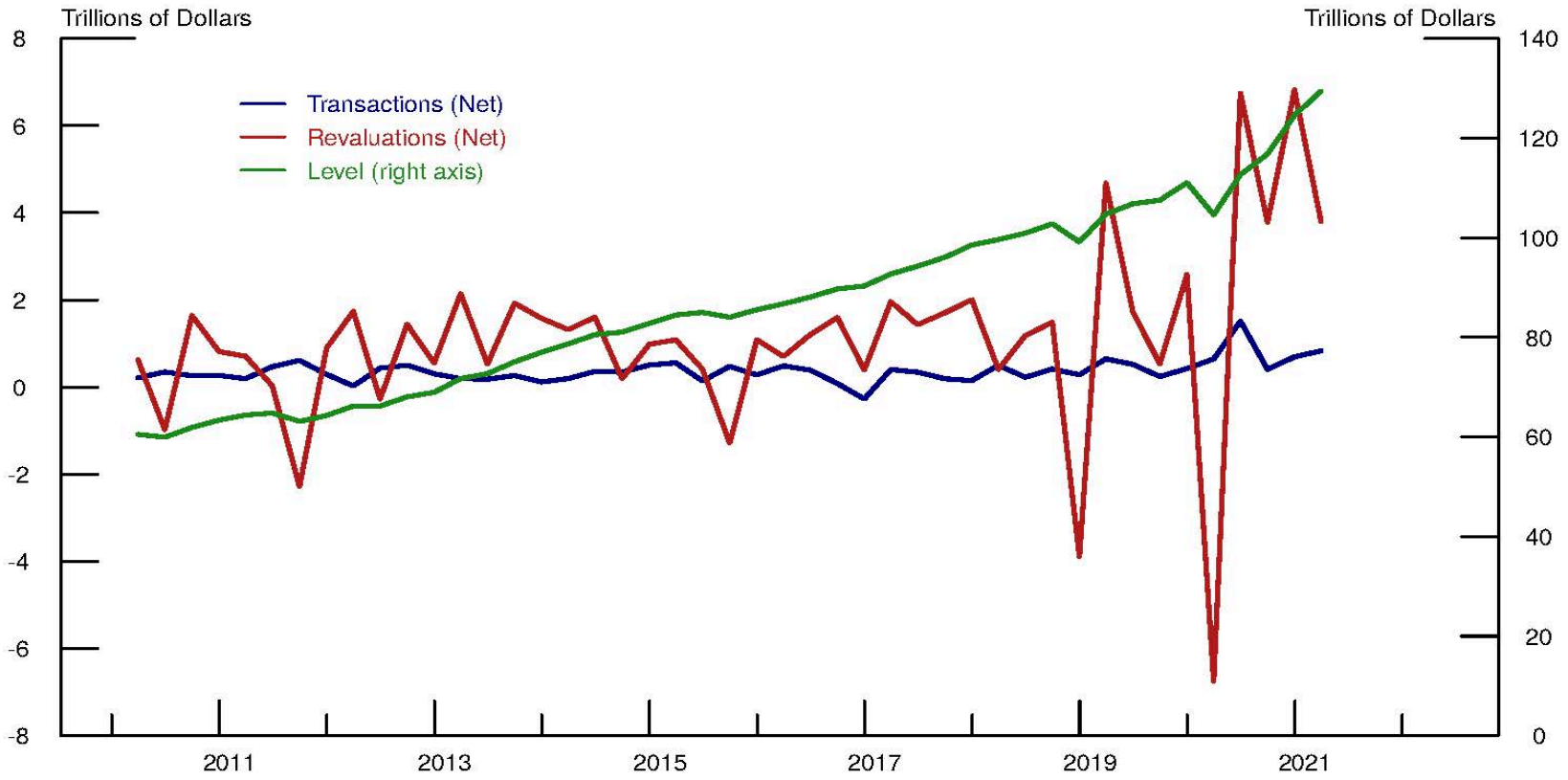
Wealth Inequality and COVID-19: Evidence from the Distributional Financial Accounts

Michael Batty, Ella Deeken and Alice Henriques Volz

Household balance sheets during pandemic

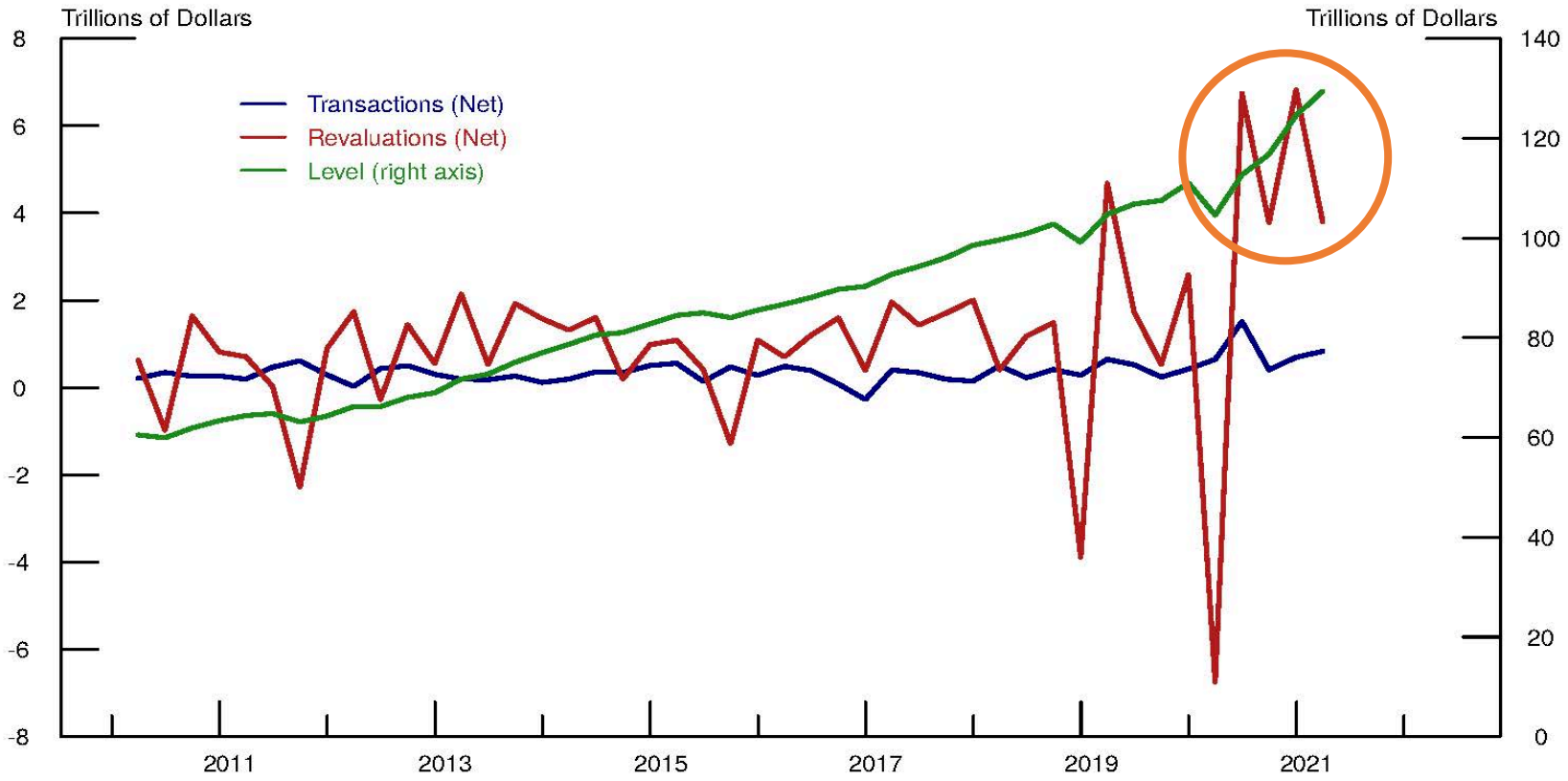
- Significant fiscal support for households
  - Expanded UI
    - Eligibility
    - Increased benefits
    - Increased duration
  - Stimulus payments in three rounds (not for top incomes)
- Recession followed by rising asset prices during second half of 2020

Aggregates from the Financial Accounts



Source: Financial Accounts of the United States. Note: The level of household net worth is plotted on the right axis, and the major sources of wealth change are plotted on the left axis. Transactions represent the net savings from flows into and out of each asset and liability. Revaluations represent the effect of changes in market prices. Omitted from this figure are other changes in volume, which are typically account for a much smaller portion of wealth change, and capture things like changes in valuation methodology and the depreciation or destruction of real assets.

Aggregates from the Financial Accounts



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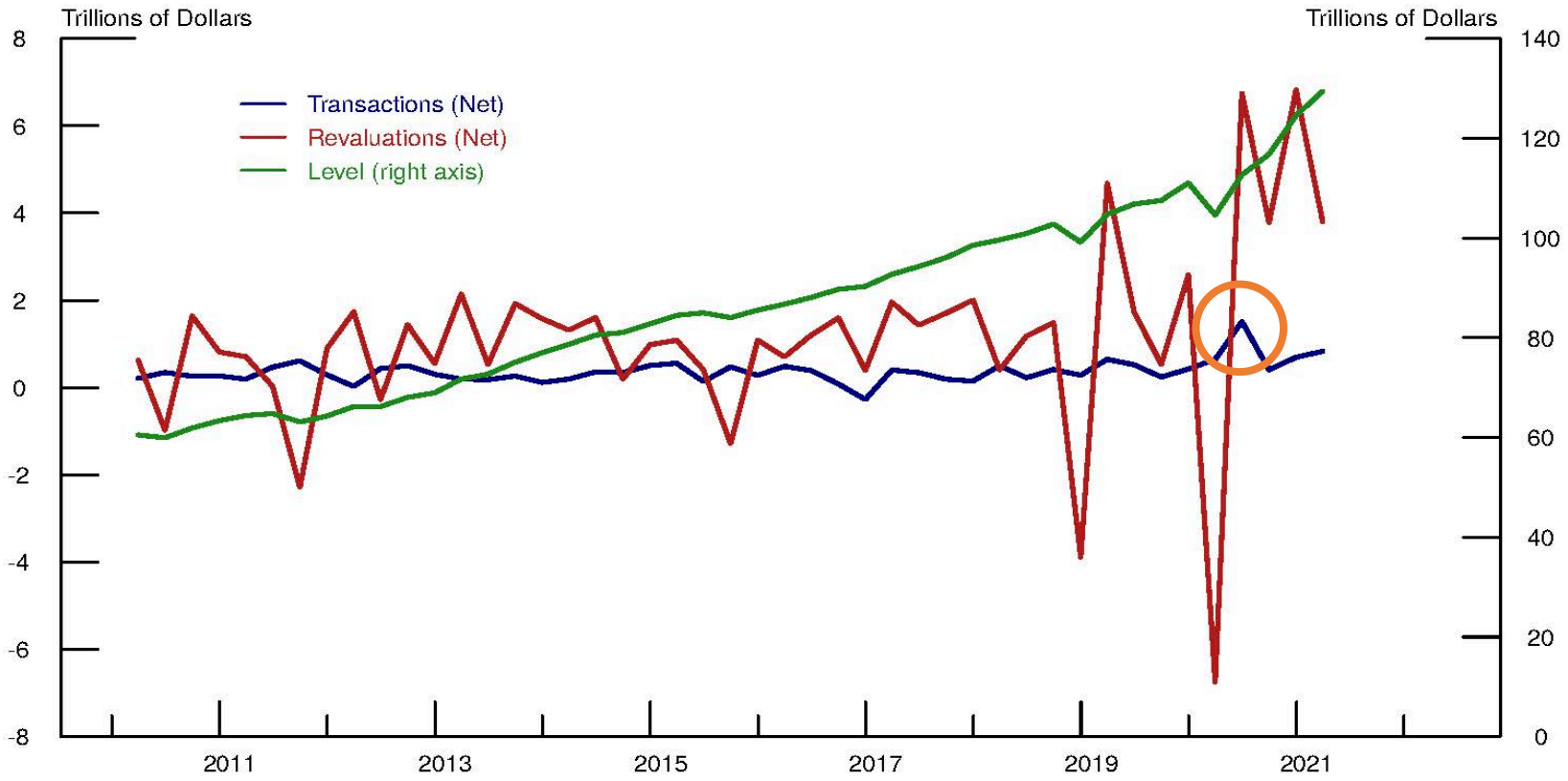

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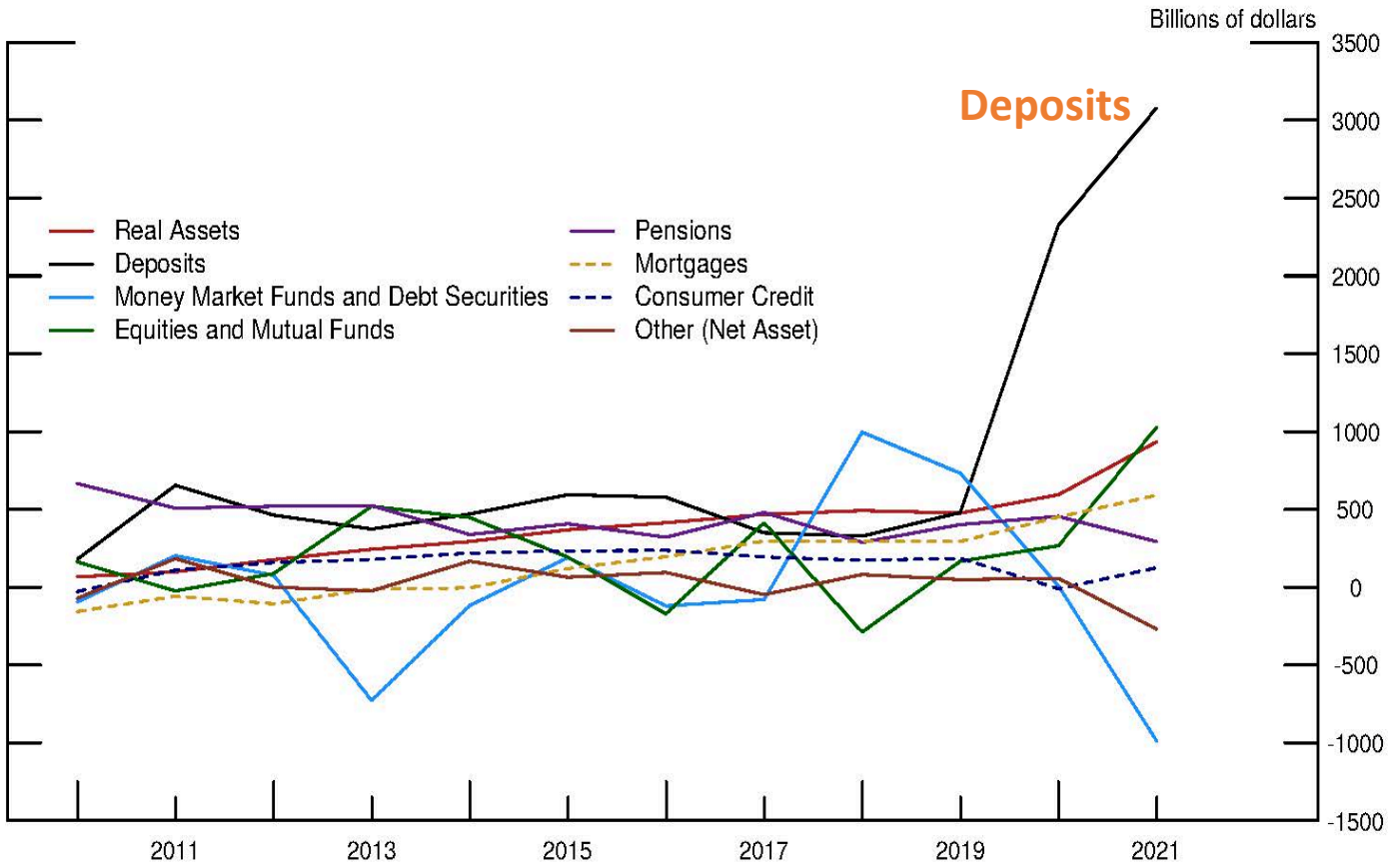
Components of Net Transactions

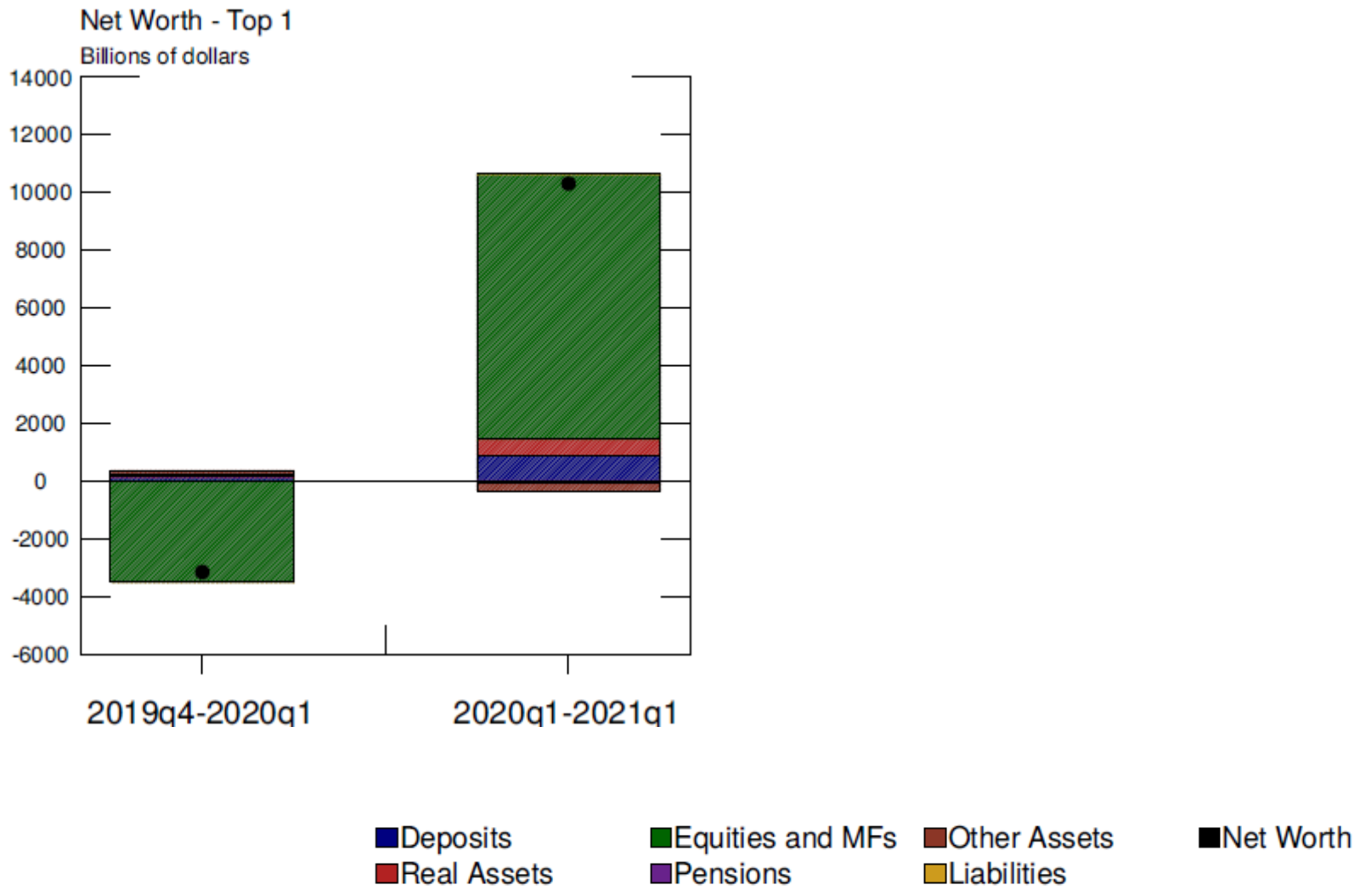


Source: Financial Accounts of the United States. Note: Figure 2 breaks down the flows shown in Figure 1 by major asset and liability category.

Interpolation and Forecasting

- Forecasting reflects historical relationships

Baseline DFA results during pandemic



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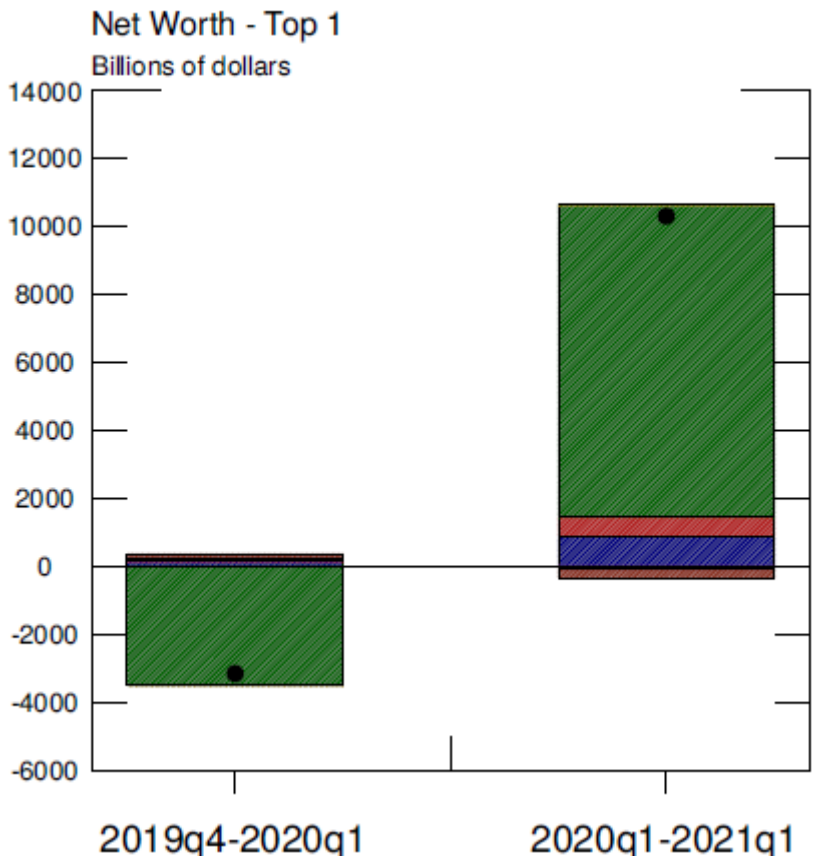
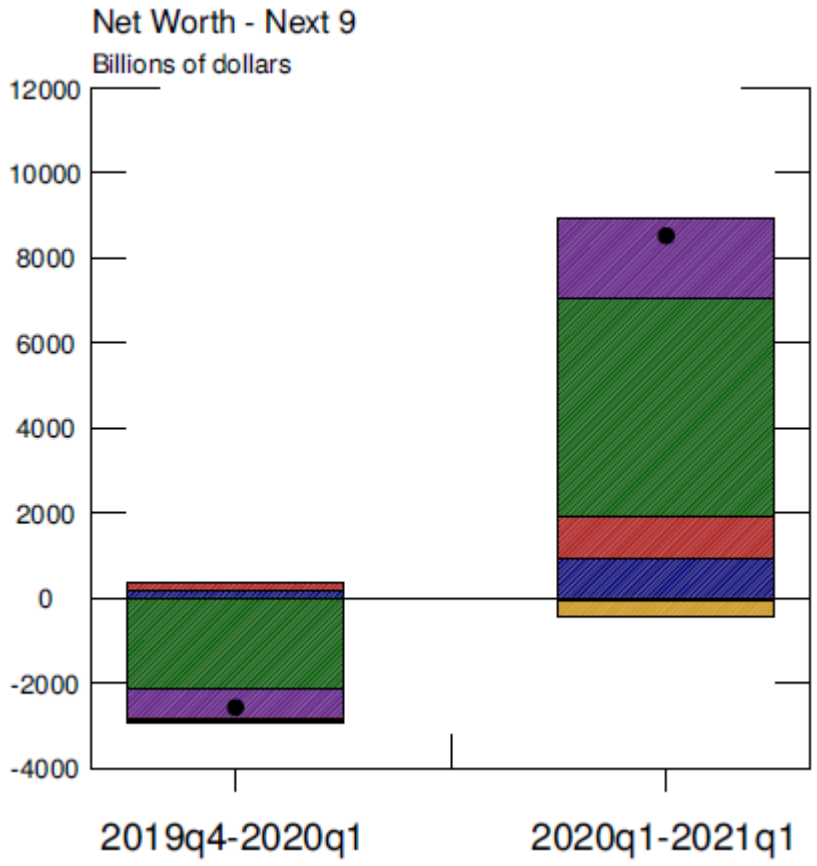
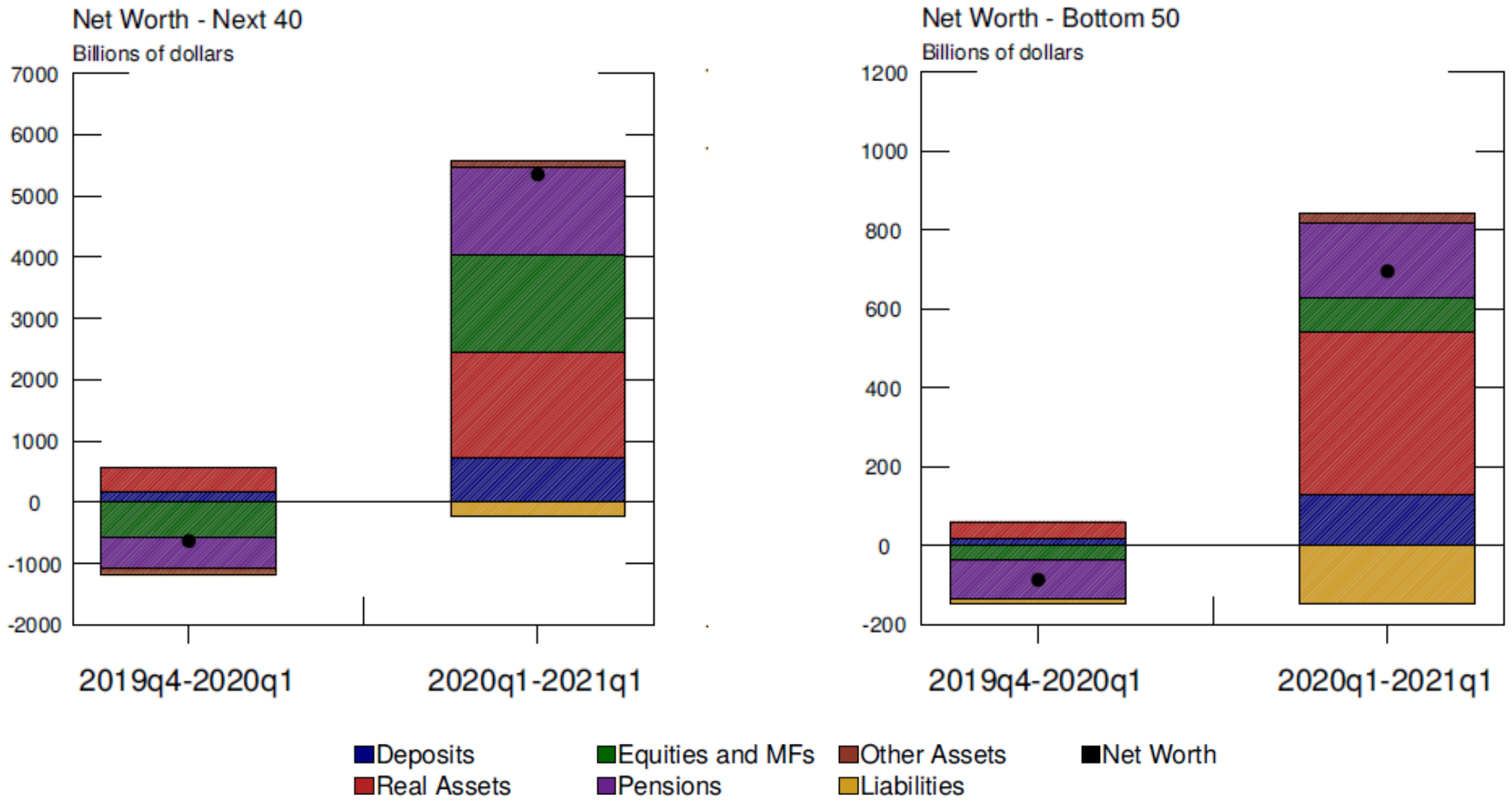


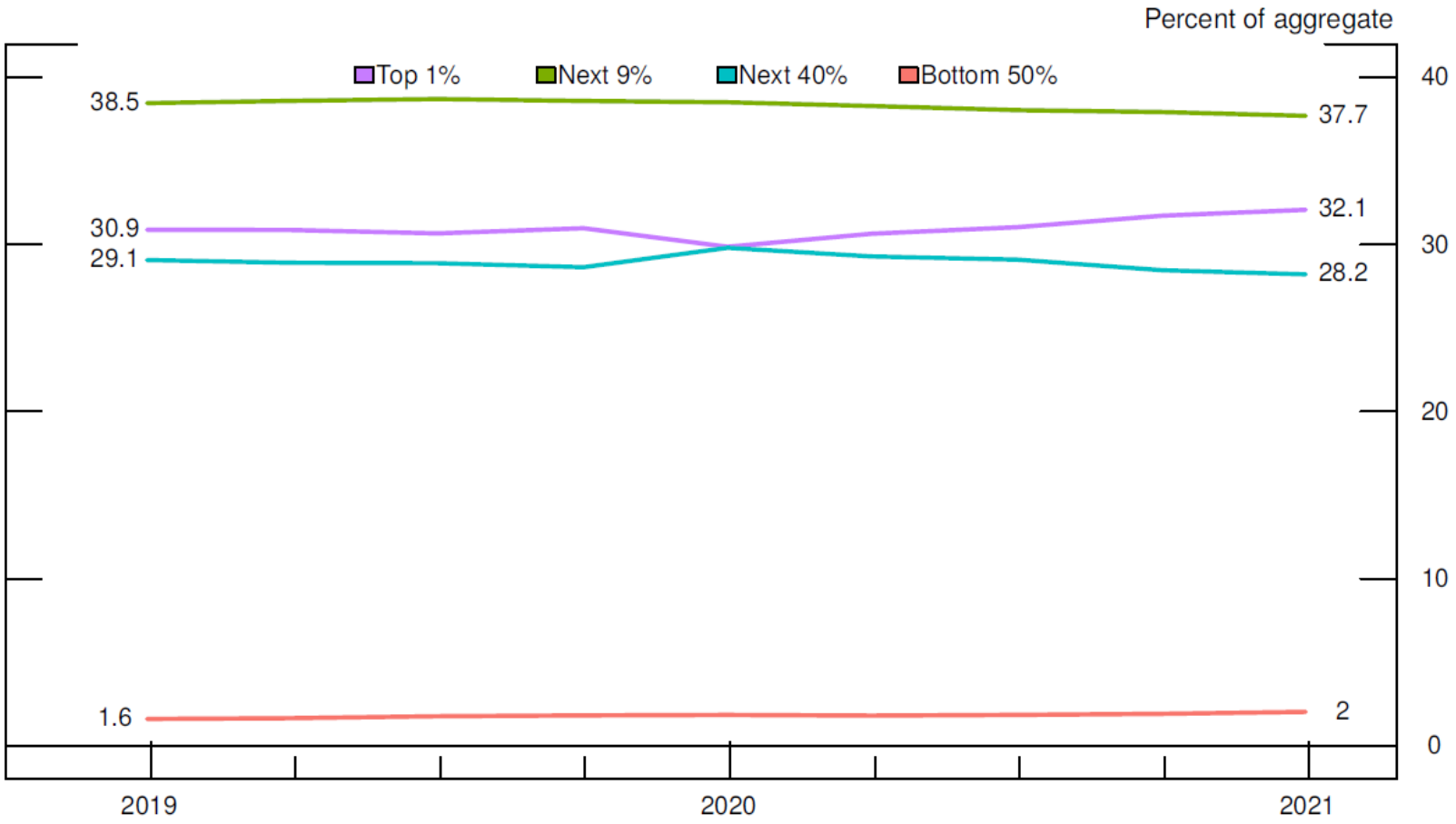


Deposits
Real Assets
Equities and MFs
Pensions
Other Assets
Liabilities
Net Worth

Baseline DFA results during pandemic



Baseline DFA Wealth Shares



Excess Savings Exercise

- Combination of income losses, reduced consumption and government relief during pandemic leading to a build-up of liquid deposits
- Define excess savings as the net increase in asset and liability transactions in 2020 and 2021Q1 over the rate for 2019.
  - This accumulates to $1.8 trillion from 2020Q1-2021Q1
- Similar in magnitude to other (more developed) estimates of total excess savings
  - Blanchard (2021) and Briggs and Mericle (2021)
- Given observed net transactions, vast majority of excess savings flowed into bank accounts rather than reducing debt or otherwise invested

Counterfactual Distributions

- Subtract the quarterly estimates of excess savings from the levels of savings and checking deposits
- Distribute excess savings to deposits under three alternative scenarios

Counterfactual Distributions for Deposits

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		DFA	Equally Distributed	Somewhat Equally Distributed	All to Bottom 50%
Wealth	Top 1	34%	1%	8%	0%
	Next 9	35%	9%	17%	0%
	Next 40	26%	40%	39%	0%
	Bottom 50	6%	50%	36%	100%

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	Bottom 50	6%	50%	36%	100%
Income	99-100	32%	1%	8%	0%
	80-99	35%	19%	24%	0%
	60-80	18%	20%	21%	0%
	40-60	11%	20%	17%	20%
	0-40	4%	40%	29%	80%

Wealth Growth 2020Q1-2021Q1

		DFA 2021q1	Equally Distributed	Somewhat Equally Distributed	All to the Bottom 50%
Wealth	Top 1	21%	19.%	19%	19%
	Next 9	14%	13%	13%	12%
	Next 40	15%	16%	16%	13%
	Bottom 50	30%	70%	57%	115%

Wealth Shares 2021Q1

		DFA 2019Q4	DFA 2021q1	Equally Distributed	Somewhat Equally Distributed	All to the Bottom 50%
Wealth Percentile	Top 1	*31.0%*	32.1%	31.6%	31.7%	31.6%
	Next 9	*38.9%*	37.7%	37.3%	37.5%	37.2%
	Next 40	*28.6%*	28.2%	28.4%	28.4%	27.9%
	Bottom 50	*1.8%*	2.0%	2.6%	2.4%	3.3%

Discussion

- Nontrivial uncertainty in the growth rate of wealth held by the bottom half of the wealth distribution.
- Average wealth of the Bottom 50 increased from $31,000 in 2019Q4 to:
  - $41,000 in baseline DFA
  - $49,000 somewhat equally distributed
  - $53,000 equally distributed
  - $67,000 all to the bottom

(in 2021Q1)

Wealth Growth by Income Groups

		DFA 2021q1	Equally Distributed	Somewhat Equally Distributed	All to the Bottom 50%
Income Percentile	99-100	23.1%	21.0%	21.5%	21.0%
	80-99	13.9%	13.3%	13.5%	12.6%
	60-80	19.5%	19.8%	19.9%	17.6%
	40-60	13.1%	15.0%	14.4%	15.0%
	0-40	8.2%	16.3%	13.8%	25.2%

Wealth Shares by Income Groups

		DFA 2019Q4	DFA 2021q1	Equally Distributed	Somewhat Equally Distributed	All to the Bottom 50%
Income Percentile	99-100	*25.3%*	23.1%	21.0%	21.5%	21.0%
	80-99	*45.1%*	13.9%	13.3%	13.5%	12.6%
	60-80	*14.9%*	19.5%	19.8%	19.9%	17.6%
	40-60	*7.4%*	13.1%	15.0%	14.4%	15.0%
	0-40	*7.3%*	8.2%	16.3%	13.8%	25.2%

Discussion

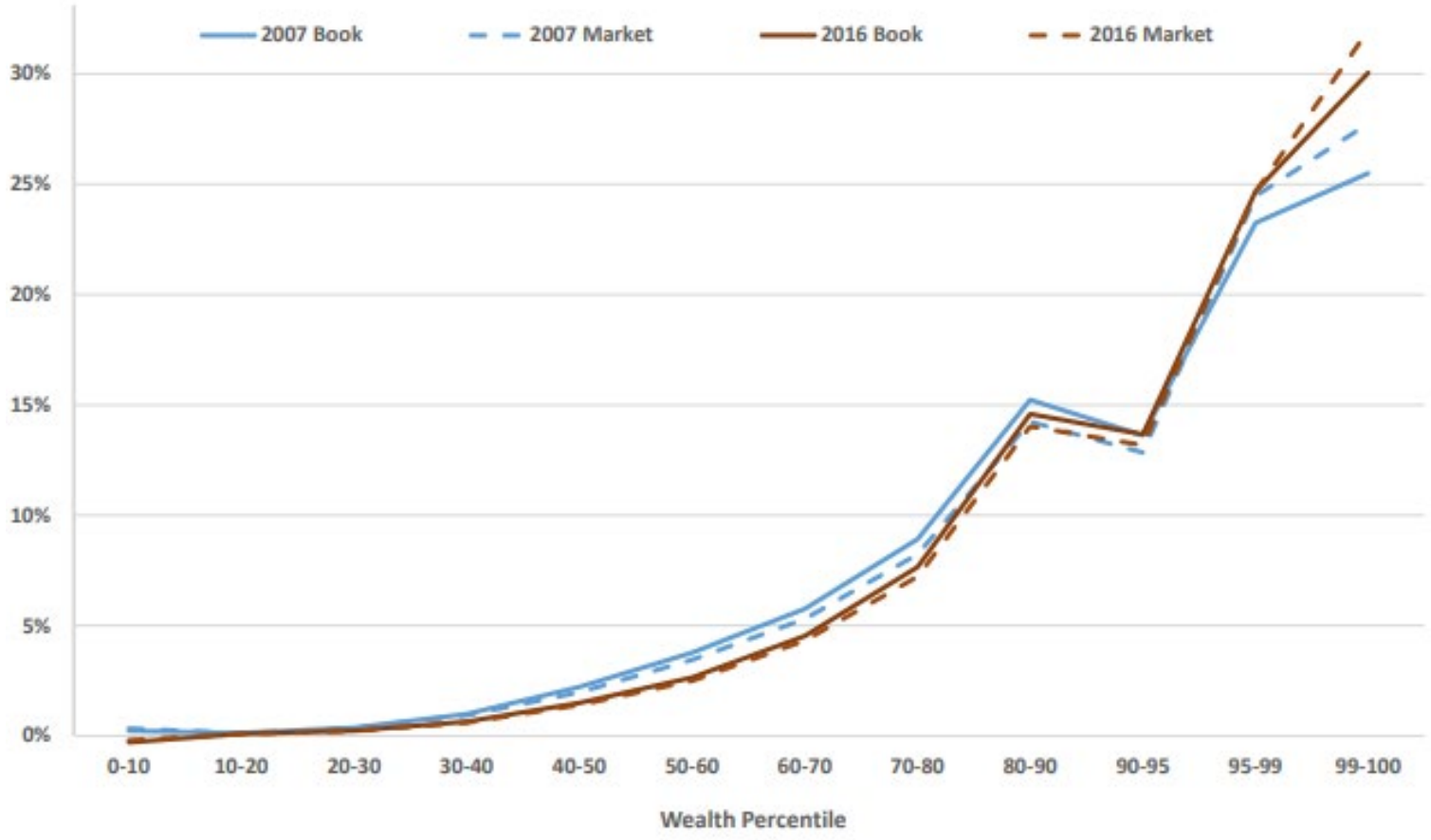
- Range of plausible growth rates for the bottom 40 by income is lower than for wealth because per household wealth levels for the lower income groups are substantially higher than for the bottom half of the wealth distribution
- The exercise also highlighted some challenges to consider while working to improve interpolation and forecasting

Conclusions

- The distribution of wealth has been relatively stable recently despite the massive economic upheaval caused by the COVID-19 pandemic
- Stability of the wealth distribution stems from the fact that most of the wealth gained during pandemic comes from appreciation of assets that were heavily concentrated before the pandemic
- Gains on these assets were so large that they dwarf the historic increase in household savings that also occurred
- Alternate distributions of excess savings highlights the significance of the government response in supporting economic well-being of low wealth and income households

Extra slides

Distribution of non-corporate business measures



Extreme error assumptions