House Price Cycles, Wealth Inequality and Portfolio Reshuffling

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Motivation

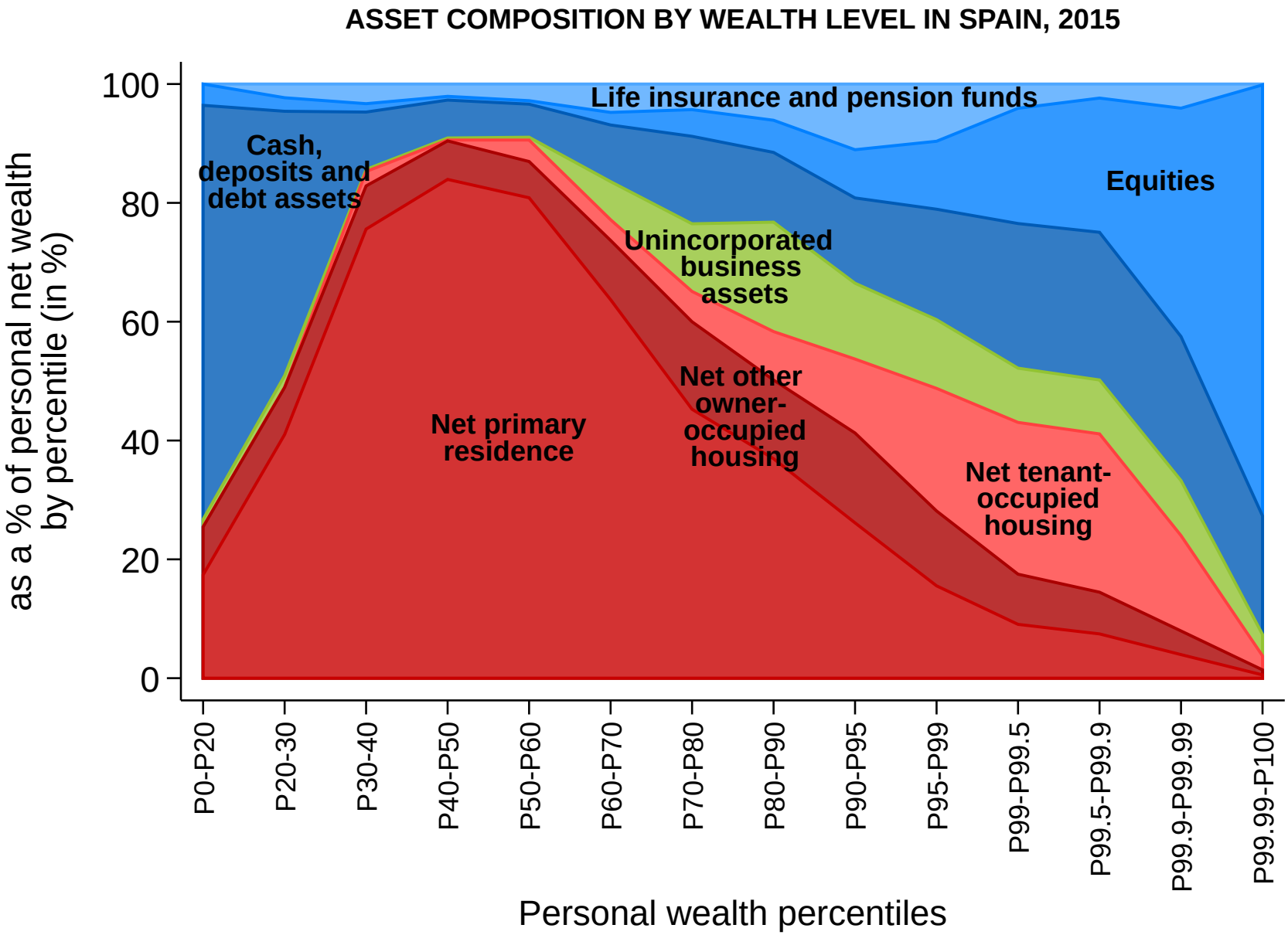
1. **Aggregate household wealth**: Similar levels and trends relative to national income across advanced countries since 1980's (Piketty and Zucman [2014])
   Wealth to income ratios

2. **Household wealth distribution**: Diverging wealth concentration trends since 1980's US (Saez and Zucman [2016]) vs. Continental Europe (Garbinti et al. [2020] ; Alvaredo et al. [2018]) Top 10% wealth shares

- Little empirical evidence on
  - the complex interactions between the **short/medium-term** dynamics of aggregate wealth and its distribution
  - their **determinants**
- These interactions become quite relevant during **asset booms and busts**
  - Households' wealth levels and portfolio composition might significantly change and wealth inequality trends could revert
  - More relevant during house price cycles, as housing forms the lion's share of total return on wealth (Jorda et al. [2019] ; Piketty and Zucman [2014])

$\rightarrow$ Wealth inequality matters in the **determination of aggregates**, such as consumption (Carroll et al. [2017] ; Krueger et al. [2016])

Motivation


ASSET COMPOSITION BY WEALTH LEVEL IN SPAIN, 2015
as a % of personal net wealth by percentile (in %)
100
80
60
40
20
0
Life insurance and pension funds
Cash, deposits and debt assets
Equities
Unincorporated business assets
Net other owner-occupied housing
Net primary residence
Net tenant-occupied housing
P0-P20
P20-30
P30-40
P40-P50
P50-P60
P60-P70
P70-P80
P80-P90
P90-P95
P95-P99
P99-P99.5
P99.5-P99.9
P99.9-P99.99
P99.99-P100
Personal wealth percentiles

This paper

- **Research question**: How do housing booms and busts shape the wealth distribution ? In particular, which are the key forces driving the observed wealth inequality dynamics ?

- **Context**: Spain and its two most recent housing booms (1985-1991, 1998-2007) and busts (1992-1995, 2008-2014)

- **Data**: Large data compilation
  - Macro sources: income flows and wealth stocks from national accounts
  - Micro sources: tax records, income and wealth surveys

- **Methodology**
  1. Reconstruct the joint wealth and income distribution between 1984-2015
  2. Develop a new asset-specific decomposition of wealth accumulation to identify the key determinants (i.e., labor income, saving rates and rates of return) of wealth inequality dynamics
  3. Conduct counterfactual simulation exercises to quantify the relative importance of each channel

Why Spain ?

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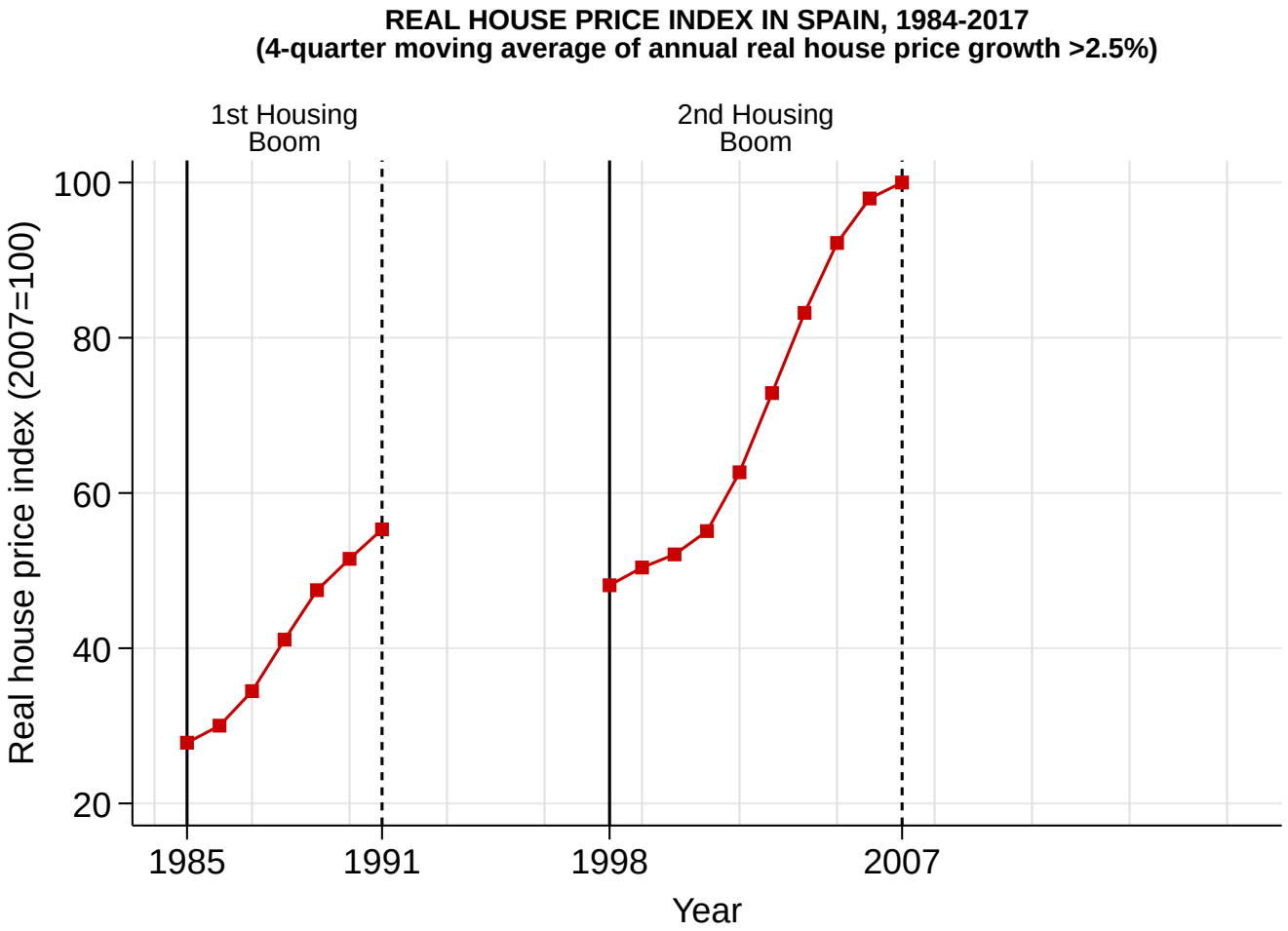


FIGURE – Source: International House Price Database, Federal Reserve Bank of Dallas

Real estate transactions | Spain's wealth to national income ratio | Housing booms and busts

Why Spain ?

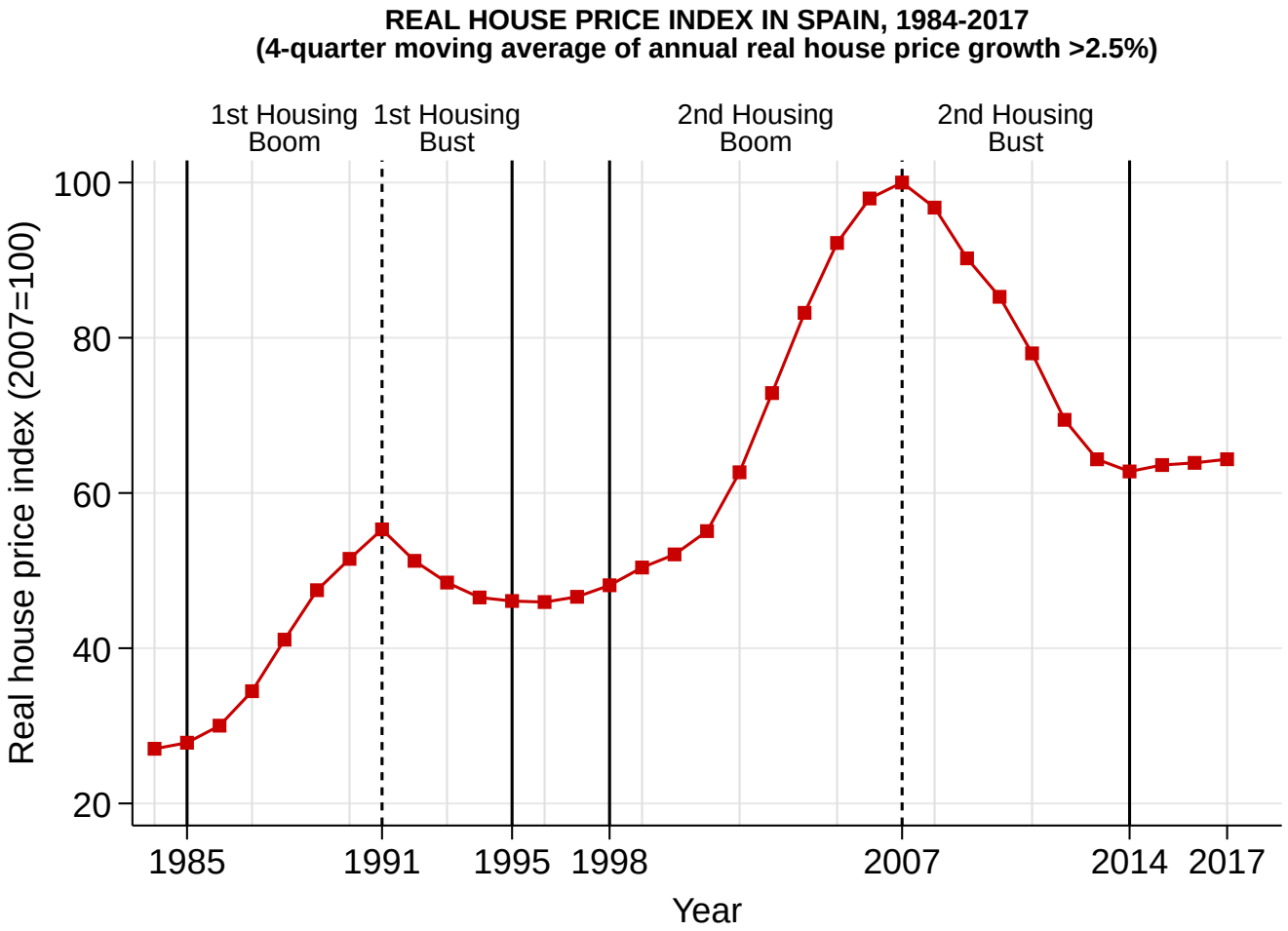


FIGURE – Source: International House Price Database, Federal Reserve Bank of Dallas

Real estate transactions | Spain's wealth to national income ratio | Housing booms and busts

Preview of Results

- **Top 10% wealth concentration** drops during **housing booms**, but the decreasing pattern reverts during **housing busts**

- **Main drivers** of the observed dynamics:
  - **Housing booms**: Differences in **capital gains** across wealth groups
    - ⋆ Capital gains on housing higher on average than on financial assets
    - ⋆ Winners: Middle and bottom wealth groups
      - → Larger share of housing in their portfolio
      - → Higher total rate of capital gain
  - **Housing busts**: Differences in **saving behavior** across wealth groups
    - ⋆ Similar rates of capital gain across wealth groups
    - ⋆ Winners: Top wealth groups
      - → Higher saving rate levels
      - → Portfolio reshuffling from housing towards financial assets

→ **Key Finding**: *Portfolio choice dynamics* shape wealth inequality dynamics

Mechanisms: Nature of Saving Responses

- Top wealth holders subject to fewer **portfolio adjustment frictions**
  - Higher saving rates and lower indebtedness $\rightarrow$ fewer difficulties to incur in housing transaction costs or in new savings towards financial assets
  - Lower indebtedness through home mortgages $\rightarrow$ less constrained by the evolution of the property value relative to the mortgage value
  - Larger holdings of real estate for investment $\rightarrow$ no mobility costs
  - Sale of rented properties during housing busts

Contributions to the Literature

1. **Historical evolution of wealth distributions:** Alvaredo and Saez [2009] ; Roine and Waldenström [2009] ; Saez and Zucman [2016] ; Garbinti et al. [2020] ; Alvaredo et al. [2018] ; Kuhn et al. [2019] ; Smith et al.[2020]
   - This paper: Focus on **short/medium-term** wealth inequality dynamics during **asset booms and busts** with new long-run dataset on Spain

2. **Determinants of wealth inequality dynamics:** Bach et al. [2020] ; Benhabib and Bisin [2018] ; Fagereng et al. [2020] ; Gomez [2019] ; Gomez and Gouin-Bonenfant [2020] ; Hubmer et al. [2020] ; Kuhn et al. [2019] ; Mian et al. [2020] ; Nekoei and Seim [2019] ; Xavier [2020]
   - This paper:
     - ⋆ Novel **asset-specific wealth accumulation equation** that makes it possible to decompose saving by asset class
     - ⋆ **Composition of saving** key to understand saving behavior and wealth inequality dynamics along the cycle

3. **Households' portfolio decisions:** Brueckner [1997] ; Campbell [2006] ; Chetty et al. [2017] ; Cocco [2005] ; Guiso et al. [2002]
   - This paper: Implications of portfolio choice heterogeneity for wealth inequality

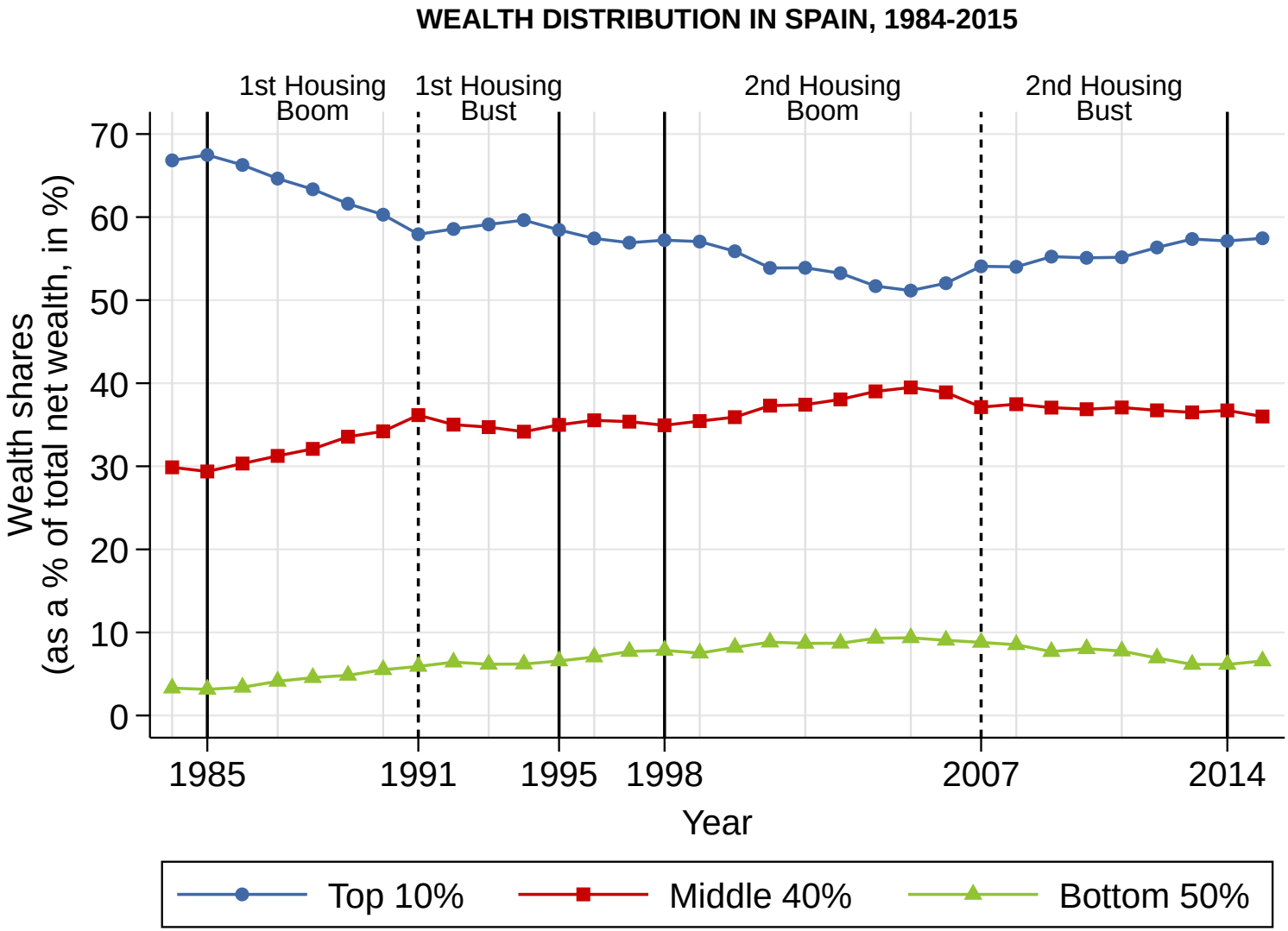
Wealth Concept and Data

- **Wealth Concept**: Current market value of all financial and non-financial assets owned by households net of all their debts (System of National Accounts, 2009)

- **Multiple data sources**
  - Macro data:
    - ⋆ Income: National Accounts (INE, 1984-2015)
    - ⋆ Wealth: Financial Accounts (Bank of Spain, 1984-2015) and Non-financial Accounts (Artola et al. [2018], 1984-2015)
  - Micro data:
    - ⋆ Personal income (1984-2015) and wealth tax records (1999-2007) (IEF and AEAT)
    - ⋆ Wealth and income surveys (Survey of Household Finances, Bank of Spain, five waves 2002-2014 ; Household Budget Survey, INE, 1986-1998)

The Mixed Capitalization-Survey Method

- **First step**: Reconstruct the capital income distribution using personal income tax records
  - Bottom individuals: Imputation based on the census of population and household surveys Missing individuals
- **Second step**: Capitalize the capital income distribution to arrive to the wealth distribution
  - Construct capitalization factors by asset class using dissaggregated income flows and wealth stocks from national accounts
  - Assumption: Constant capitalization factor within a given asset class along the distribution
- **Third step**: Accounting for wealth which does not generate taxable capital income
  - Missing wealth components: primary residence (1999-2015), life insurance, investment and pension funds Missing wealth components
    - ⋆ Imputation performed so as to match the distribution of these wealth components in household surveys



Top 10% wealth concentration declines during booms, but the decreasing pattern reverts during busts

Additional Results and Robustness Checks

- **Additional results**
  - Wealth levels in 2015 [2015 Wealth Table]
  - Top wealth shares [Top wealth shares]
  - Composition of wealth shares [Composition of wealth shares]
  - Accounting for offshore assets [Unreported offshore assets]
  - Decomposition by age [Age decomposition] [Age-wealth profiles]
  - Income shares [Income shares]

- **Robustness checks**
  - House price distribution [Heterogeneity of house prices]
  - Wealth surveys [Survey wealth shares] [Survey capitalization]
  - Wealth taxes [Rate of return on deposits] [Alvaredo and Saez [2009]]

A New Asset-Specific Wealth Accumulation Decomposition

Standard wealth accumulation decomposition:

$$W^g_{t+1} = (1 + q^g_t)[W^g_t + s^g_t(Y^g_{L_t} + r^g_t W^g_t)] \tag{1}$$

- g: wealth group (e.g., top 10%, bottom 50%)
- W^g_t: average real wealth of wealth group g at time t
- $Y^g_{L_t}$: average real labor income of wealth group g at time t
- r^g_t: average rate of return of group g at time t
- q^g_t: average rate of real capital gain of wealth group g at time t
- s^g_t: synthetic saving rate of wealth group g at time t

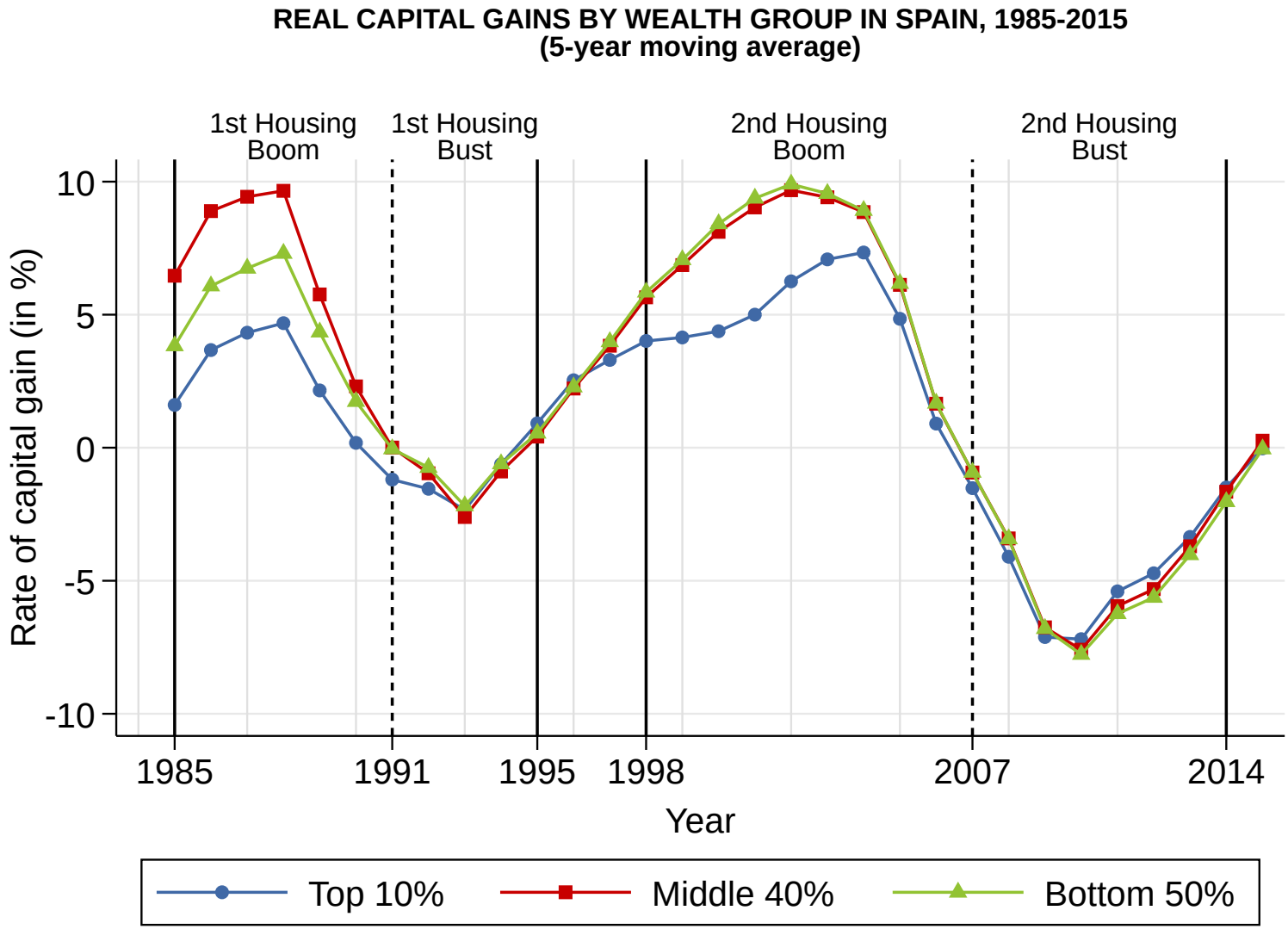
New decomposition to derive saving by asset class:

$$W^g_{t+1} = W^g_{H,t+1} + W^g_{B,t+1} + W^g_{F,t+1} \tag{2}$$

$$W^g_{H,t+1} = (1 + q^g_t)[W^g_{H,t} + s^g_{H,t}(Y^g_{L_t} + r^g_t W^g_t)] \tag{3}$$

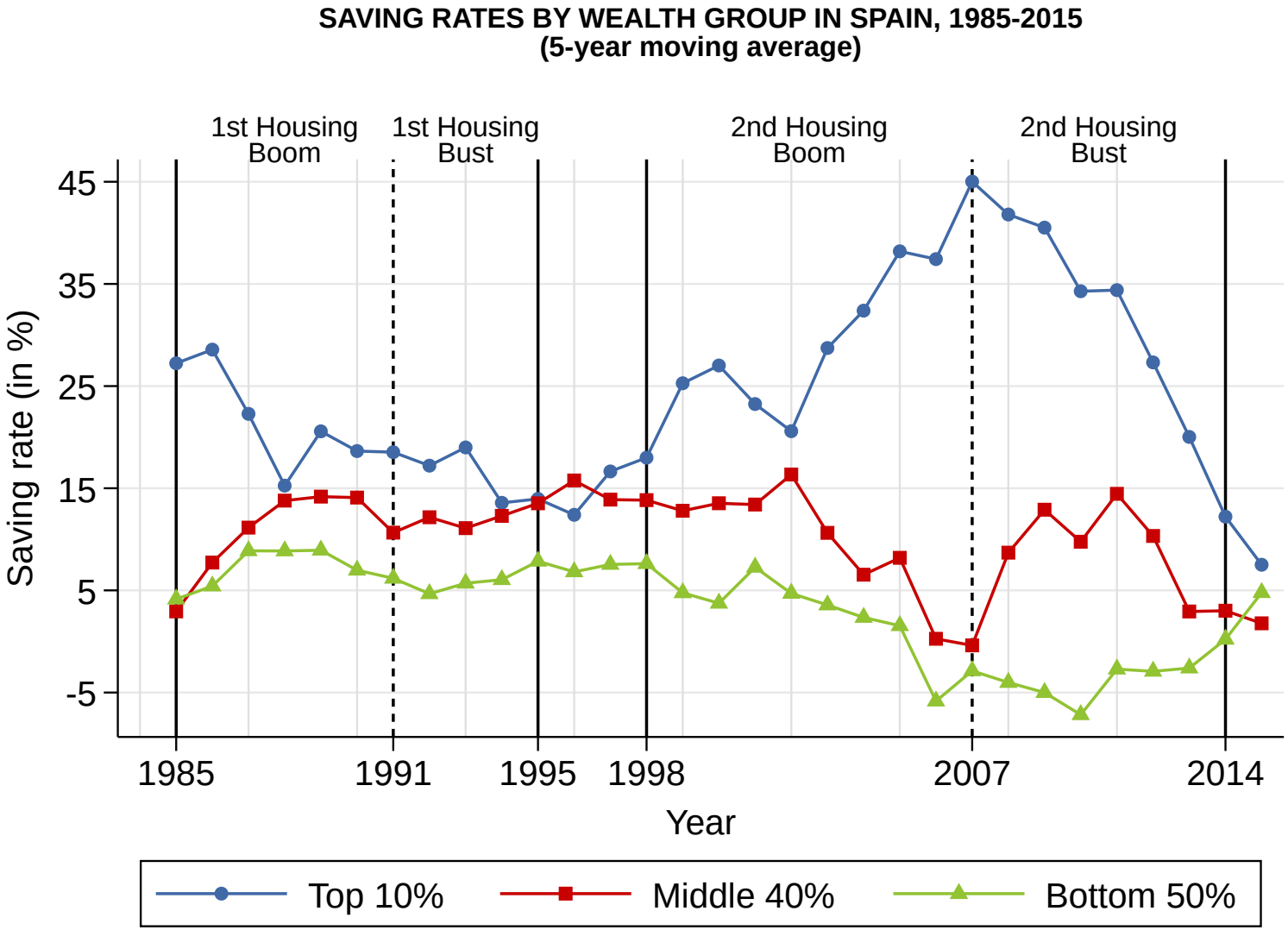
- H, B, and F: Housing, Business Assets and Financial Assets

Total rate of return decomposition



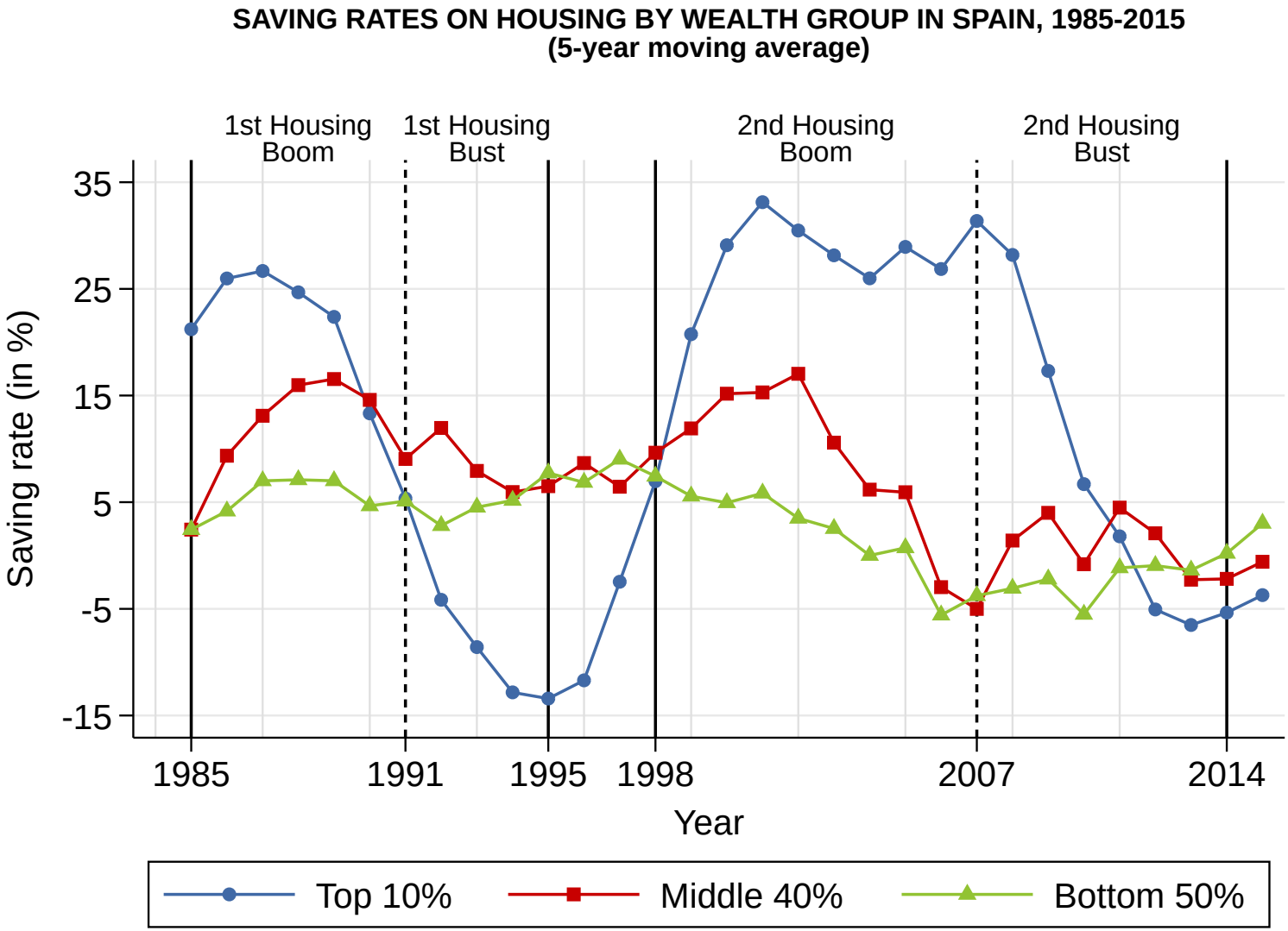
Capital gains contribute to decreasing top 10% wealth concentration during housing booms

Table returns | Labor income | Flow returns | Simulation no capital gains | Simulation no saving



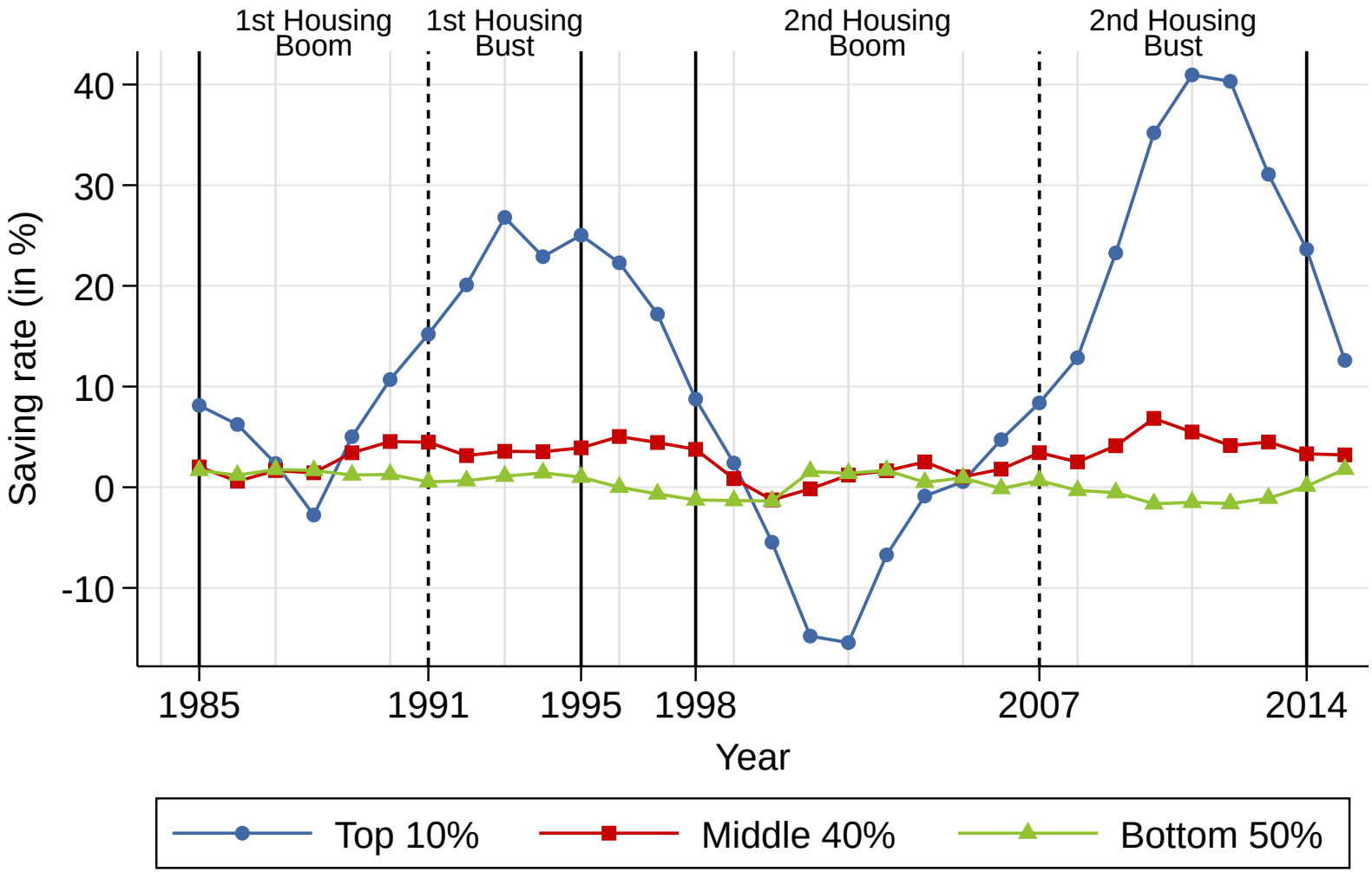
Saving rates are higher among top wealth holders during housing busts

Real income | Consumption



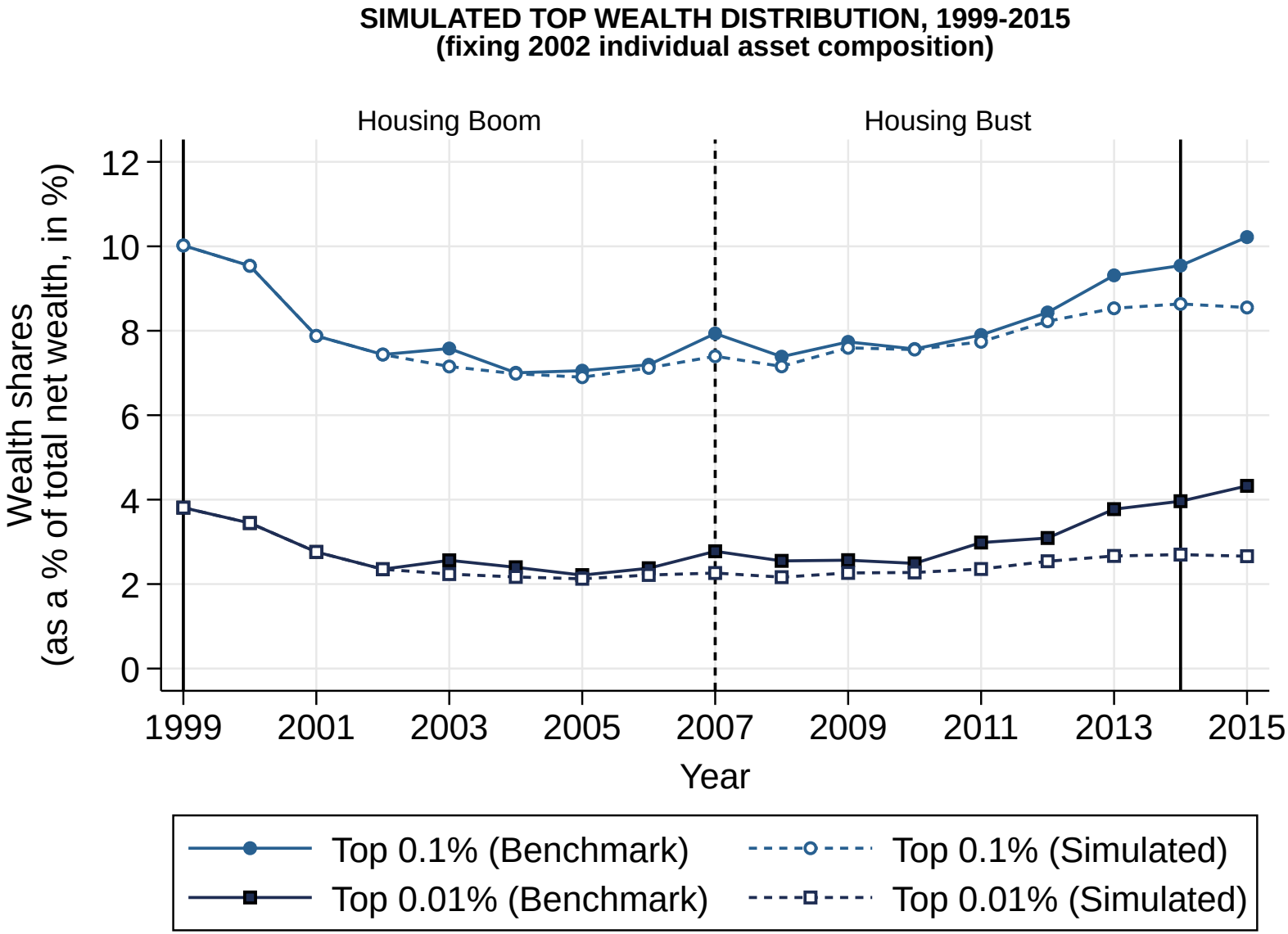
Top wealth holders accumulate housing during housing booms and reshuffle their portfolio away from housing...

SAVING RATES ON FINANCIAL ASSETS BY WEALTH GROUP IN SPAIN, 1985-2015
(5-year moving average)

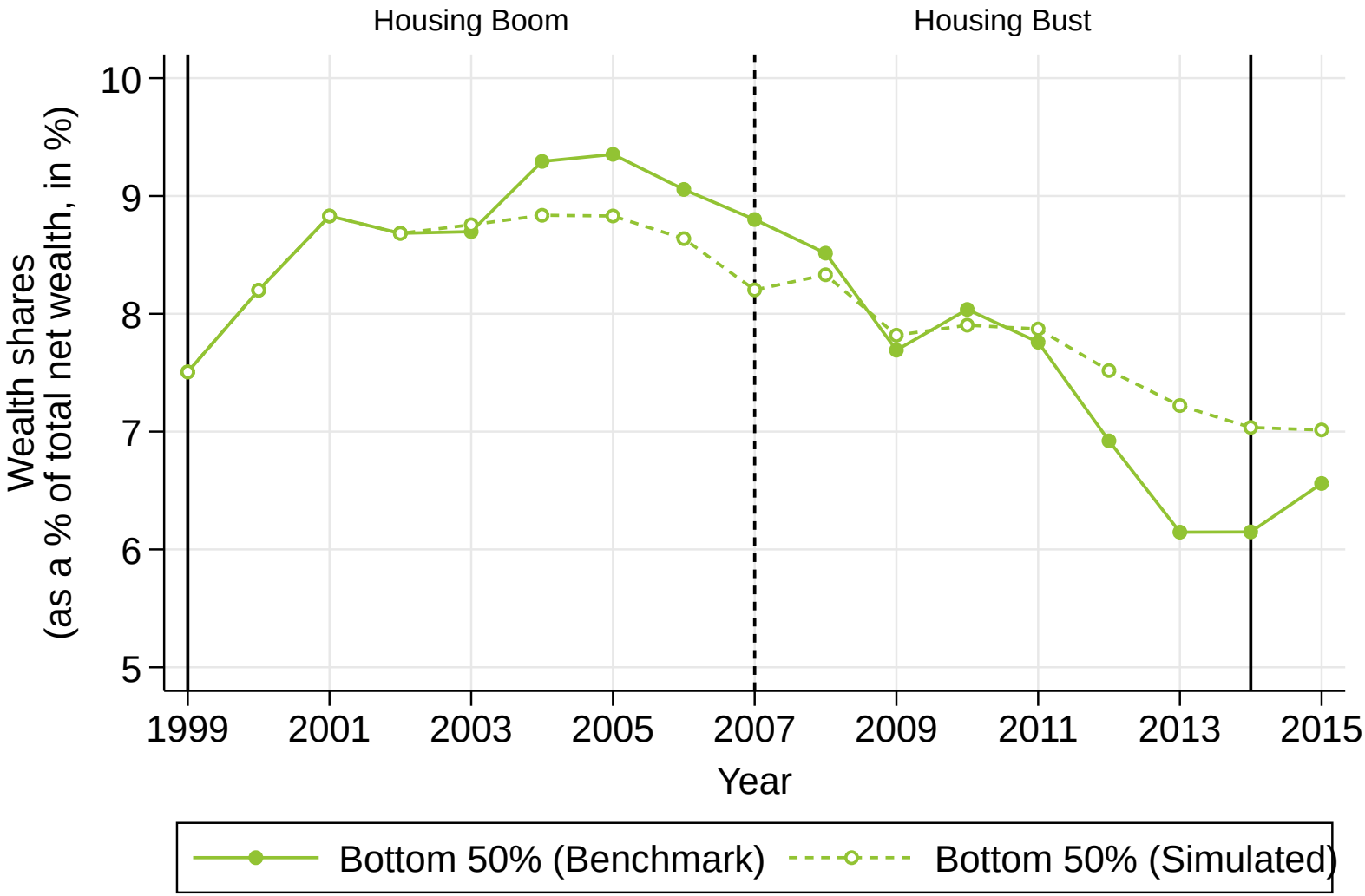


...towards financial assets during housing busts

Saving rates on business assets | Foreign real estate transactions | Probability to save


SIMULATED TOP WEALTH DISTRIBUTION, 1999-2015
(fixing 2002 individual asset composition)
Housing Boom
Housing Bust
Wealth shares
(as a % of total net wealth, in %)
0
2
4
6
8
10
12
1999
2001
2003
2005
2007
2009
2011
2013
2015
Year
Top 0.1% (Benchmark)
Top 0.1% (Simulated)
Top 0.01% (Benchmark)
Top 0.01% (Simulated)

SIMULATED BOTTOM WEALTH DISTRIBUTION, 1999-2015
(fixing 2002 individual asset composition)



External Validity and Additional Robustness Checks

- **External validity: France and the US**
  - House price cyles (International house prices)
  - Wealth shares (International wealth shares)
  - Capital gains (Capital gains France) (Capital gains US)
  - Saving rates (Saving rates France) (Saving rates US)
  - Saving rates on housing (Saving rates housing France) (Saving rates housing US)
  - Saving rates on financial assets (Saving rates financial assets France) (Saving rates financial assets US)

- **Robustness checks**
  - Accounting for wealth mobility (Saving rates with panel)
  - Alternative asset-specific saving rates (Alternative saving rates)

Mechanisms: Nature of saving responses

Main candidate explanation

1. Portfolio adjustment frictions
   - ✓ Less prevalent among top wealth holders

Other potential explanations

1. Real estate market dynamics Real estate demand
   - ✗ No greater demand for properties owned by top wealth holders
2. Risk aversion Attitudes toward risk
   - ✗ Saving on deposits is less risky than on housing
3. Financial knowledge and advising Financial knowledge and advising
   - ✗ Saving on deposits does not require much financial literacy nor advising
4. Expectations on future house prices
   - ✗ Top wealth holders did not have more pessimistic expectations during the recent housing bust (Bover [2015])

Portfolio Adjustment Frictions

- **Transaction costs:** Bottom and middle wealth holders more difficulties to incur in these costs
  - High indebtedness Indebtedness by wealth group
  - Low saving rates Saving rates by wealth group
- **Mobility costs:** Bottom and middle wealth holders have higher mobility costs Asset composition by wealth level Dissaving in housing for investment
  - Housing is mostly a consumption good for middle and bottom wealth holders
  - Housing is also an investment good for top wealth holders

Conclusion

- Novel empirical regularities on the **evolution and drivers of short/medium-term wealth inequality dynamics**
  - Heterogeneity in portfolio choice across wealth groups (the heterogeneity in the *timing of portfolio adjustments*) matters to explain wealth inequality dynamics
  - Macro theories of wealth inequality dynamics and asset price changes could incorporate this new dimension of heterogeneity
  - Portfolio choice heterogeneity seems relevant to study welfare effects of business cycles

$\rightarrow$ The decomposition and tools used could be applied to study the distributional consequences of other business cycles (e.g., COVID 19)

$\rightarrow$ The wealth distribution series are available on `wid.world`

Thank you for your attention !

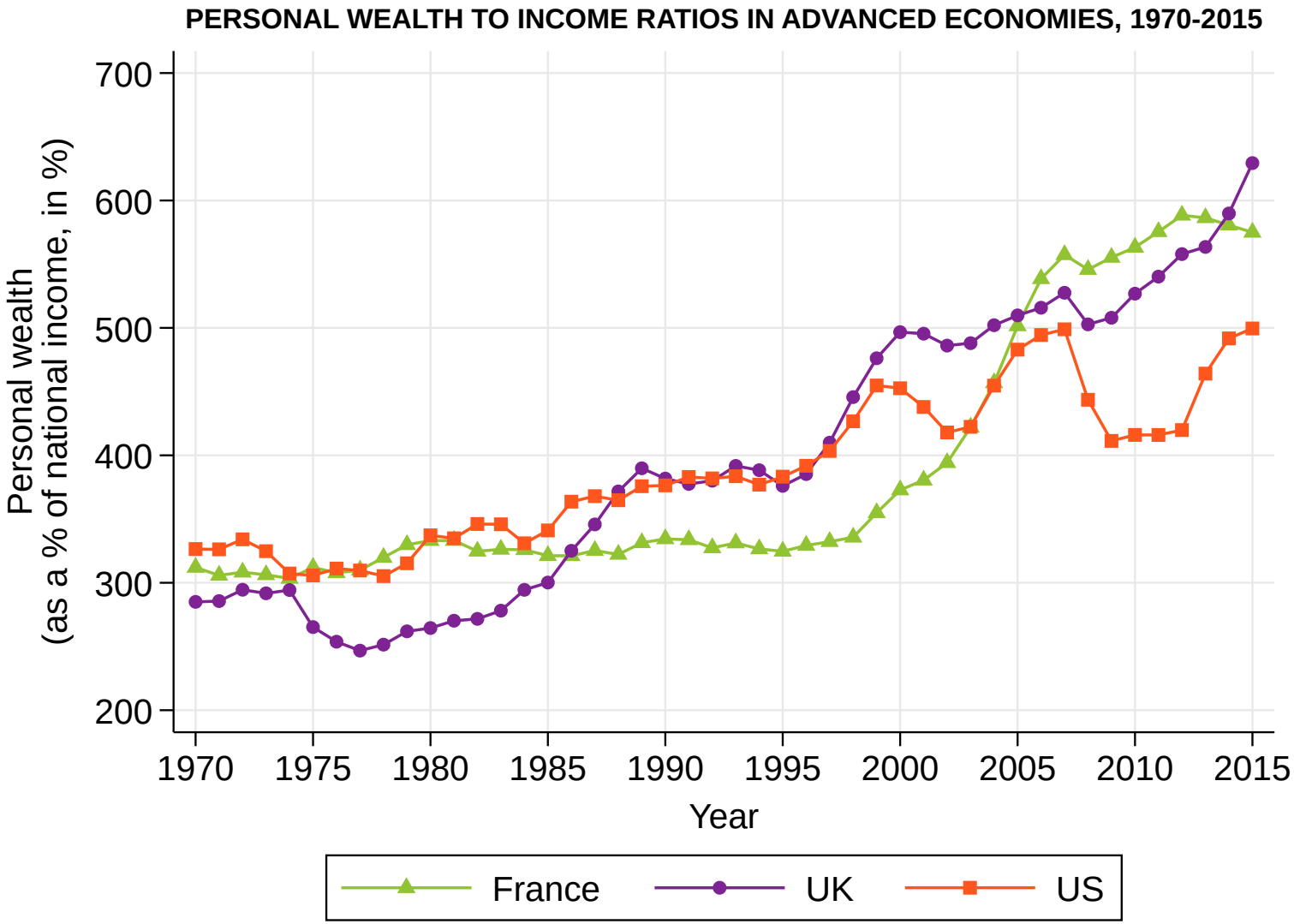


FIGURE – Source: Piketty and Zucman [2014]

Back

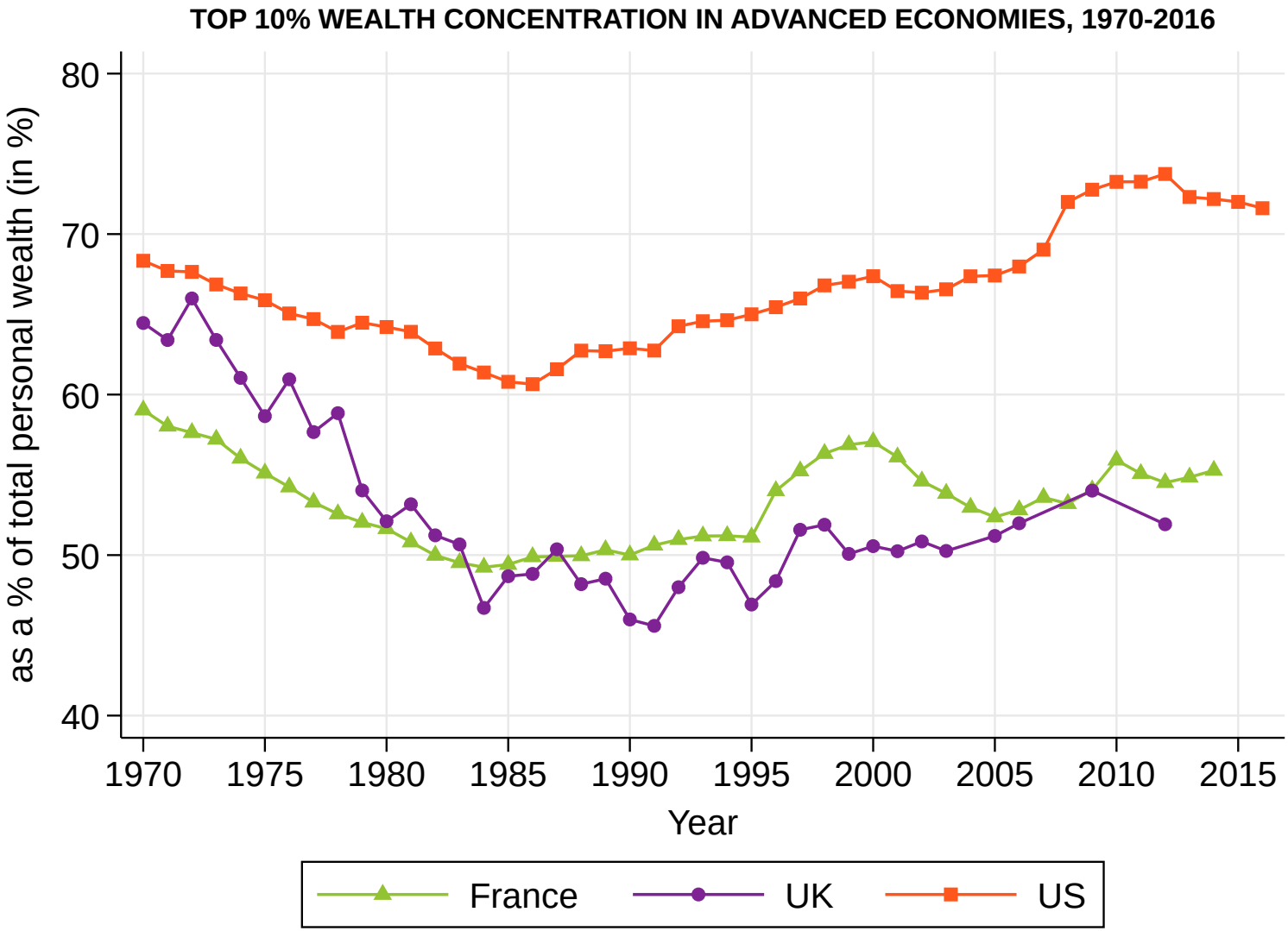


FIGURE – Source: Saez and Zucman [2016] ; Atkinson et al. [2018] and Garbinti et al. [2018]

Back

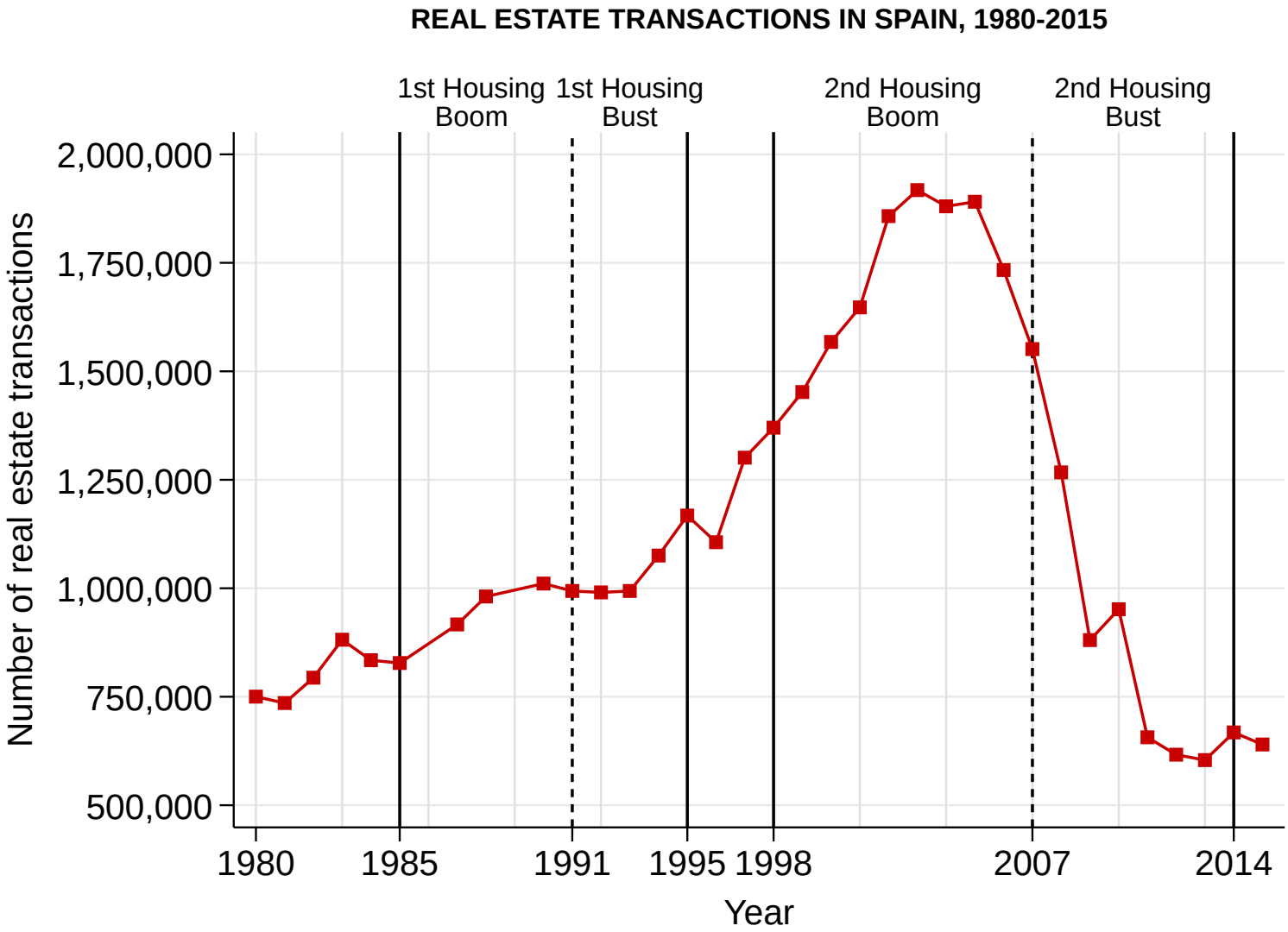


FIGURE – Source: Own elaboration after digitizing Registrars' Yearbooks

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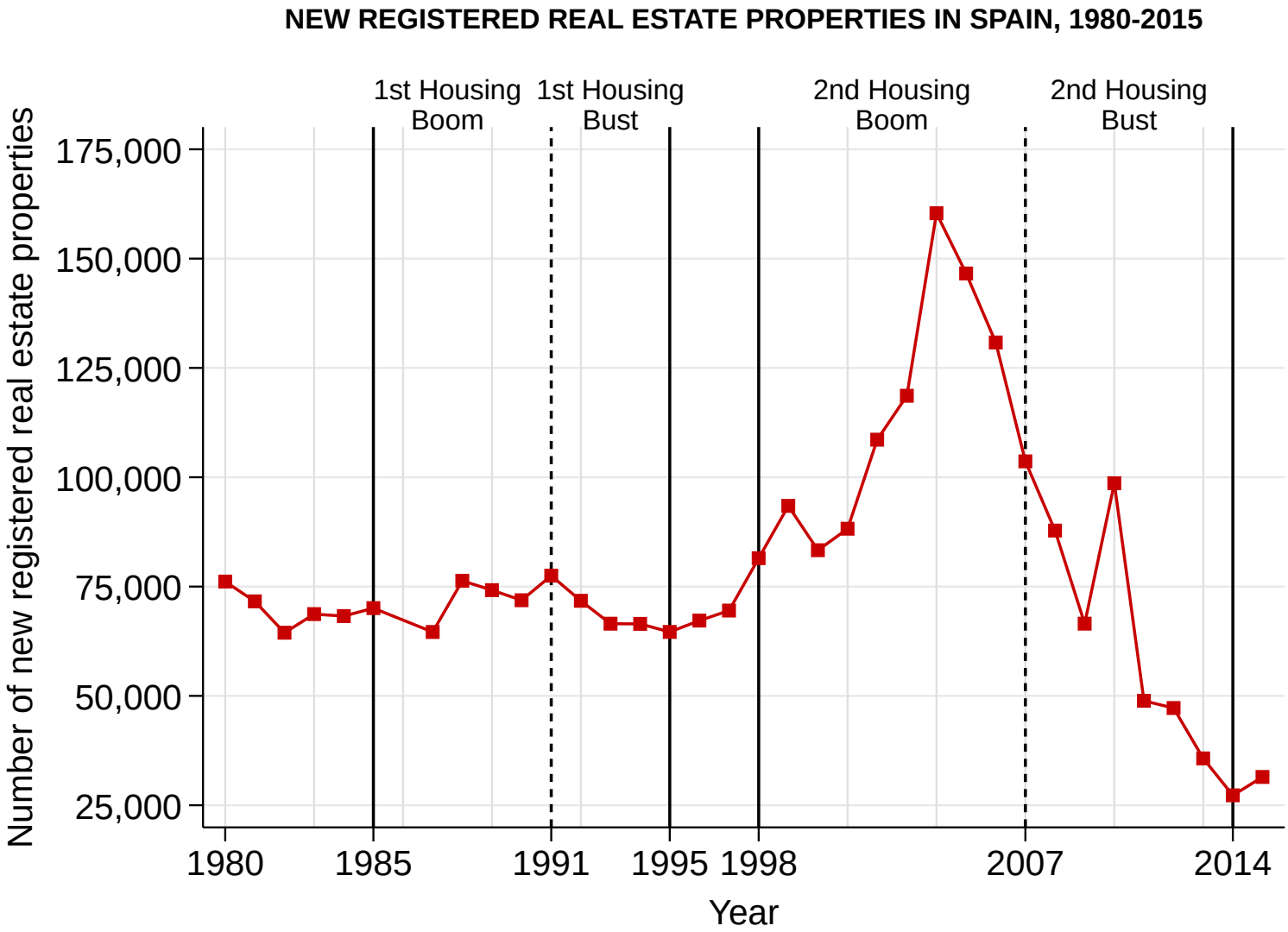

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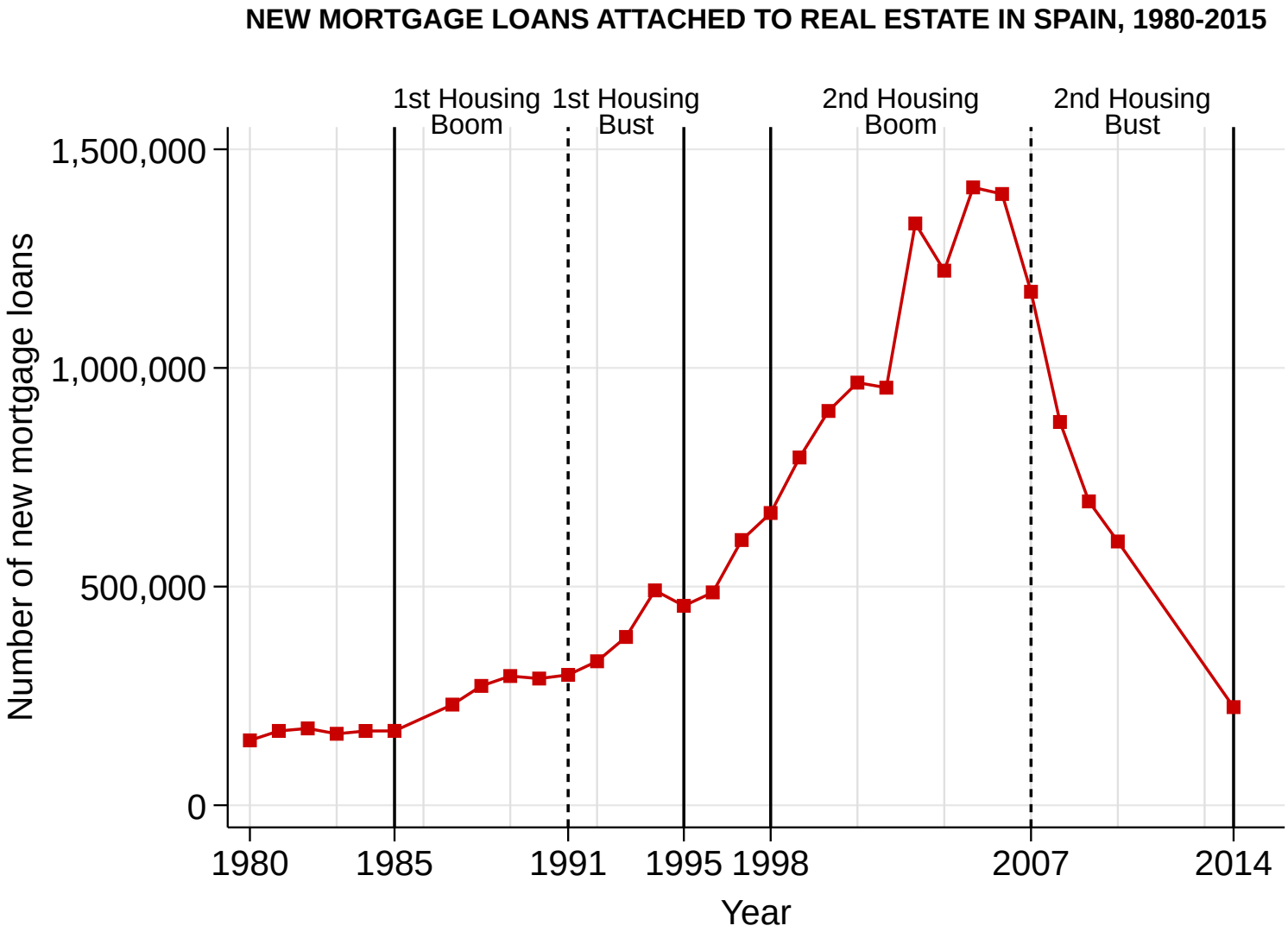
Back



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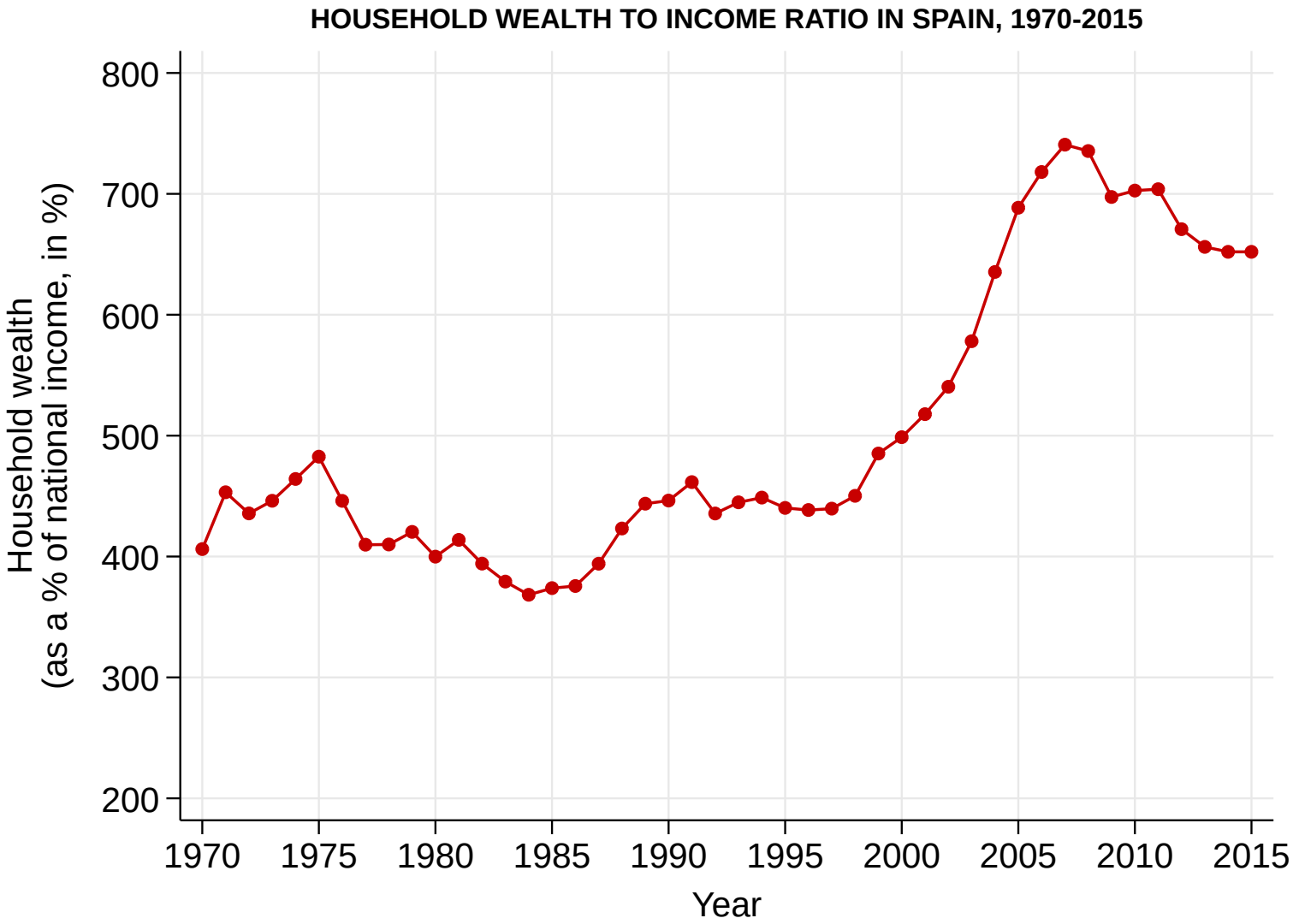


FIGURE – Source: Artola et al. [2019]

Back

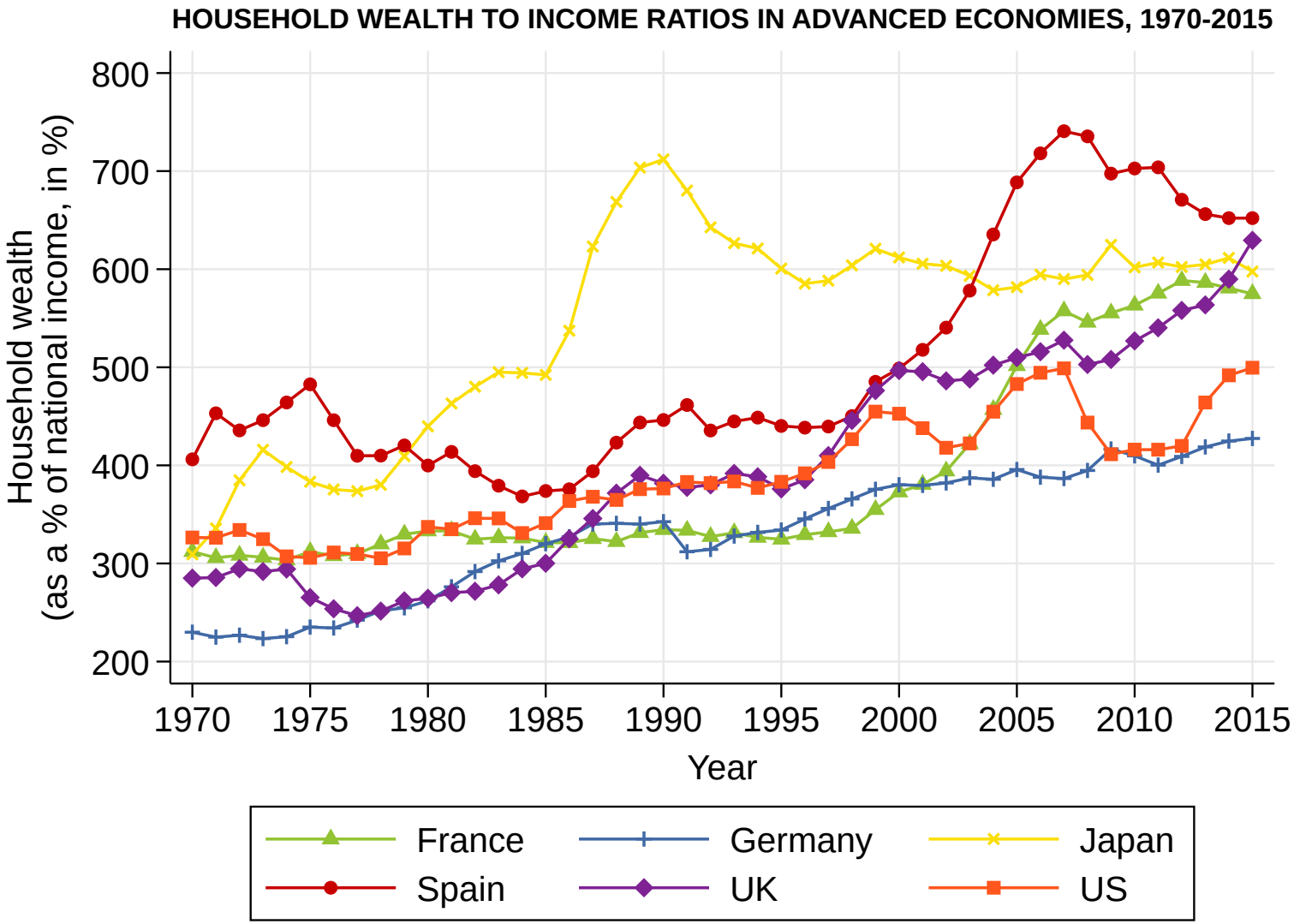
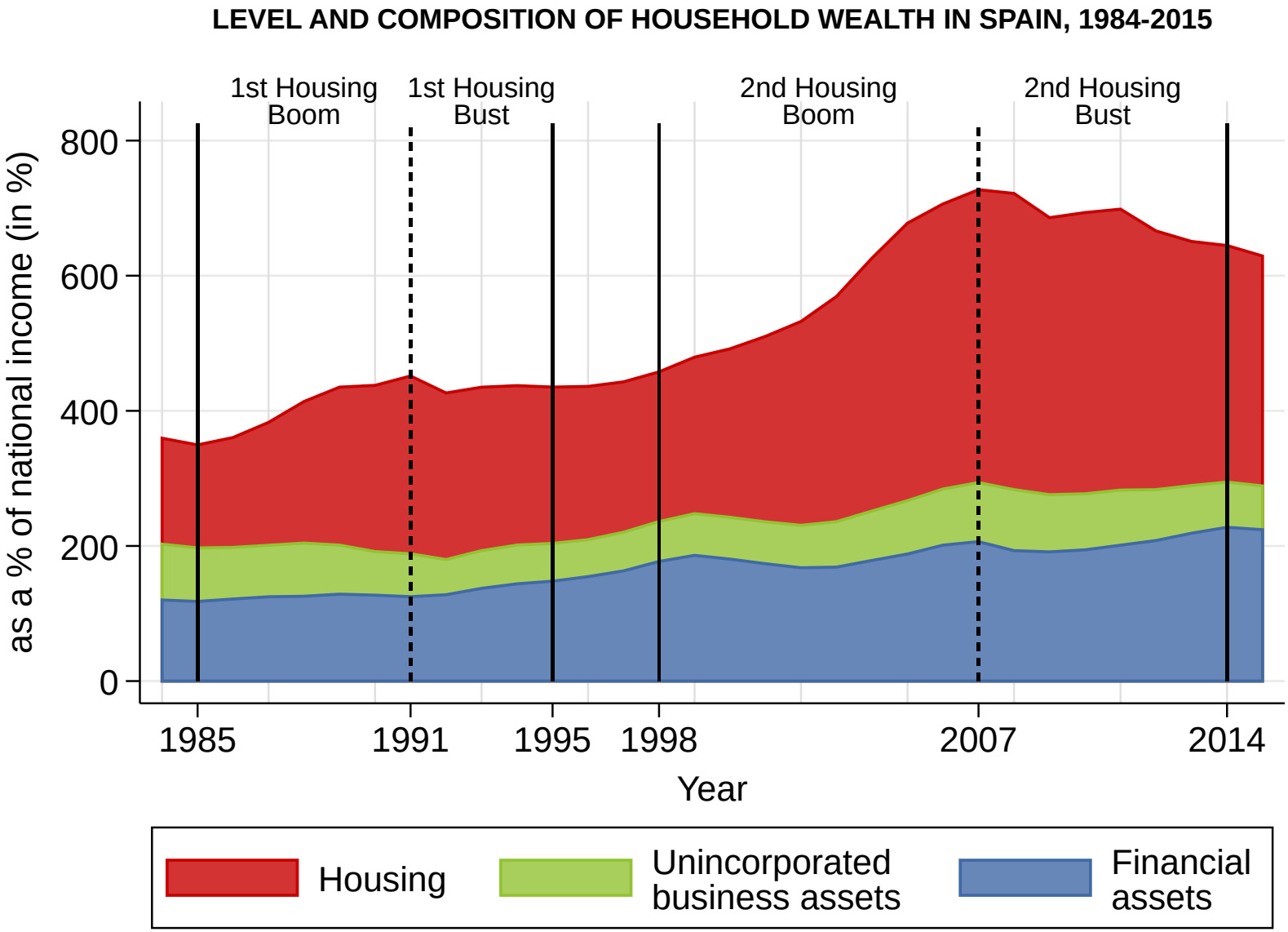


FIGURE – Source: World Inequality Database

Back


LEVEL AND COMPOSITION OF HOUSEHOLD WEALTH IN SPAIN, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
as a % of national income (in %)
800
600
400
200
0
1985
1991
1995
1998
2007
2014
Year
Housing
Unincorporated business assets
Financial assets

Back

Boom Phases					Bust Phases				
Country	Years	Persistence	Magnitude	Severity indicator*	Country	Years	Persistence	Magnitude	Severity indicator*
Sweden	1997-2007	11	67.08	368.929	Japan	1992-2006	15	-45.47	-341.055
France	1998-2006	9	51.36	231.112	Netherlands	1979-1985	7	-78.95	-276.339
United kingdom	1997-2004	8	47.58	190.333	Switzerland	1990-1999	10	-44.17	-220.842
Netherlands	1971-1978	8	47.09	188.380	Ireland	1980-1987	8	-50.93	-203.702
Spain	1986-1991	6	62.55	187.664	Norway	1987-1993	7	-57.59	-201.556
United States	1998-2005	8	41.95	167.793	United Kingdom	1990-1996	7	-56.85	-198.991
Norway	1994-2001	8	40.73	162.914	Belgium	1980-1985	6	-58.06	-174.184
United Kingdom	1983-1989	7	43.31	151.592	New Zealand	1975-1980	6	-53.48	-160.434
Spain	1999-2006	8	37.19	148.766	Denmark	1987-1993	7	-45.42	-158.977
Italy	1999-2007	9	32.67	147.010	Spain	1992-1998	7	-44.64	-156.233
New Zealand	2002-2007	6	48.76	146.279	Finland	1990-1993	4	-71.45	-142.892
Denmark	1994-2001	8	34.36	137.422	Sweden	1980-1985	6	-44.48	-133.432
Australia	1998-2004	7	36.97	129.410	Italy	1993-1998	6	-40.36	-121.084
Canada	2001-2007	7	36.93	129.264	Italy	1982-1986	5	-47.12	-117.791
Ireland	1995-2000	6	40.56	121.674	France	1991-1997	7	-30.05	-105.188
Switzerland	1983-1989	7	34.70	121.459	Spain	1979-1982	4	-52.38	-104.754
Italy	1987-1992	6	40.12	120.354	Finland	1974-1979	6	-33.00	-99.002
Netherlands	1996-2001	6	31.10	93.311	United States	1990-1997	8	-24.17	-96.672
Japan	1986-1991	6	27.42	82.267	United kingdom	1974-1977	4	-47.48	-94.955
Canada	1986-1989	4	37.64	75.280	Norway	1975-1983	9	-20.15	-90.684
Denmark	1983-1986	4	37.58	75.167	Denmark	1979-1982	4	-42.76	-85.514
Sweden	1986-1990	5	29.87	74.687	Japan	1974-1978	5	-33.97	-84.922
Finland	1996-2000	5	27.40	68.494	France	1981-1985	5	-26.02	-65.054
Finland	2002-2007	6	22.35	67.048	Germany	2000-2007	8	-14.11	-56.455
Finland	1987-1989	3	44.41	66.611	Sweden	1991-1993	3	-35.61	-53.408

FIGURE – Source: European Central Bank (2009)

Back

PERSONAL INCOME TAX FILERS, 1999-2015

Year	Filers	Total adult population	Share of filers
1999	18,521,709	29,443,569	62.9%
2000	19,246,192	29,802,677	64.6%
2001	19,757,147	30,151,784	65.5%
2002	19,914,191	30,806,036	64.6%
2003	20,371,413	31,493,090	64.7%
2004	20,853,041	32,086,956	65.0%
2005	21,364,900	32,787,486	65.2%
2006	21,949,869	33,353,020	65.8%
2007	22,659,298	34,046,357	66.6%
2008	23,231,888	34,612,129	67.1%
2009	23,099,973	34,890,003	66.2%
2010	22,921,340	35,041,460	65.4%
2011	23,067,189	35,173,023	65.6%
2012	22,946,558	35,200,009	65.2%
2013	22,735,378	35,082,702	64.8%
2014	22,835,510	34,982,154	65.3%
2015	22,882,152	34,942,929	65.5%

Back

IMPUTED NET HOUSEHOLD WEALTH, 1984-2015

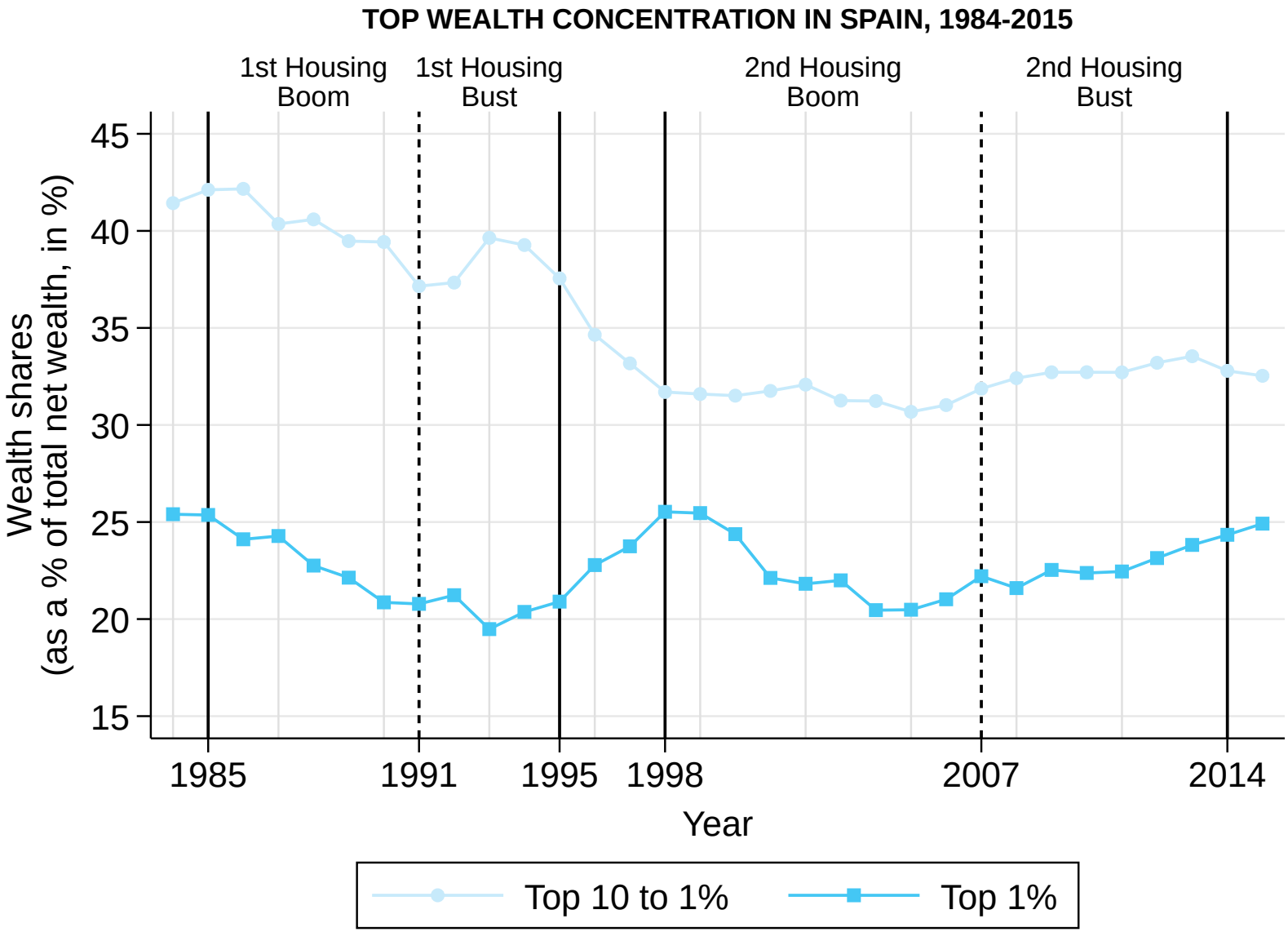
Year	Primary residence	Investment funds	Pension funds	Life insurance	Total imputed wealth
1984		0.1%	0.2%	0.3%	0.6%
1985		0.1%	0.3%	0.4%	0.7%
1986		0.2%	0.4%	0.4%	1.0%
1987		0.3%	0.5%	0.5%	1.3%
1988		0.3%	0.7%	0.7%	1.7%
1989		0.4%	0.9%	0.8%	2.1%
1990		0.4%	1.1%	0.9%	2.4%
1991		0.9%	1.2%	0.9%	3.1%
1992		1.8%	1.4%	1.1%	4.4%
1993		2.9%	1.5%	1.3%	5.7%
1994		3.5%	1.5%	1.6%	6.6%
1995		3.5%	1.4%	2.0%	6.9%
1996		4.4%	1.6%	2.2%	8.1%
1997		6.0%	1.7%	2.5%	10.2%
1998		7.3%	1.8%	2.6%	11.7%
1999	35.7%	7.0%	1.9%	2.8%	47.4%
2000	38.4%	5.7%	2.1%	2.8%	49.1%
2001	40.6%	4.6%	2.3%	2.7%	50.3%
2002	41.1%	4.0%	2.4%	2.5%	50.0%
2003	41.9%	3.7%	2.5%	2.2%	50.3%
2004	42.6%	3.6%	2.3%	2.1%	50.6%
2005	42.7%	3.6%	2.2%	2.0%	50.5%
2006	41.1%	3.5%	2.2%	1.9%	48.7%
2007	38.5%	3.2%	2.1%	1.8%	45.7%
2008	39.5%	2.7%	2.1%	1.9%	46.1%
2009	36.3%	2.5%	2.3%	2.1%	43.2%
2010	36.6%	2.3%	2.3%	2.2%	43.4%
2011	36.3%	2.1%	2.3%	2.2%	43.0%
2012	33.8%	2.1%	2.5%	2.5%	40.9%
2013	31.9%	2.7%	2.7%	2.7%	40.0%
2014	30.8%	3.6%	2.9%	2.9%	40.2%
2015	30.7%	4.3%	2.9%	3.0%	40.9%

Back

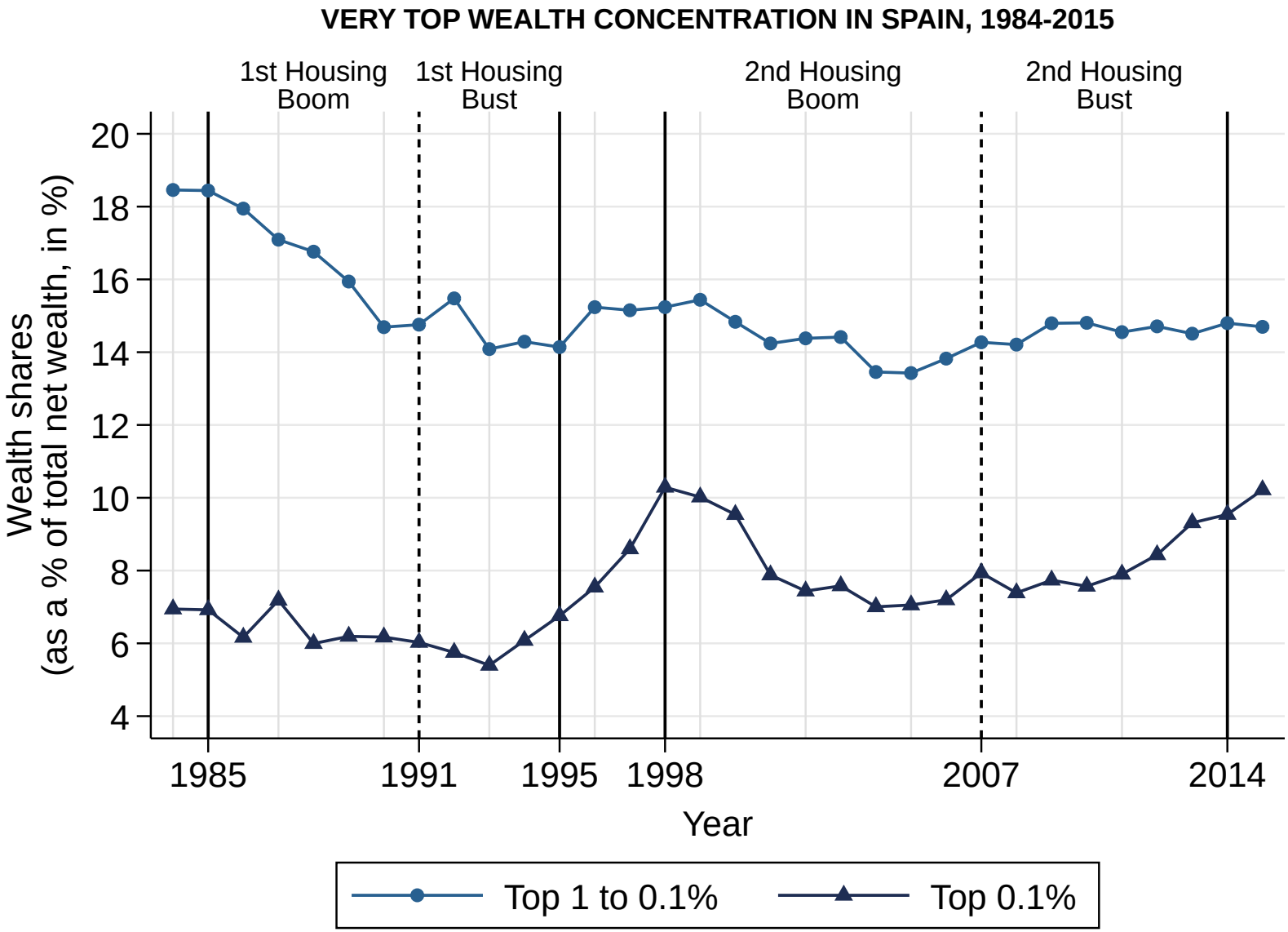
WEALTH THRESHOLDS AND SHARES IN SPAIN, 2015

Wealth group	Number of adults	Wealth threshold	Average wealth	Wealth share
Full population	35,082,703	0€	147,395€	100%
Bottom 50%	17,541,352	0€	19,413€	6.6%
Middle 40%	14,033,081	61,890€	132,643€	36.0%
Top 10%	3,721,375	284,390€	829,942€	57.4%
incl. Top 1%	372,138	1,416,646€	3,393,448€	24.9%
incl. Top 0.1%	37,214	4,894,606€	12,482,984€	10.2%
incl. Top 0.01%	3,721	19,130,185€	51,017,990€	4.3%

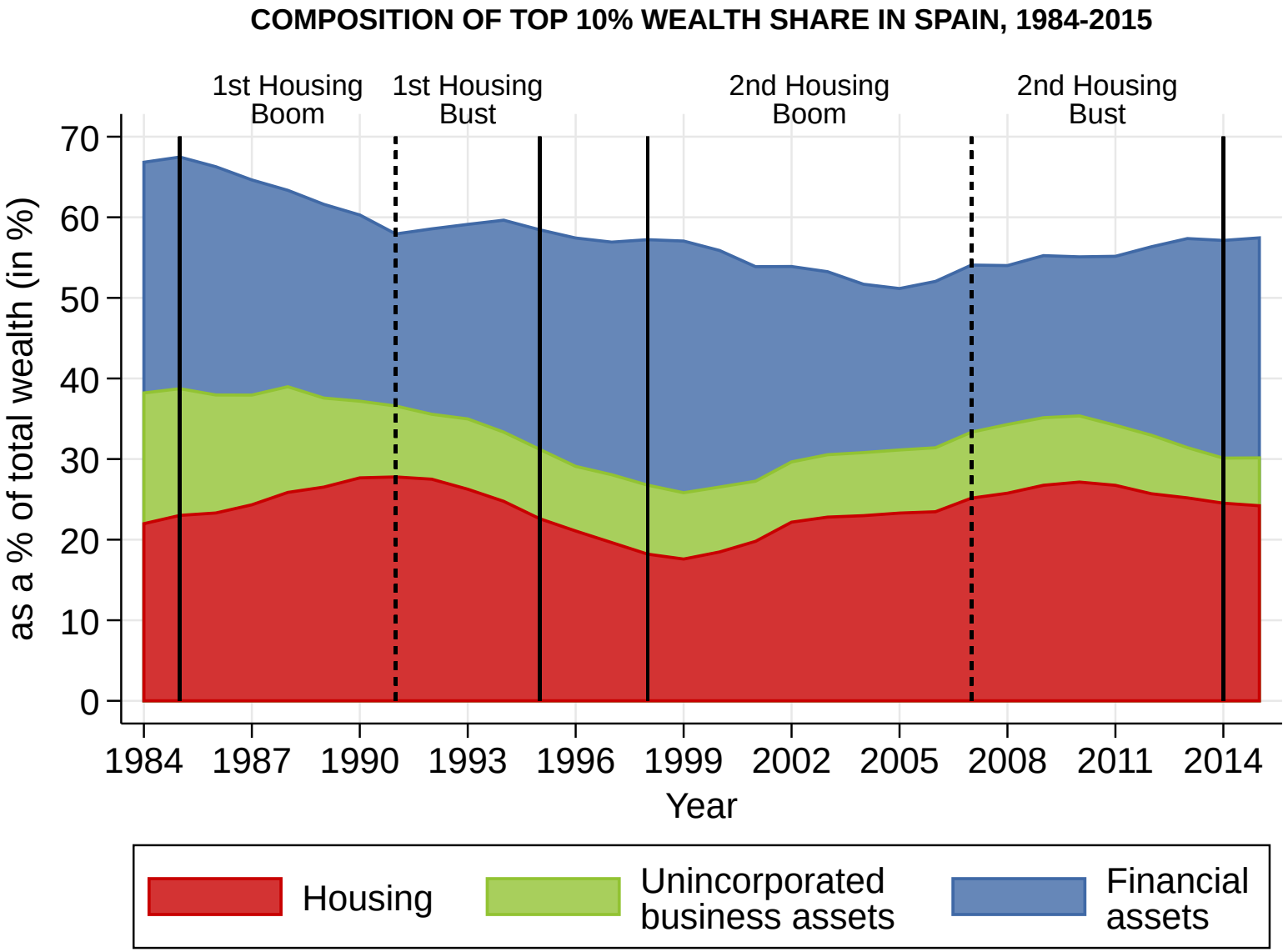
Back


TOP WEALTH CONCENTRATION IN SPAIN, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Wealth shares
(as a % of total net wealth, in %)
45
40
35
30
25
20
15
1985
1991
1995
1998
2007
2014
Year
Top 10 to 1%
Top 1%

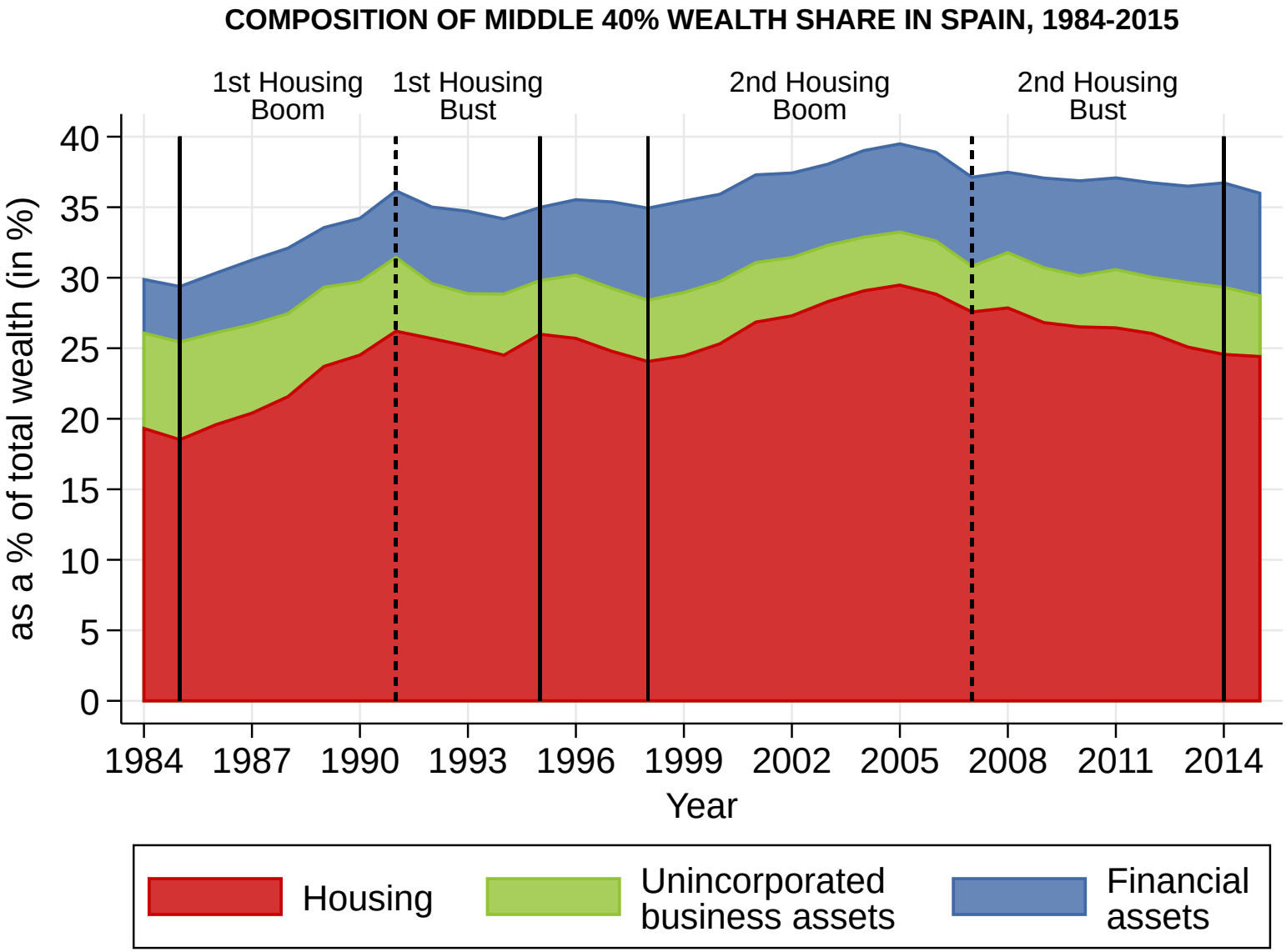
Back


VERY TOP WEALTH CONCENTRATION IN SPAIN, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Wealth shares (as a % of total net wealth, in %)
20
18
16
14
12
10
8
6
4
1985
1991
1995
1998
2007
2014
Year
Top 1 to 0.1%
Top 0.1%

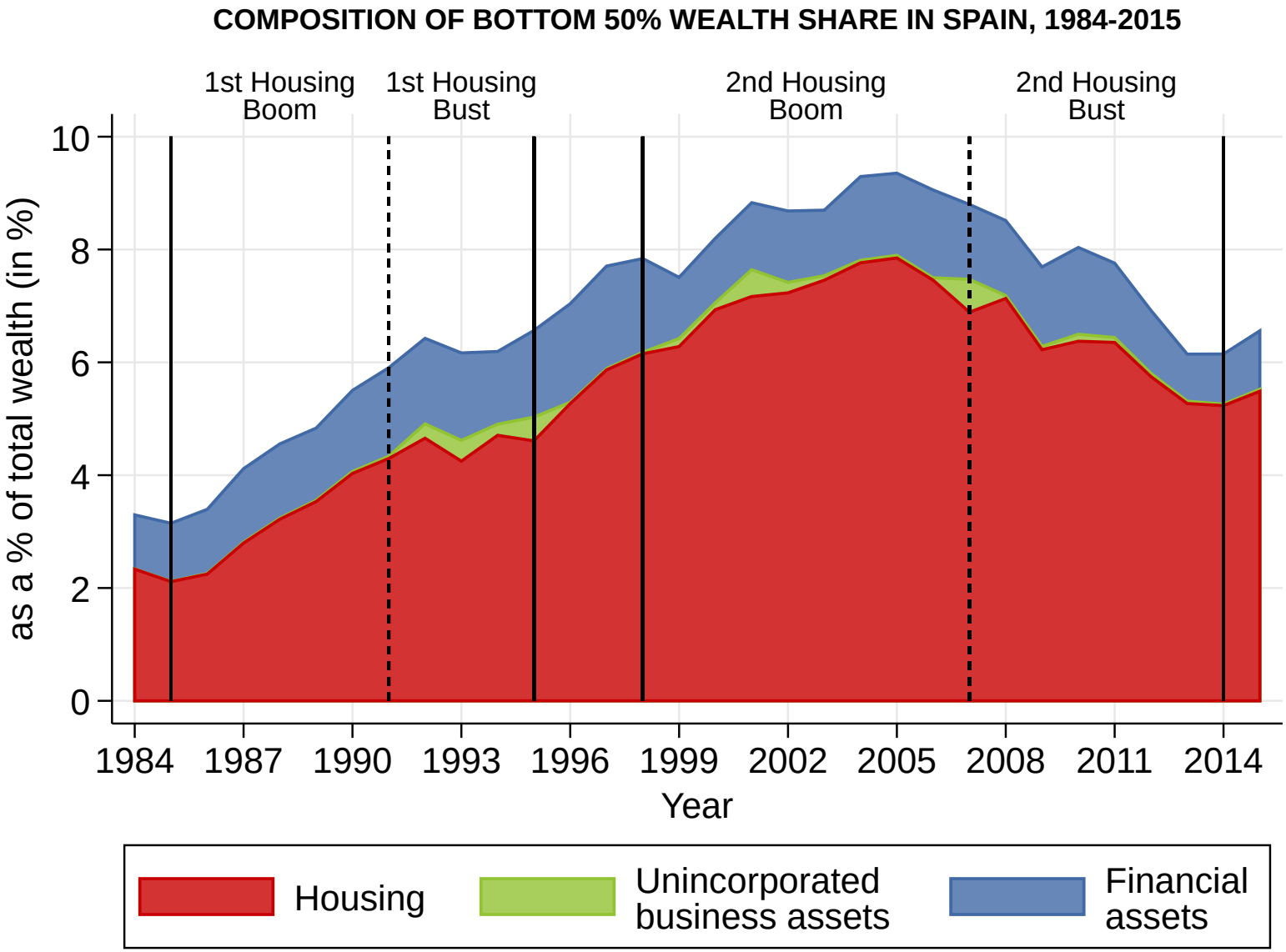
Back


COMPOSITION OF TOP 10% WEALTH SHARE IN SPAIN, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
as a % of total wealth (in %)
0
10
20
30
40
50
60
70
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
Year
Housing
Unincorporated business assets
Financial assets

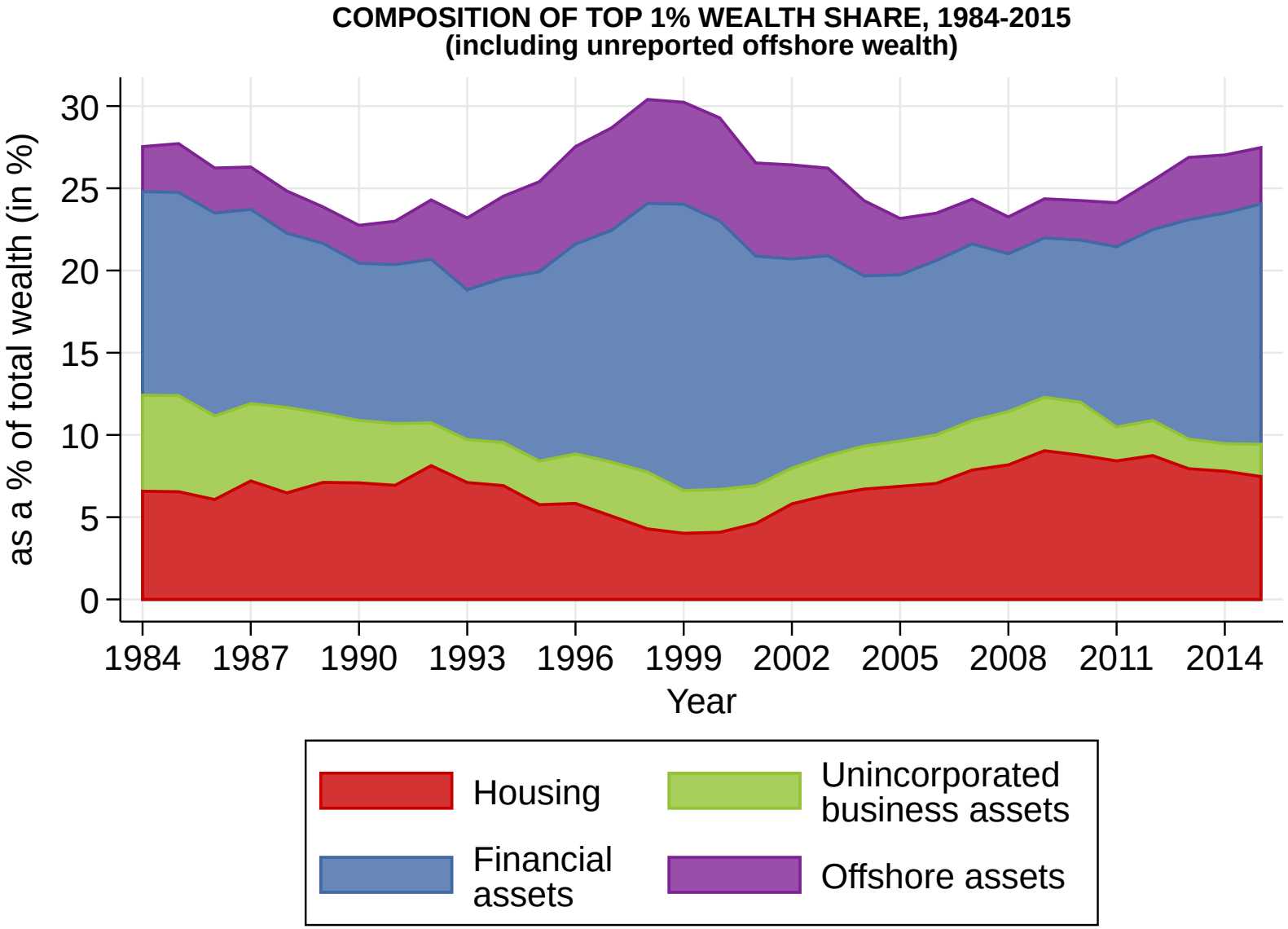
Back


COMPOSITION OF MIDDLE 40% WEALTH SHARE IN SPAIN, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
as a % of total wealth (in %)
0
5
10
15
20
25
30
35
40
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
Year
Housing
Unincorporated business assets
Financial assets

Back


COMPOSITION OF BOTTOM 50% WEALTH SHARE IN SPAIN, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
as a % of total wealth (in %)
0
2
4
6
8
10
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
Year
Housing
Unincorporated business assets
Financial assets

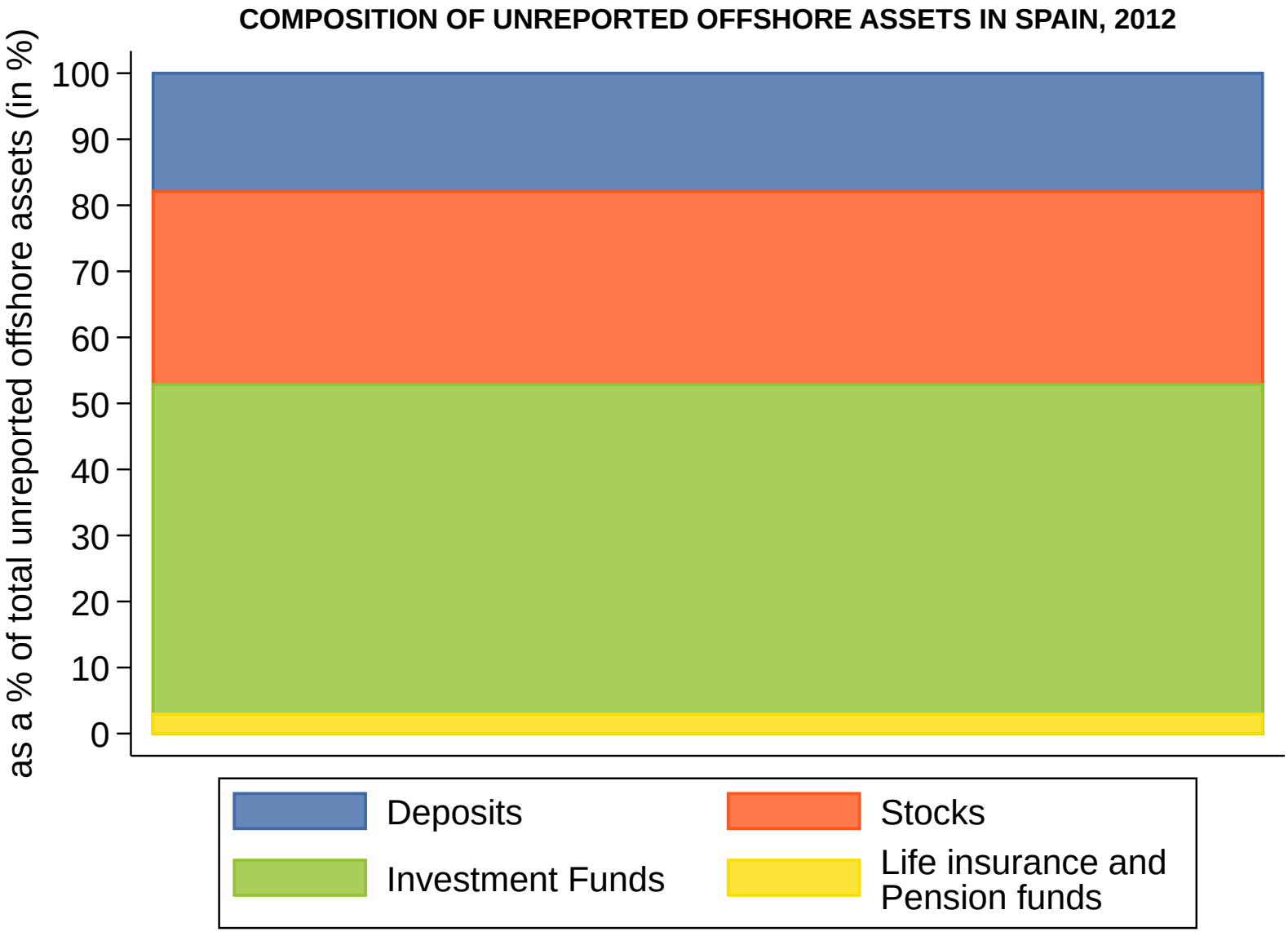
Back


COMPOSITION OF TOP 1% WEALTH SHARE, 1984-2015
(including unreported offshore wealth)
as a % of total wealth (in %)
0
5
10
15
20
25
30
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
Year
Housing
Financial assets
Unincorporated business assets
Offshore assets

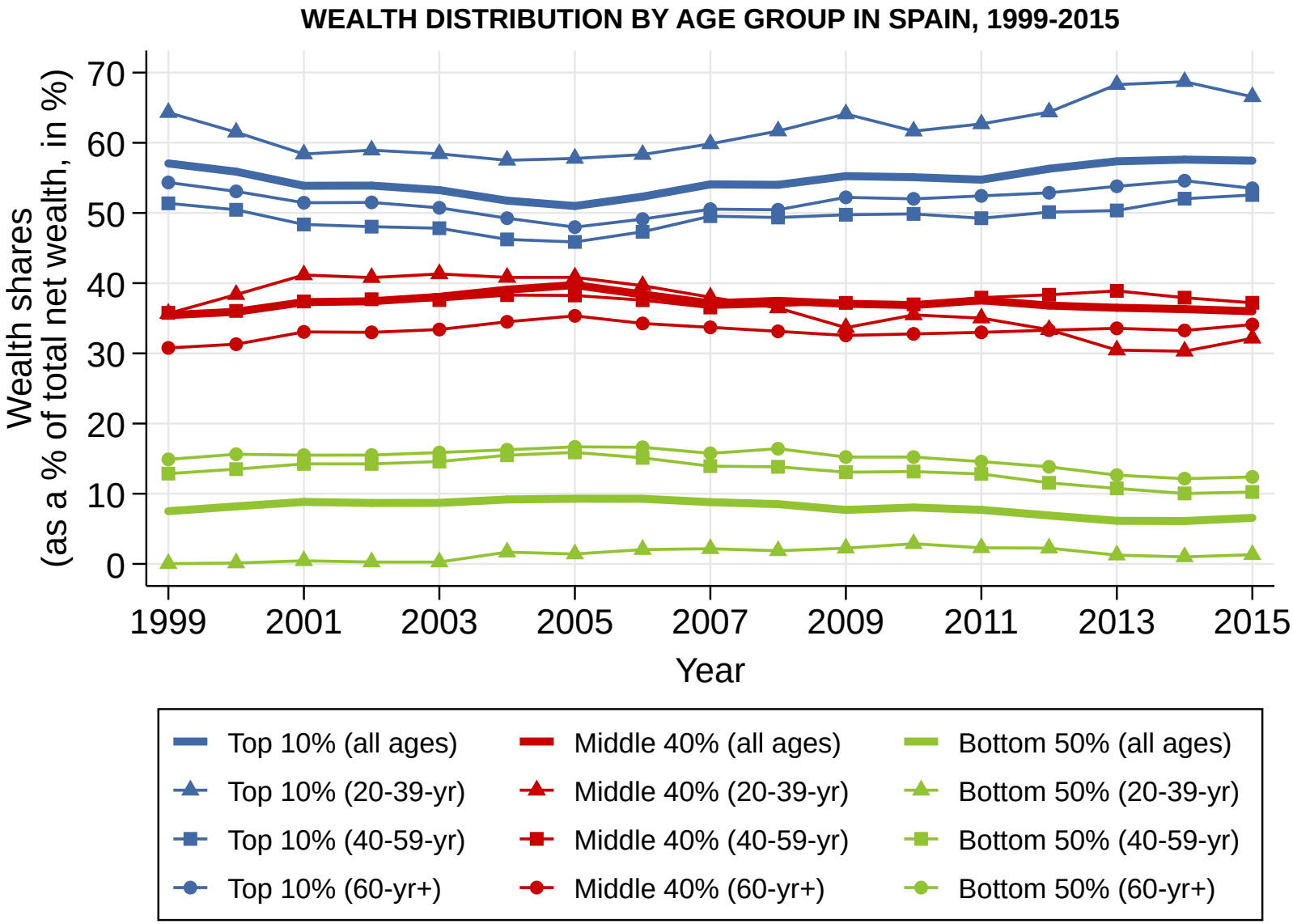
Back


TOTAL UNREPORTED OFFSHORE WEALTH IN SPAIN, 1984-2015
as a % of household financial wealth (in %)
18
16
14
12
10
8
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
Year

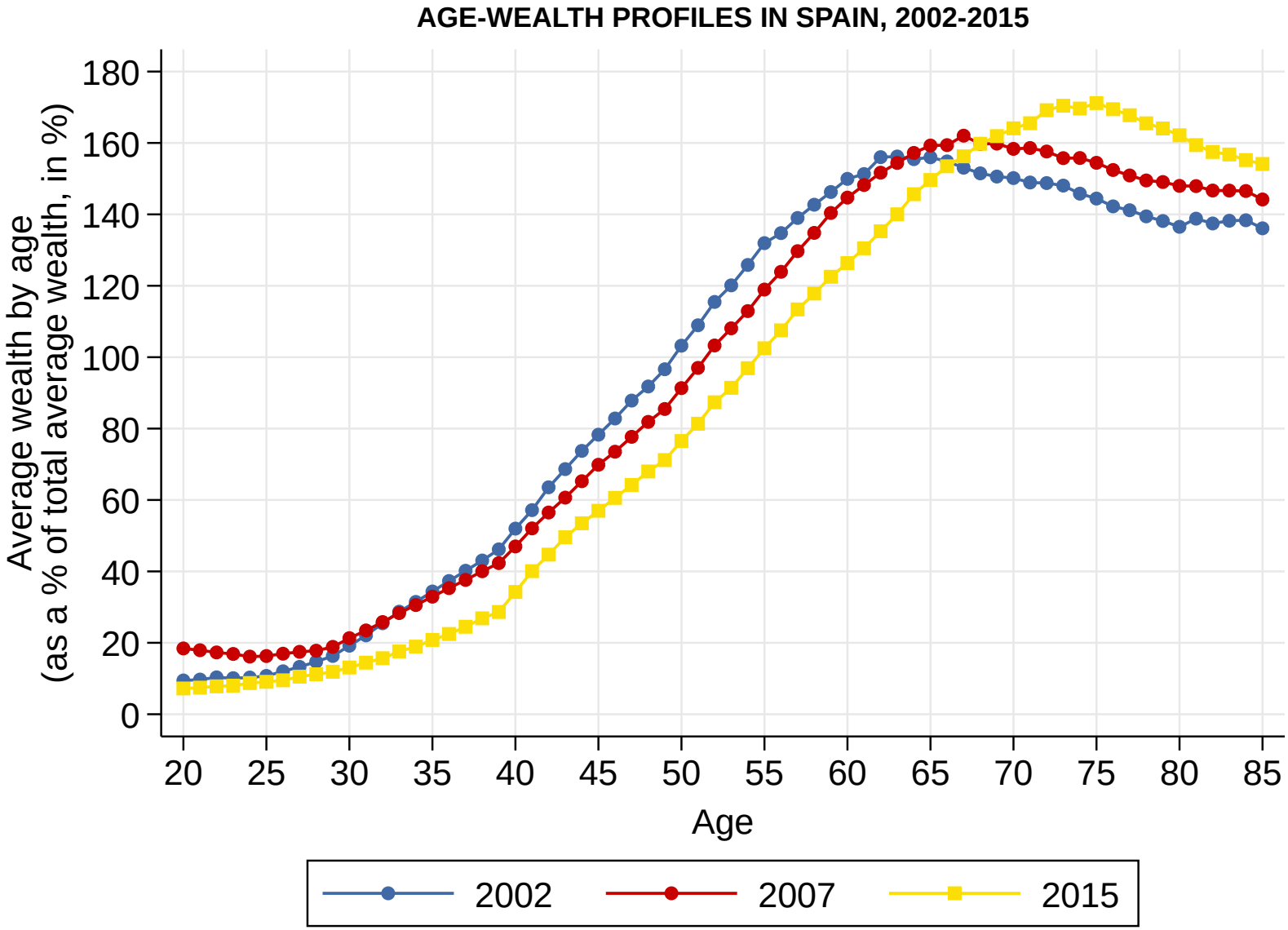
Back


COMPOSITION OF UNREPORTED OFFSHORE ASSETS IN SPAIN, 2012
as a % of total unreported offshore assets (in %)
100
90
80
70
60
50
40
30
20
10
0
Deposits
Stocks
Investment Funds
Life insurance and Pension funds

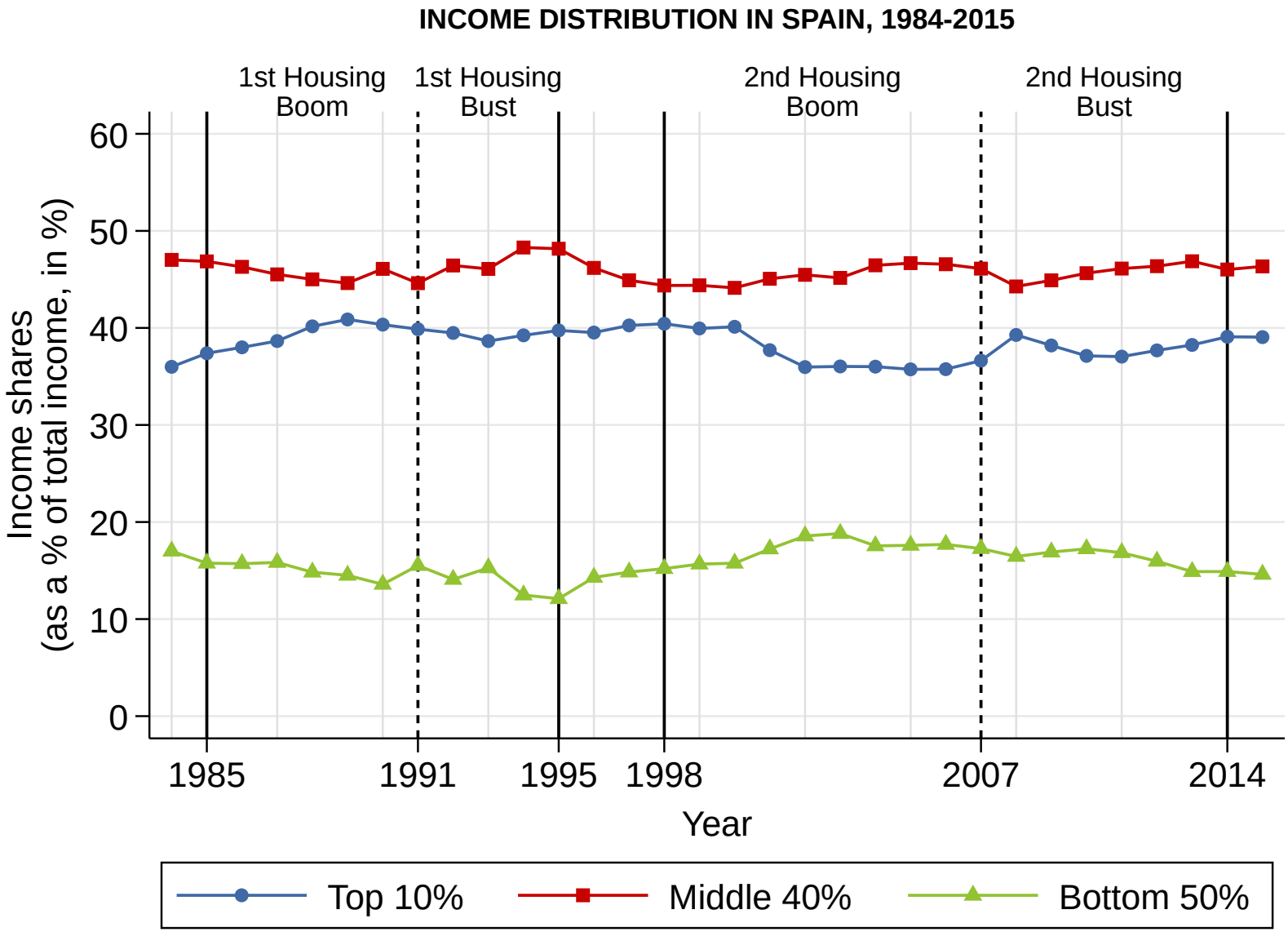
Back


WEALTH DISTRIBUTION BY AGE GROUP IN SPAIN, 1999-2015
Wealth shares
(as a % of total net wealth, in %)
0
10
20
30
40
50
60
70
1999
2001
2003
2005
2007
2009
2011
2013
2015
Year
Top 10% (all ages)
Top 10% (20-39-yr)
Top 10% (40-59-yr)
Top 10% (60-yr+)
Middle 40% (all ages)
Middle 40% (20-39-yr)
Middle 40% (40-59-yr)
Middle 40% (60-yr+)
Bottom 50% (all ages)
Bottom 50% (20-39-yr)
Bottom 50% (40-59-yr)
Bottom 50% (60-yr+)

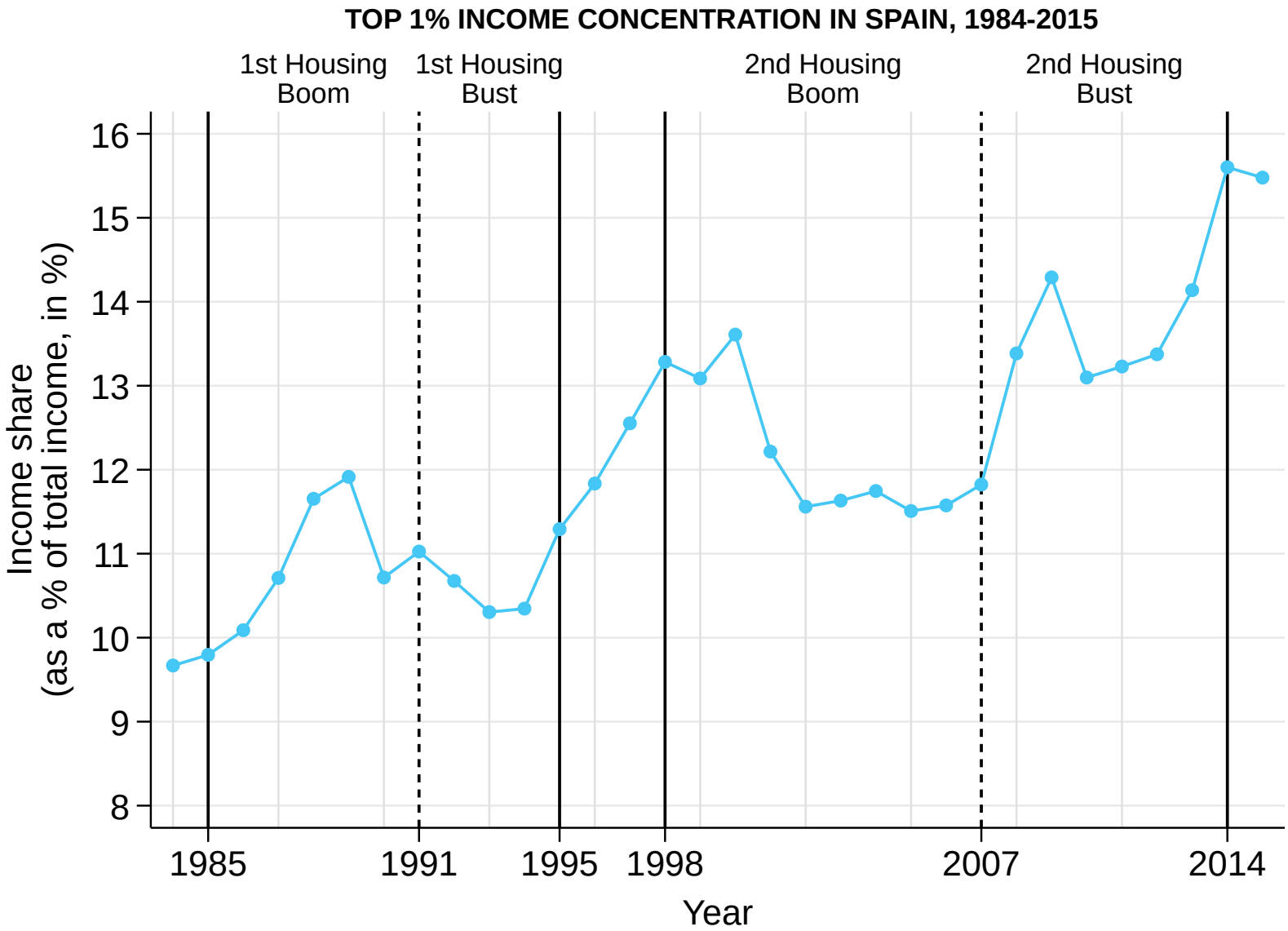
Back


AGE-WEALTH PROFILES IN SPAIN, 2002-2015
Average wealth by age
(as a % of total average wealth, in %)
0
20
40
60
80
100
120
140
160
180
20
25
30
35
40
45
50
55
60
65
70
75
80
85
Age
2002
2007
2015

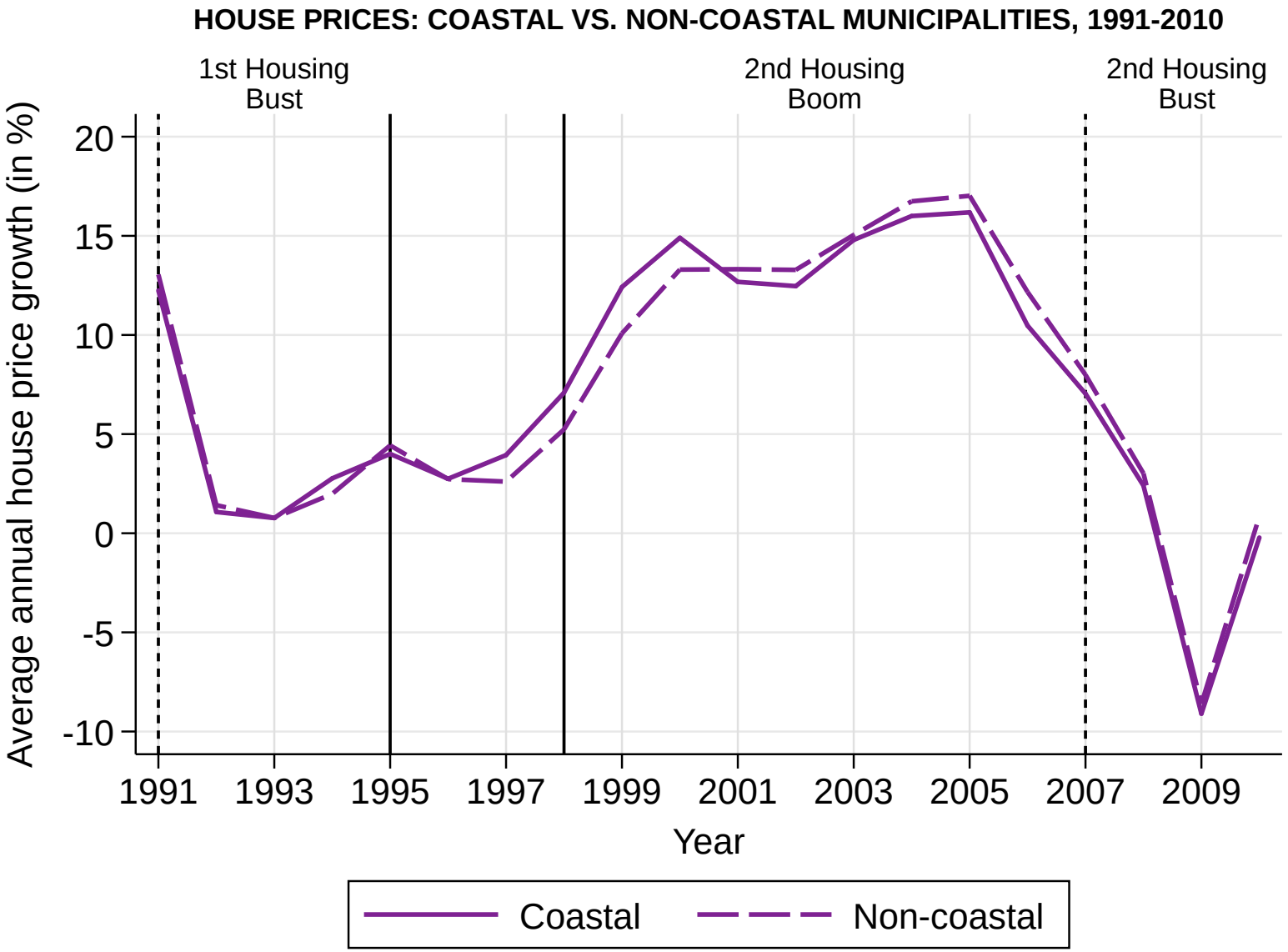
Back


INCOME DISTRIBUTION IN SPAIN, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Income shares (as a % of total income, in %)
60
50
40
30
20
10
0
1985
1991
1995
1998
2007
2014
Year
Top 10%
Middle 40%
Bottom 50%

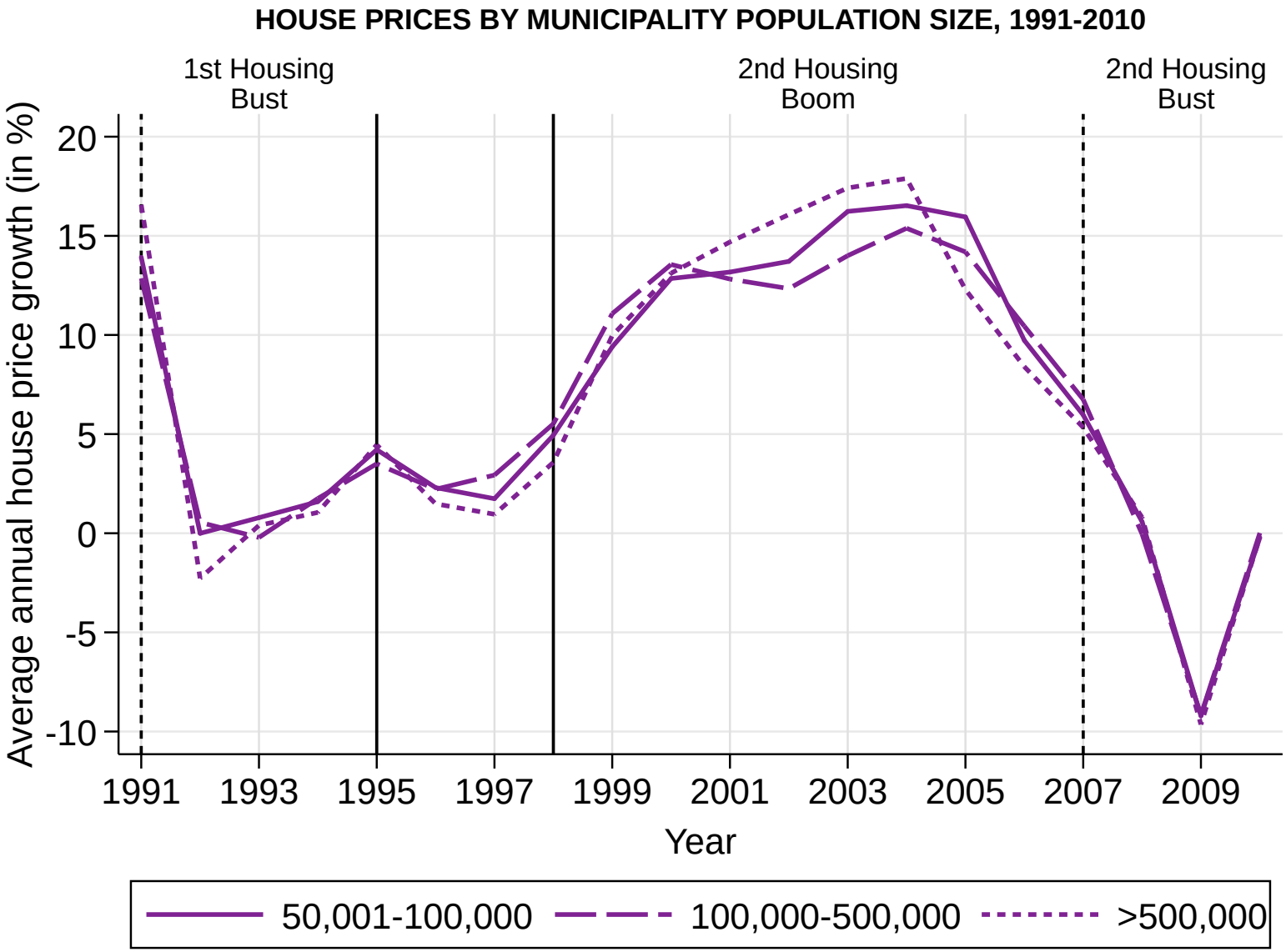
Back


TOP 1% INCOME CONCENTRATION IN SPAIN, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Income share (as a % of total income, in %)
16
15
14
13
12
11
10
9
8
1985
1991
1995
1998
2007
2014
Year

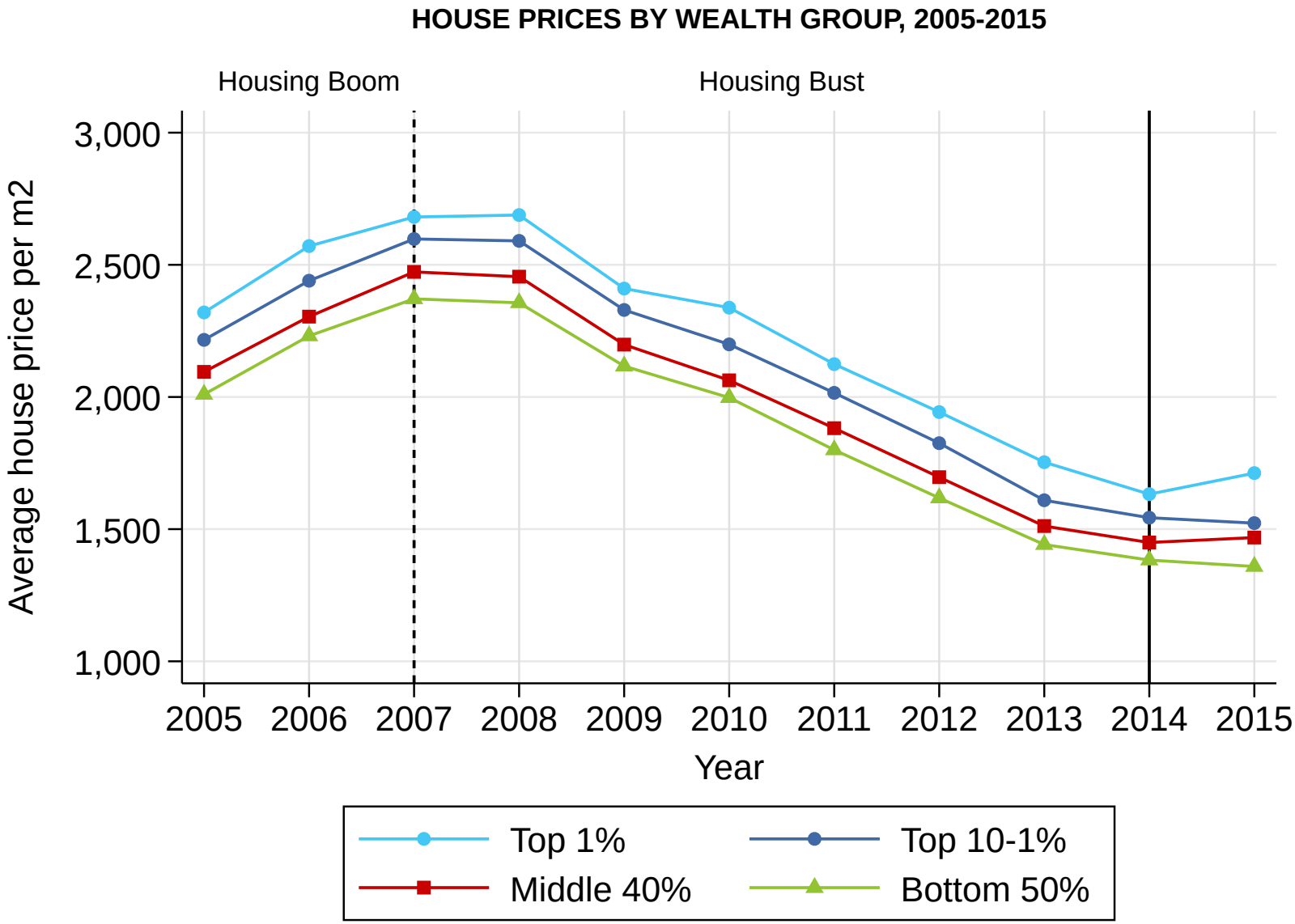
Back


HOUSE PRICES: COASTAL VS. NON-COASTAL MUNICIPALITIES, 1991-2010
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Average annual house price growth (in %)
20
15
10
5
0
-5
-10
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
Year
Coastal
Non-coastal

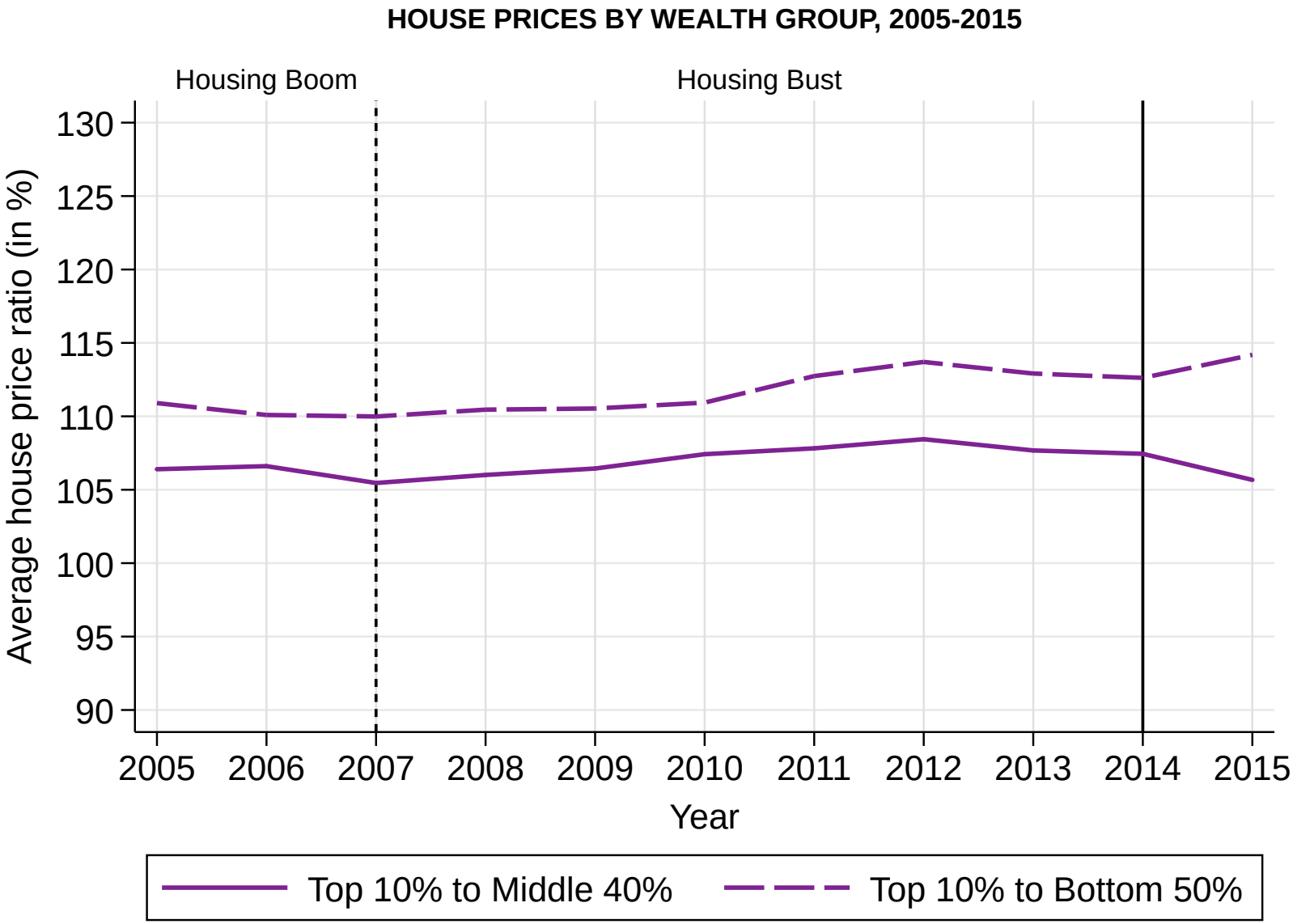
Back


HOUSE PRICES BY MUNICIPALITY POPULATION SIZE, 1991-2010
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Average annual house price growth (in %)
20
15
10
5
0
-5
-10
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
Year
50,001-100,000
100,000-500,000
>500,000

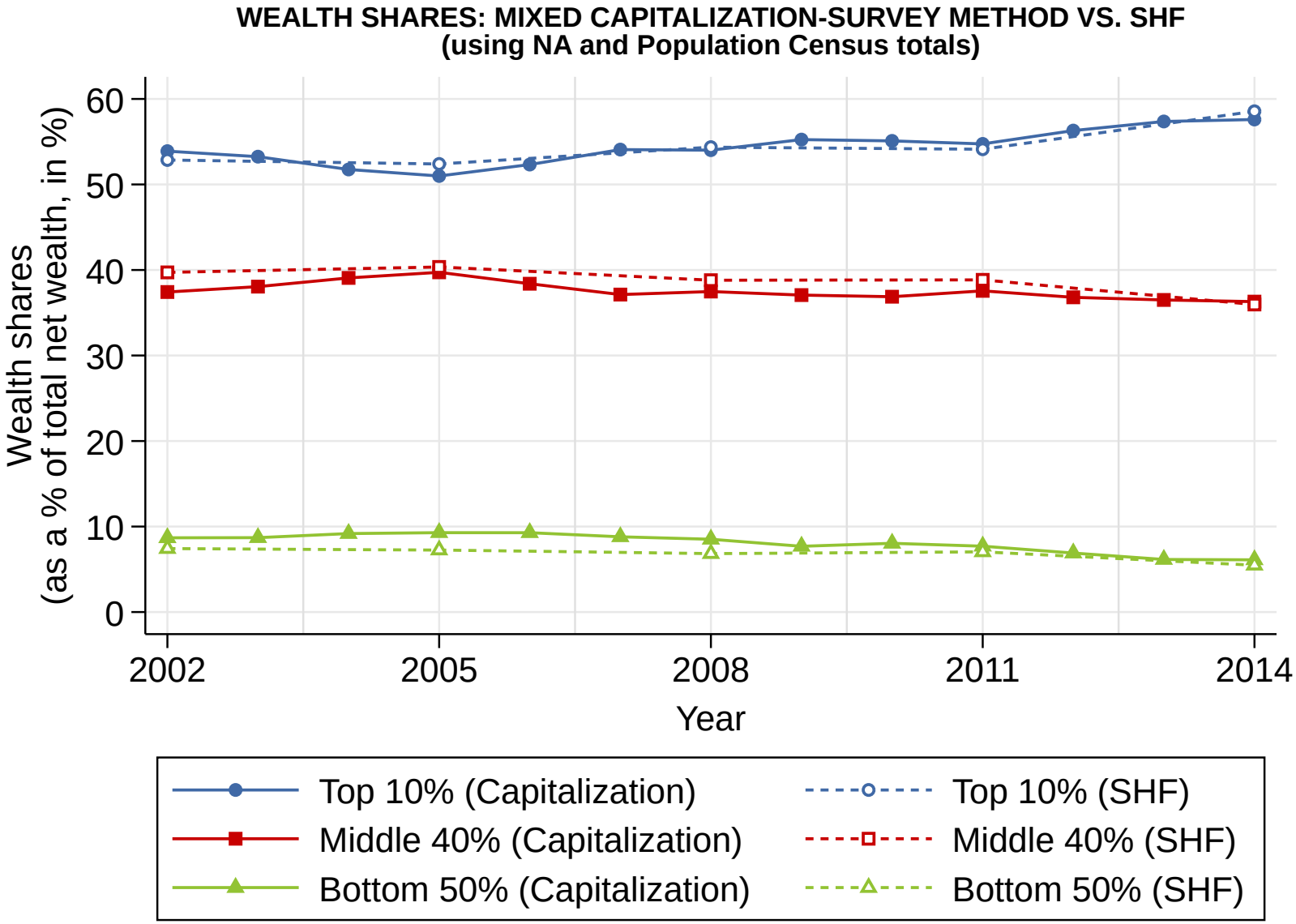
Back


HOUSE PRICES BY WEALTH GROUP, 2005-2015
Housing Boom
Housing Bust
Average house price per m2
3,000
2,500
2,000
1,500
1,000
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year
Top 1%
Top 10-1%
Middle 40%
Bottom 50%

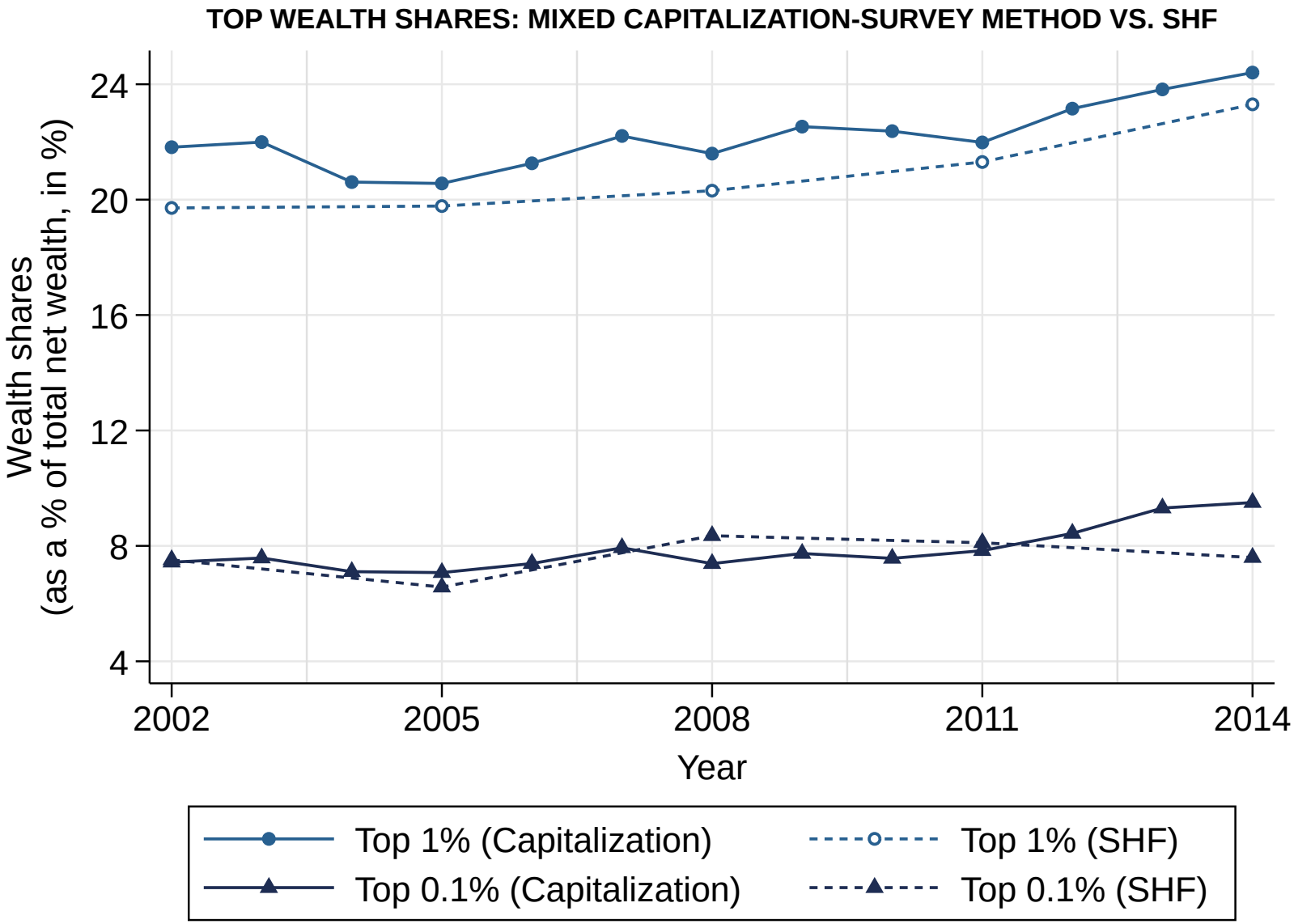
Back


HOUSE PRICES BY WEALTH GROUP, 2005-2015
Housing Boom
Housing Bust
Average house price ratio (in %)
130
125
120
115
110
105
100
95
90
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year
Top 10% to Middle 40%
Top 10% to Bottom 50%

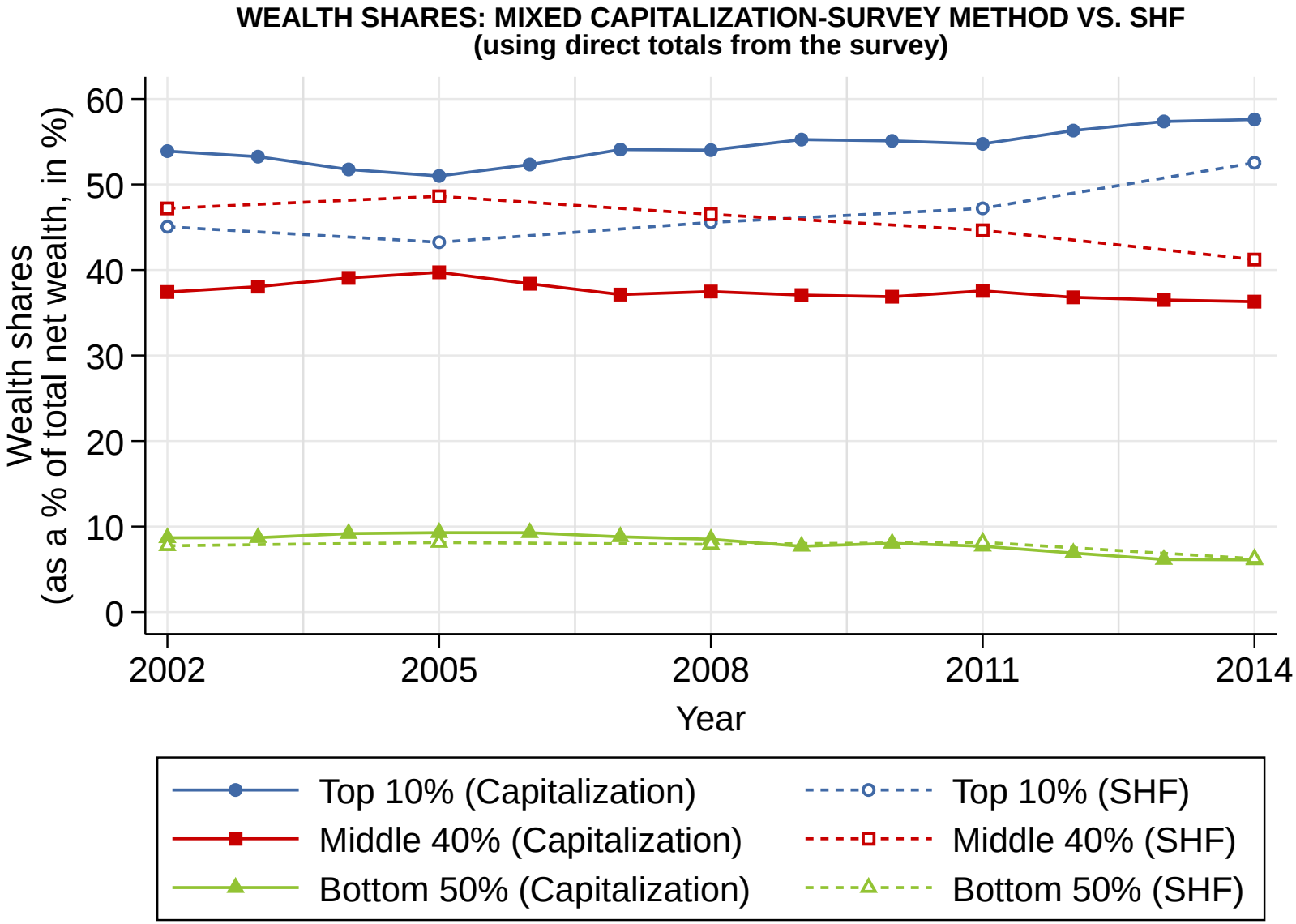
Back


WEALTH SHARES: MIXED CAPITALIZATION-SURVEY METHOD VS. SHF
(using NA and Population Census totals)
Wealth shares
(as a % of total net wealth, in %)
60
50
40
30
20
10
0
2002
2005
2008
2011
2014
Year
Top 10% (Capitalization)
Middle 40% (Capitalization)
Bottom 50% (Capitalization)
Top 10% (SHF)
Middle 40% (SHF)
Bottom 50% (SHF)

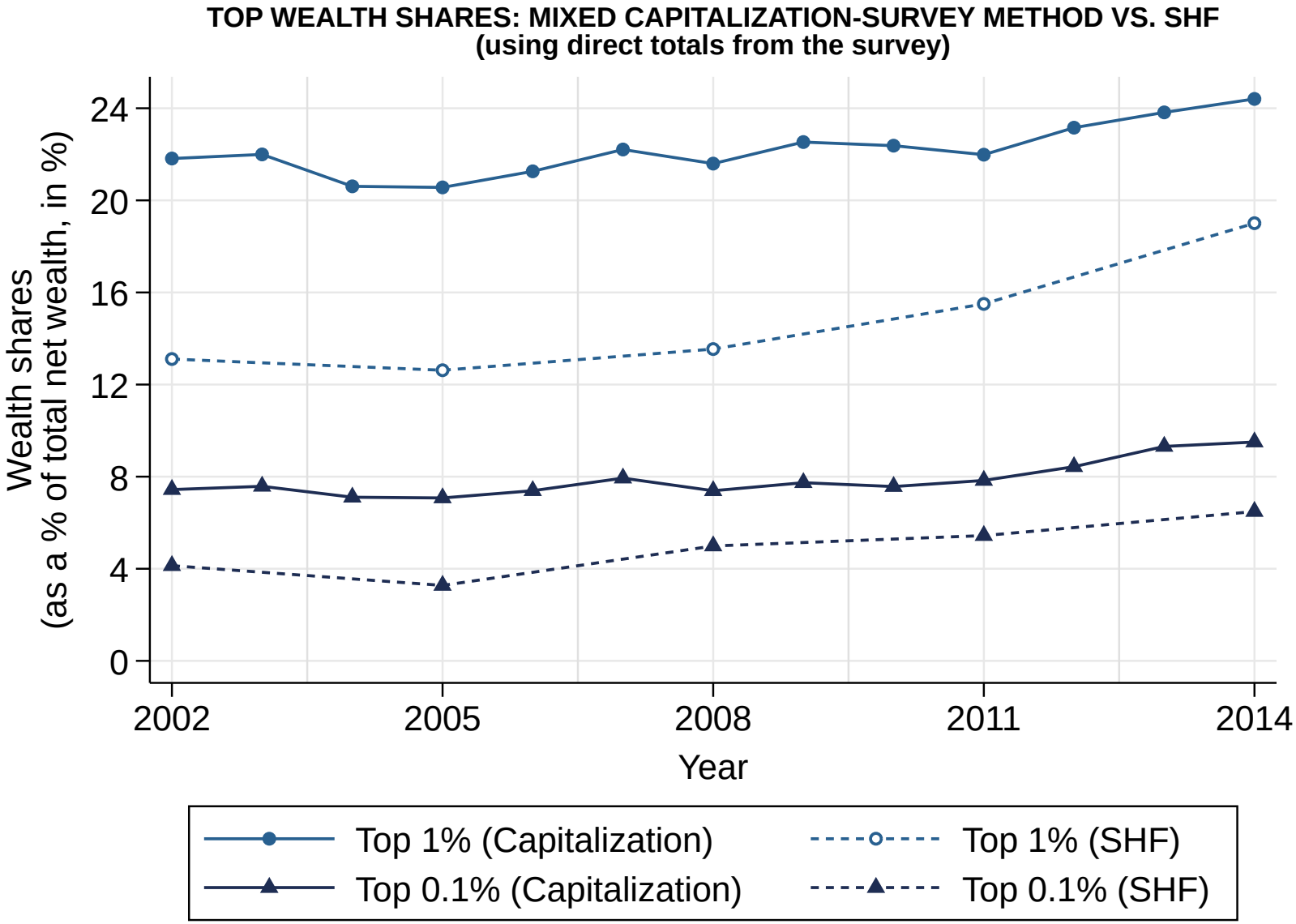
Back


TOP WEALTH SHARES: MIXED CAPITALIZATION-SURVEY METHOD VS. SHF
Wealth shares
(as a % of total net wealth, in %)
24
20
16
12
8
4
2002
2005
2008
2011
2014
Year
Top 1% (Capitalization)
Top 1% (SHF)
Top 0.1% (Capitalization)
Top 0.1% (SHF)

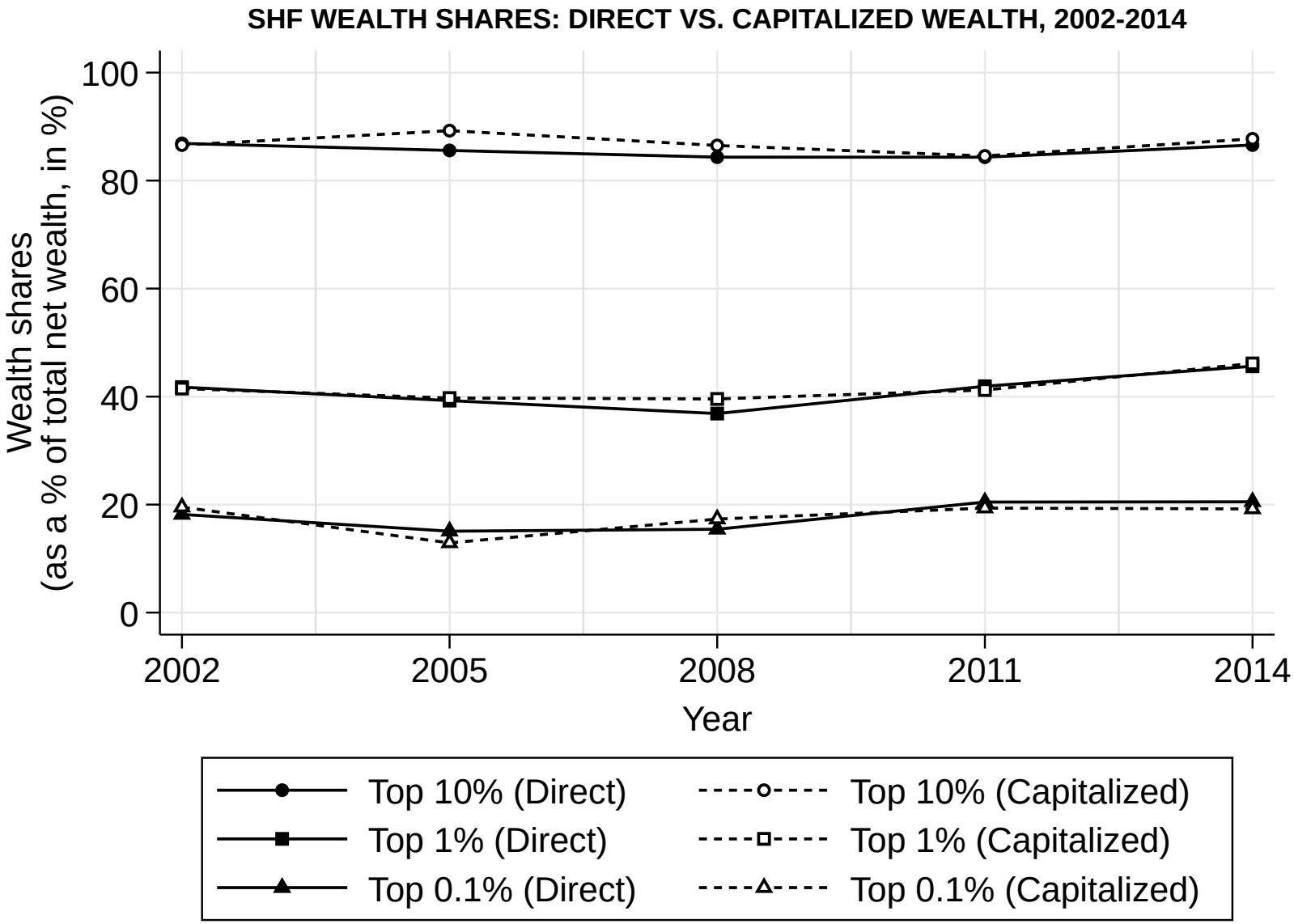
Back


WEALTH SHARES: MIXED CAPITALIZATION-SURVEY METHOD VS. SHF
(using direct totals from the survey)
Wealth shares
(as a % of total net wealth, in %)
60
50
40
30
20
10
0
2002
2005
2008
2011
2014
Year
Top 10% (Capitalization)
Middle 40% (Capitalization)
Bottom 50% (Capitalization)
Top 10% (SHF)
Middle 40% (SHF)
Bottom 50% (SHF)

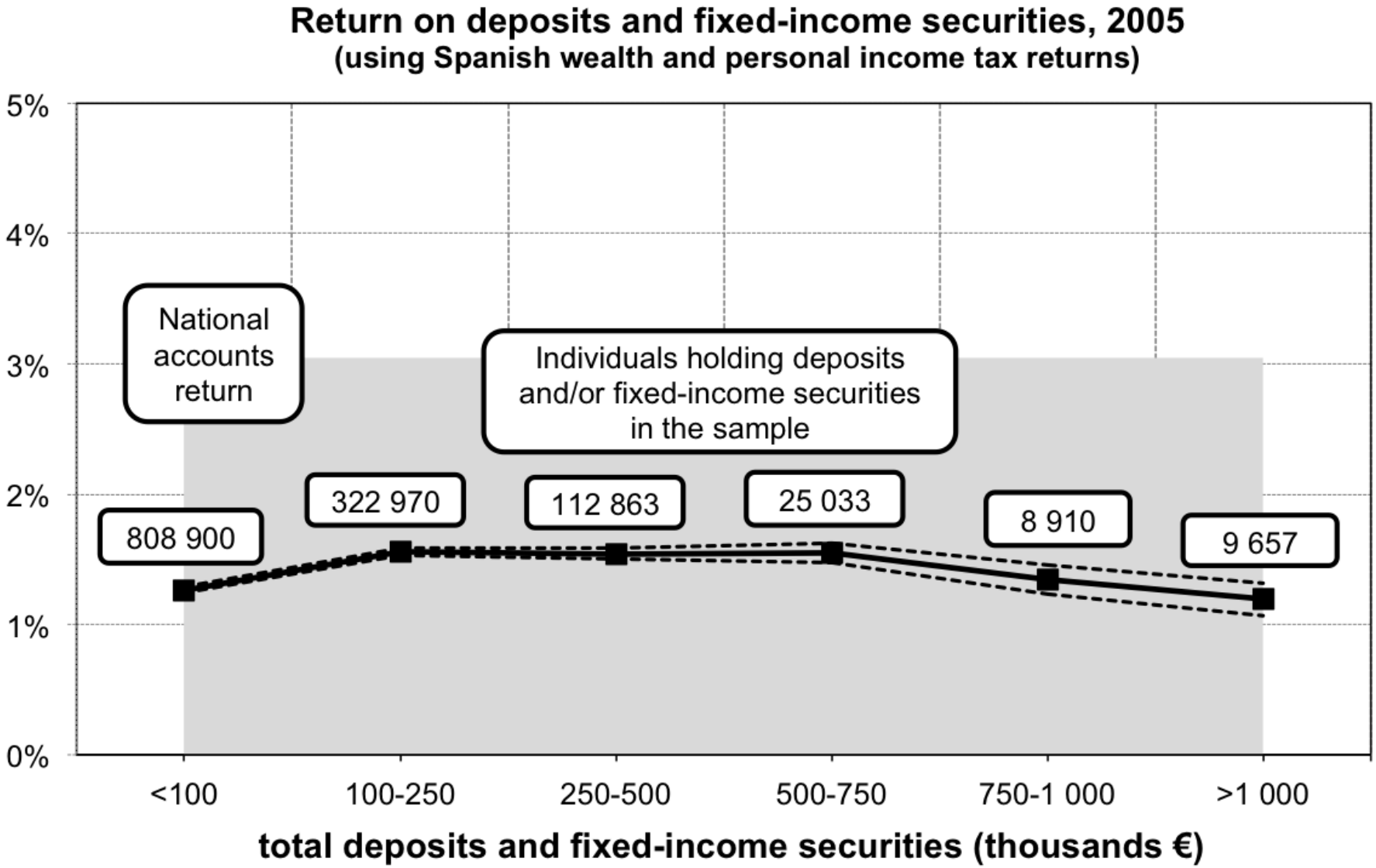
Back


TOP WEALTH SHARES: MIXED CAPITALIZATION-SURVEY METHOD VS. SHF
(using direct totals from the survey)
Wealth shares
(as a % of total net wealth, in %)
0
4
8
12
16
20
24
2002
2005
2008
2011
2014
Year
Top 1% (Capitalization)
Top 1% (SHF)
Top 0.1% (Capitalization)
Top 0.1% (SHF)

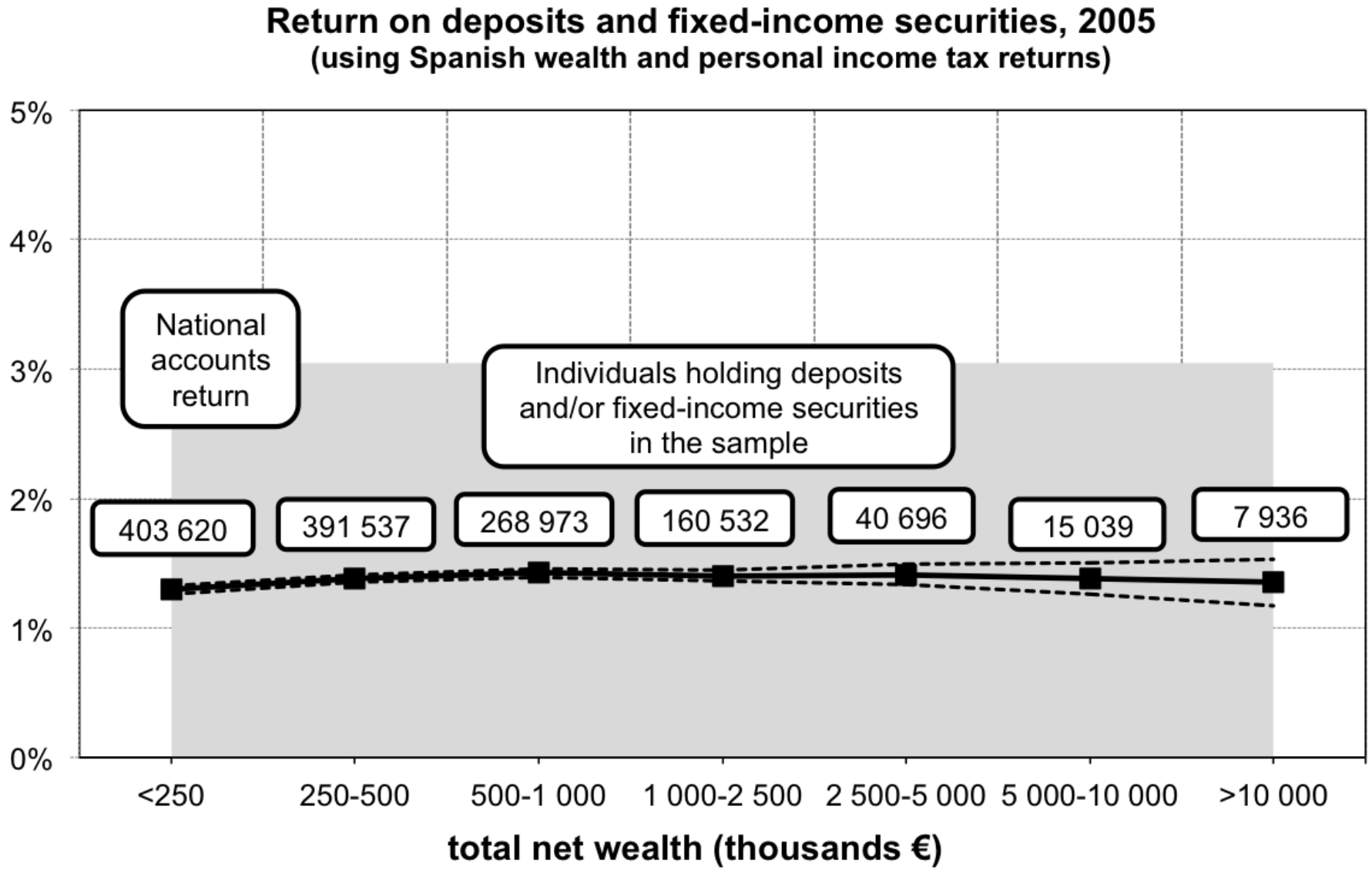
Back


SHF WEALTH SHARES: DIRECT VS. CAPITALIZED WEALTH, 2002-2014
Wealth shares
(as a % of total net wealth, in %)
100
80
60
40
20
0
2002
2005
2008
2011
2014
Year
Top 10% (Direct)
Top 10% (Capitalized)
Top 1% (Direct)
Top 1% (Capitalized)
Top 0.1% (Direct)
Top 0.1% (Capitalized)

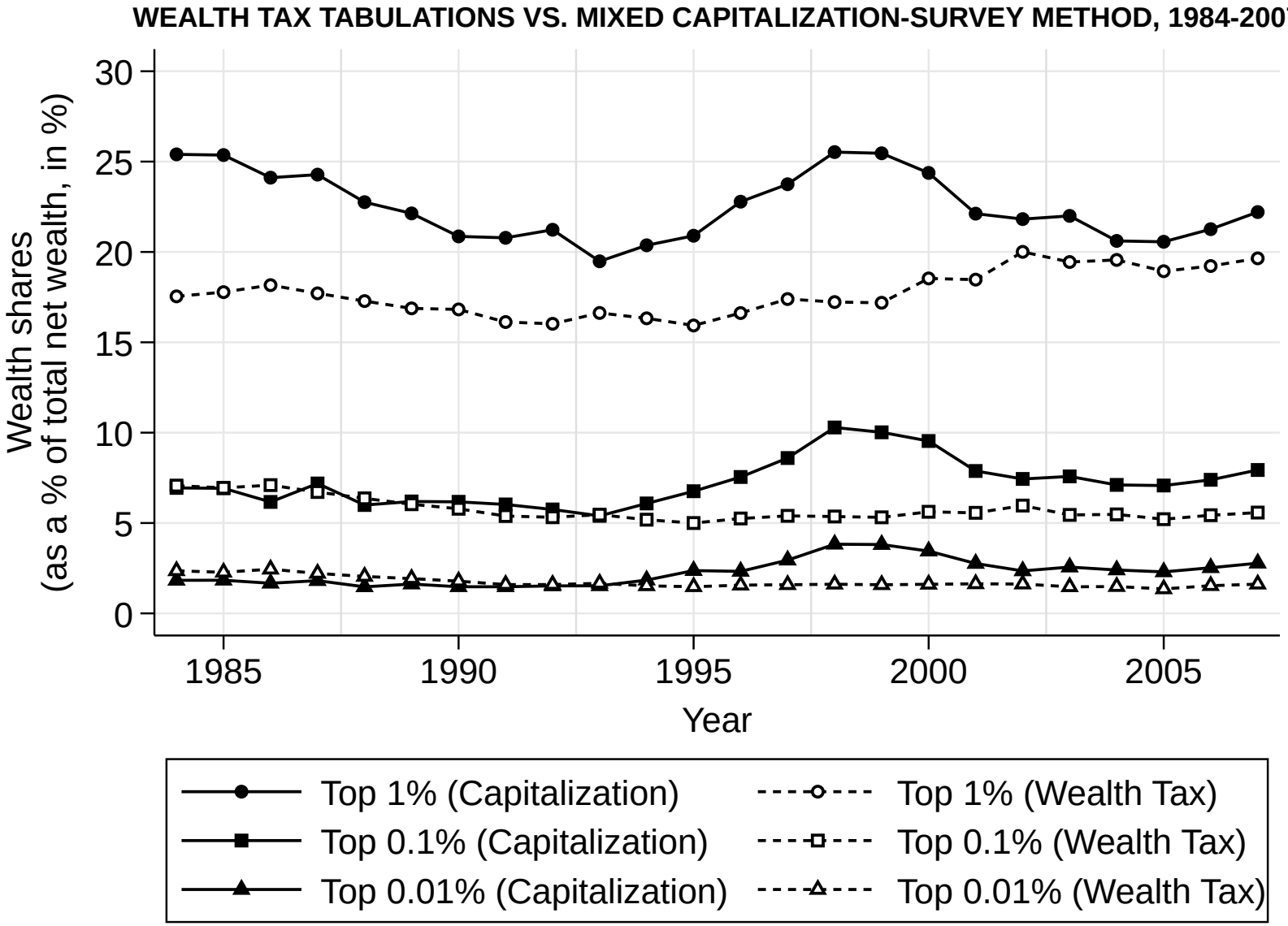
Back


Return on deposits and fixed-income securities, 2005
(using Spanish wealth and personal income tax returns)
5%
4%
3%
2%
1%
0%
National accounts return
Individuals holding deposits and/or fixed-income securities in the sample
808 900
322 970
112 863
25 033
8 910
9 657
<100
100-250
250-500
500-750
750-1 000
>1 000
total deposits and fixed-income securities (thousands €)

Back


Return on deposits and fixed-income securities, 2005
(using Spanish wealth and personal income tax returns)
5%
4%
3%
2%
1%
0%
National accounts return
Individuals holding deposits and/or fixed-income securities in the sample
403 620
391 537
268 973
160 532
40 696
15 039
7 936
<250
250-500
500-1 000
1 000-2 500
2 500-5 000
5 000-10 000
>10 000
total net wealth (thousands €)

Back


WEALTH TAX TABULATIONS VS. MIXED CAPITALIZATION-SURVEY METHOD, 1984-2007
Wealth shares
(as a % of total net wealth, in %)
30
25
20
15
10
5
0
1985
1990
1995
2000
2005
Year
Top 1% (Capitalization)
Top 0.1% (Capitalization)
Top 0.01% (Capitalization)
Top 1% (Wealth Tax)
Top 0.1% (Wealth Tax)
Top 0.01% (Wealth Tax)

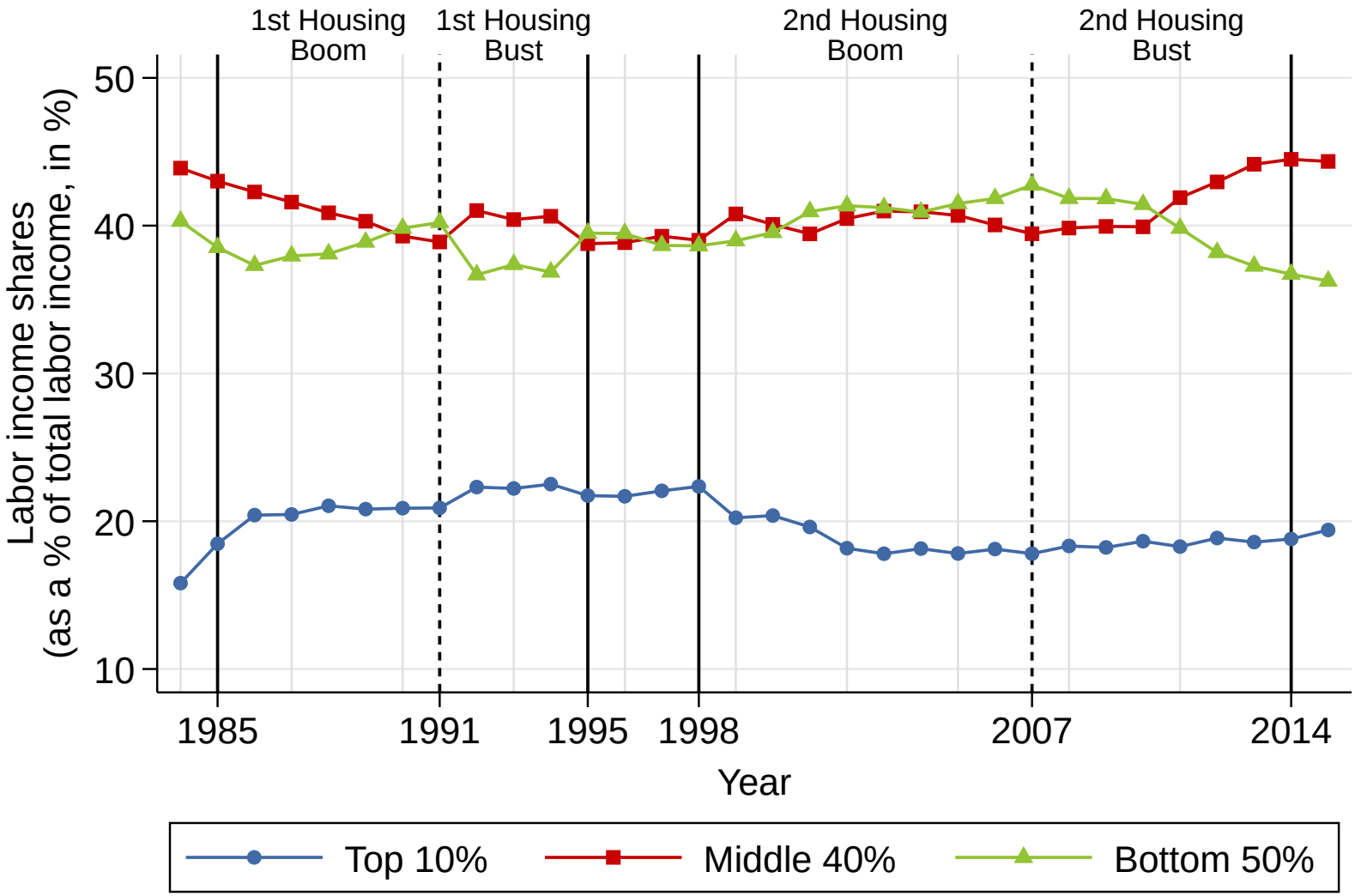
Back

AVERAGE ANNUAL RATES OF RETURN IN SPAIN, 1984-2015

	Flow return	Real capital gains	Total return
1984-2015			
Net personal wealth	5.0%	2.7%	7.9%
Housing assets	1.3%	3.0%	4.3%
Business assets	7.2%	3.0%	10.4%
Financial assets	10.2%	-2.6%	7.3%
Liabilities	1.0%	1.0%	2.0%
1984-1991 (1st housing boom)			
Net personal wealth	6.7%	4.6%	11.6%
Housing assets	1.9%	6.3%	8.3%
Business assets	8.4%	6.3%	15.2%
Financial assets	13.4%	-7.1%	5.3%
Liabilities	1.6%	-3.2%	-1.6%
1991-1998 (1st housing bust)			
Net personal wealth	5.6%	2.8%	8.5%
Housing assets	1.1%	1.1%	2.2%
Business assets	11.0%	1.1%	12.2%
Financial assets	10.8%	1.5%	12.5%
Liabilities	0.9%	2.9%	3.8%
1999-2007 (2nd housing boom)			
Net personal wealth	4.2%	6.4%	10.9%
Housing assets	1.0%	8.3%	9.3%
Business assets	7.0%	8.3%	15.9%
Financial assets	8.8%	-0.4%	8.3%
Liabilities	0.5%	7.1%	7.7%
2008-2015 (2nd housing bust)			
Net personal wealth	3.7%	-3.3%	0.3%
Housing assets	1.4%	-4.7%	-3.4%
Business assets	3.1%	-4.7%	-1.8%
Financial assets	8.2%	-4.2%	3.6%
Liabilities	0.9%	-3.3%	-2.5%

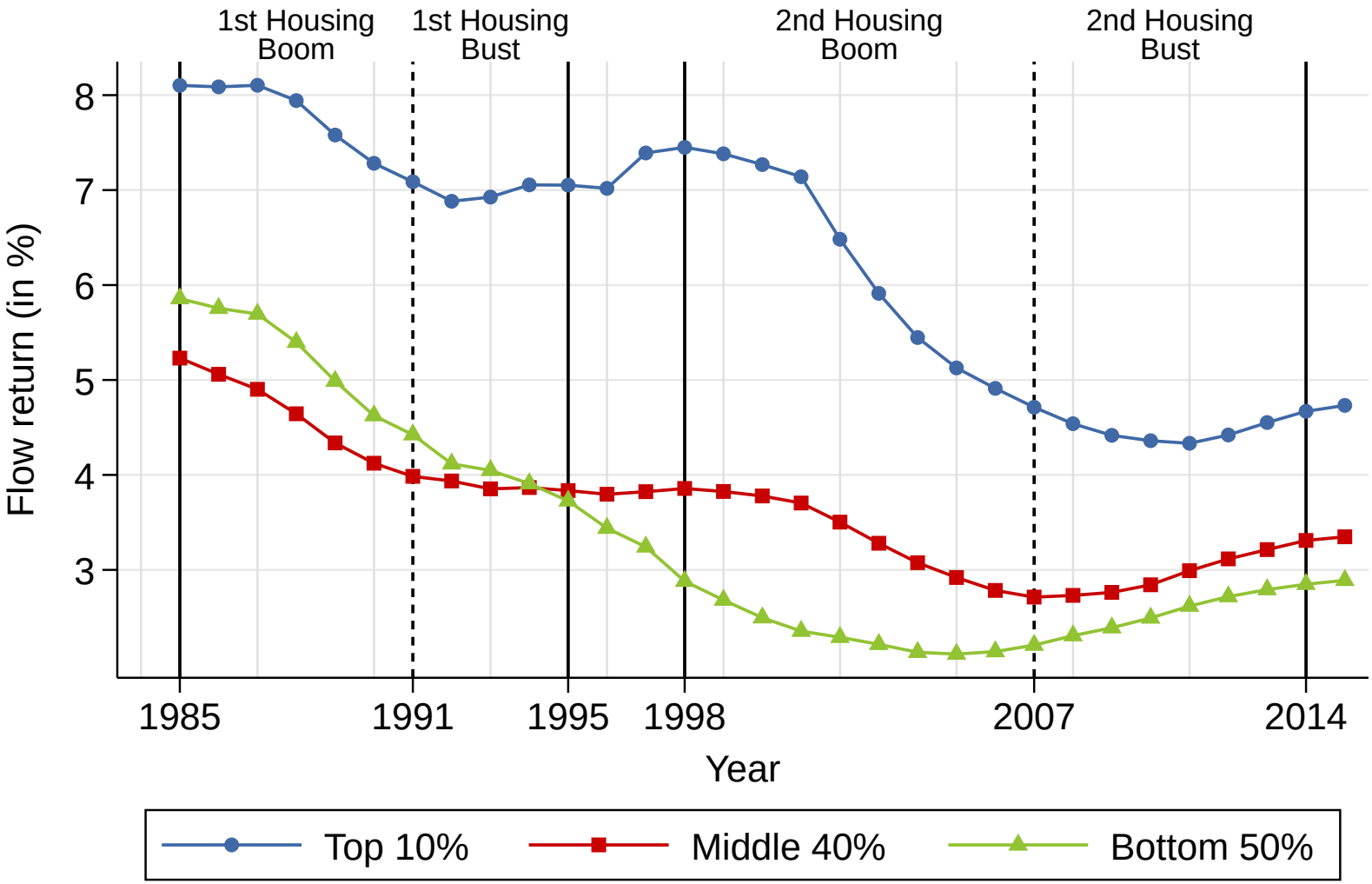
Back

LABOR INCOME BY WEALTH GROUP, 1984-2015

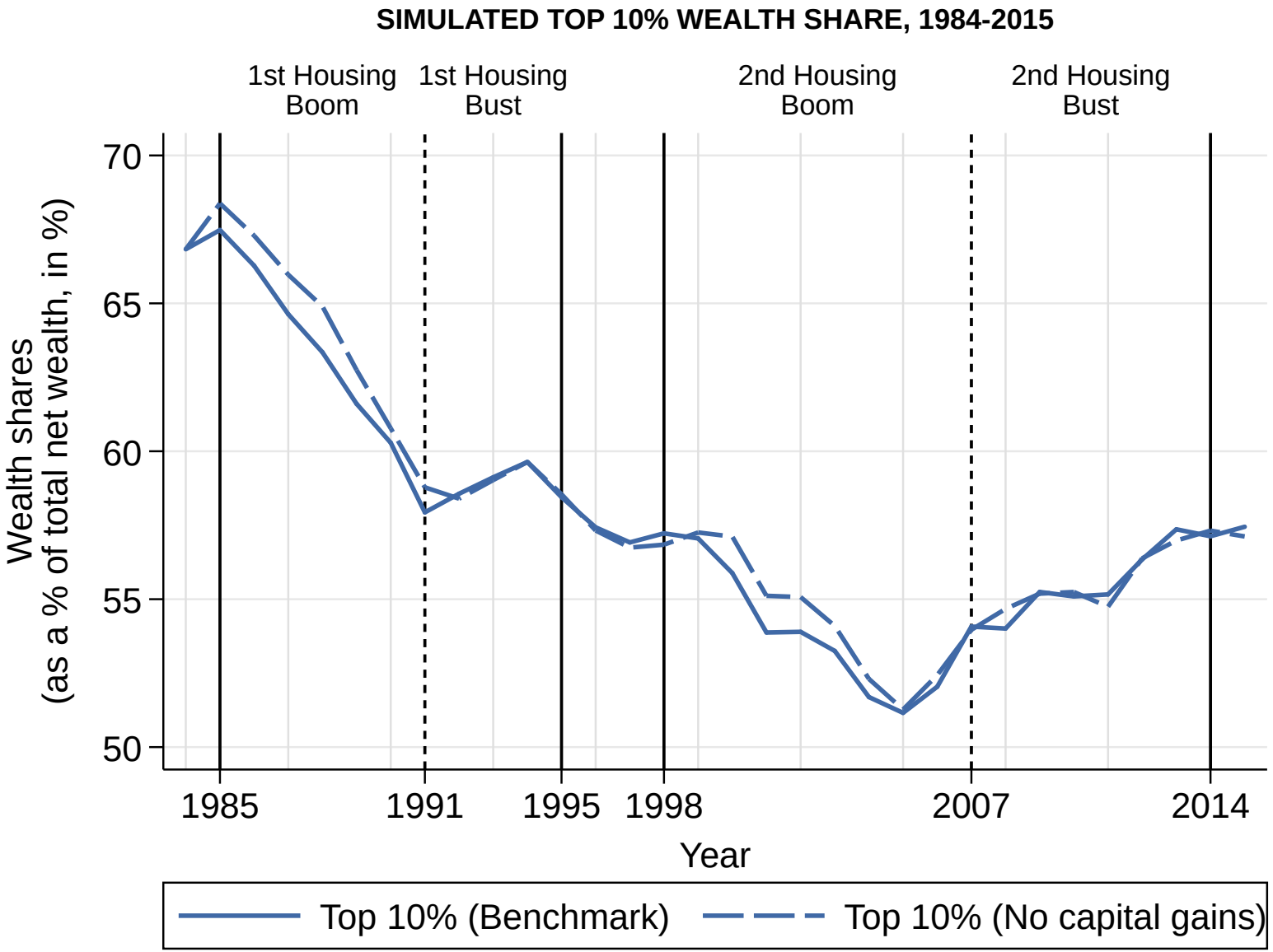


Back

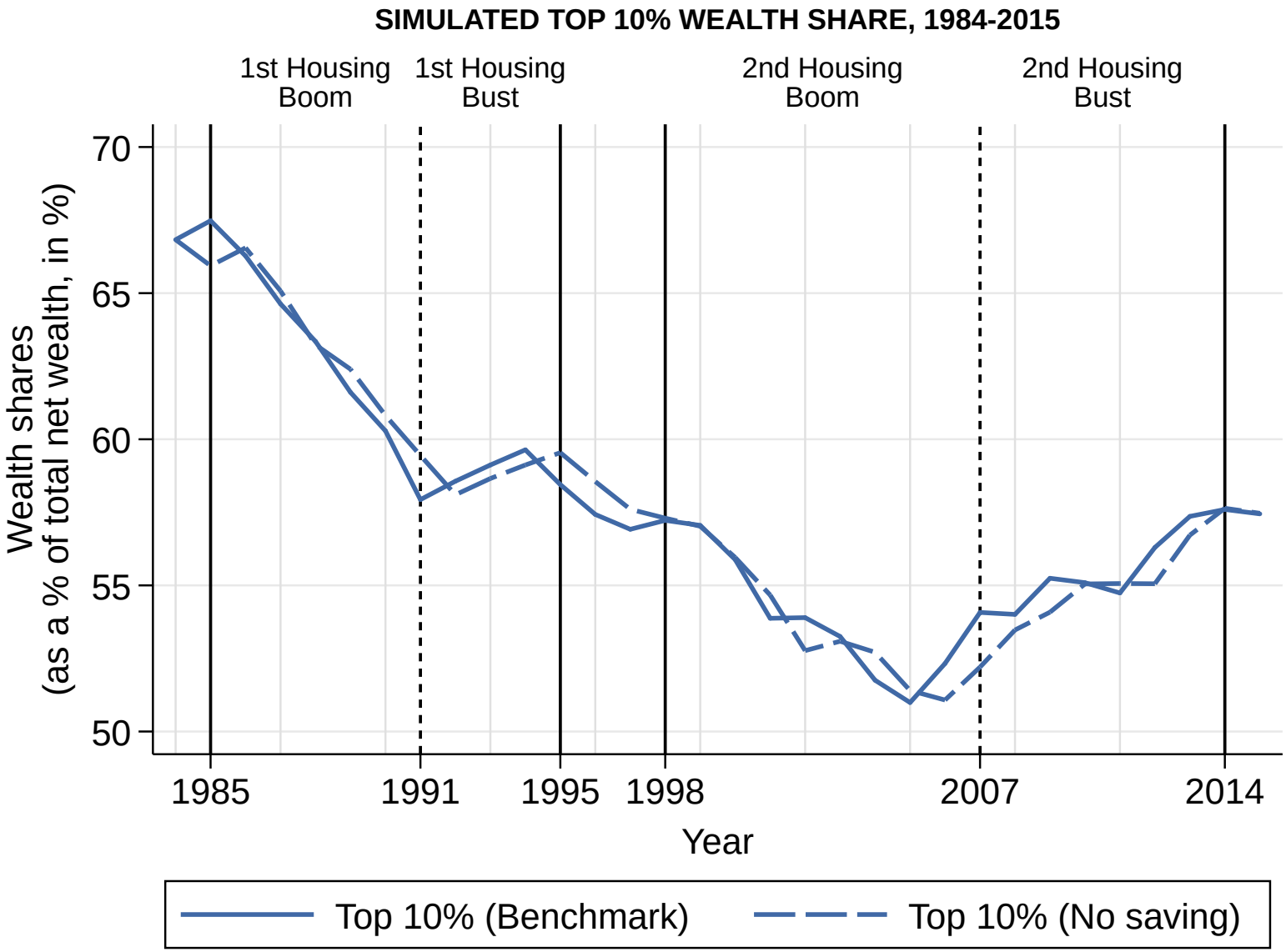
FLOW RETURNS BY WEALTH GROUP IN SPAIN, 1985-2015
(gross of all taxes, 5-year moving average)



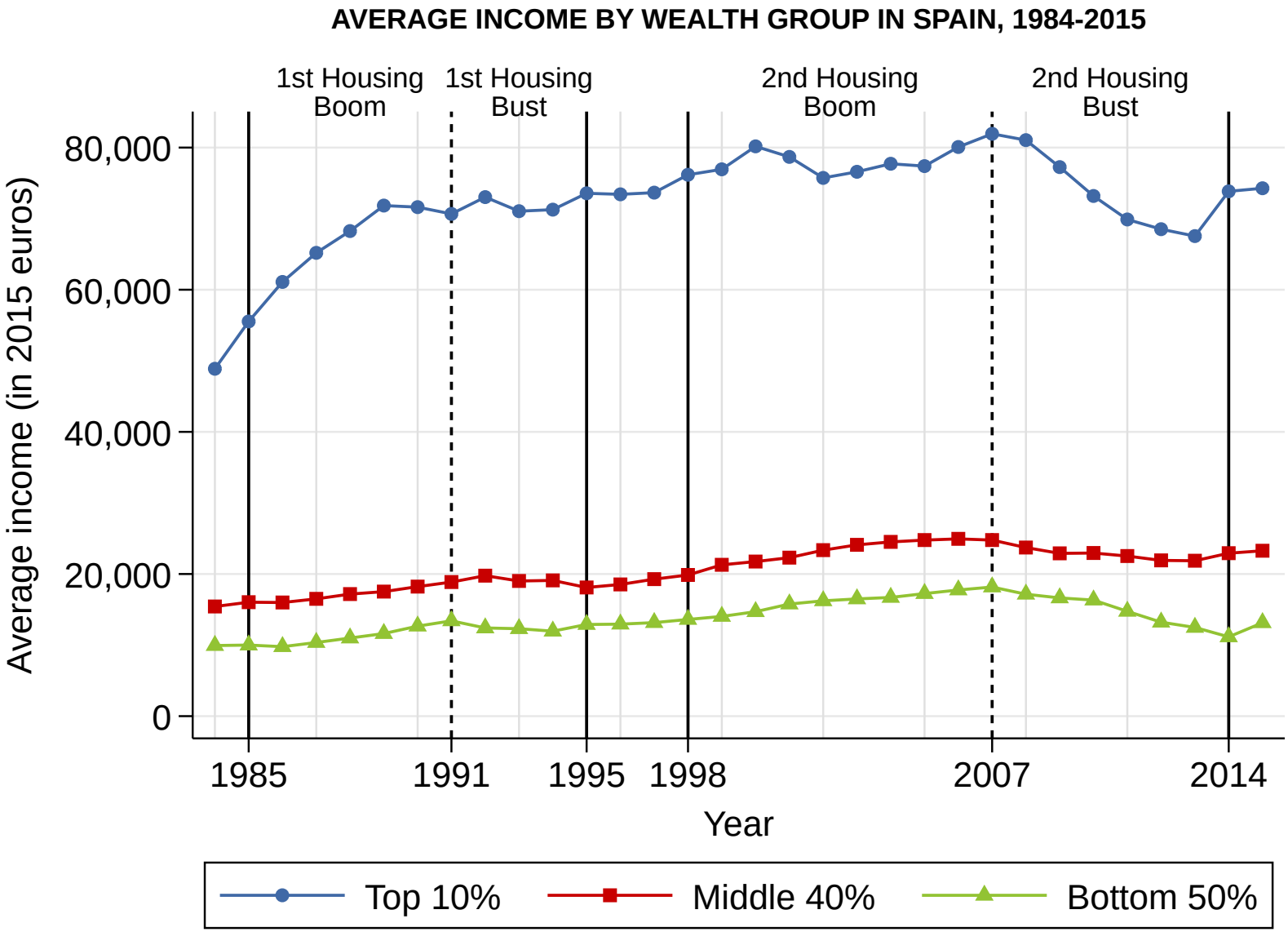
Back


SIMULATED TOP 10% WEALTH SHARE, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Wealth shares
(as a % of total net wealth, in %)
70
65
60
55
50
1985
1991
1995
1998
2007
2014
Year
Top 10% (Benchmark)
Top 10% (No capital gains)

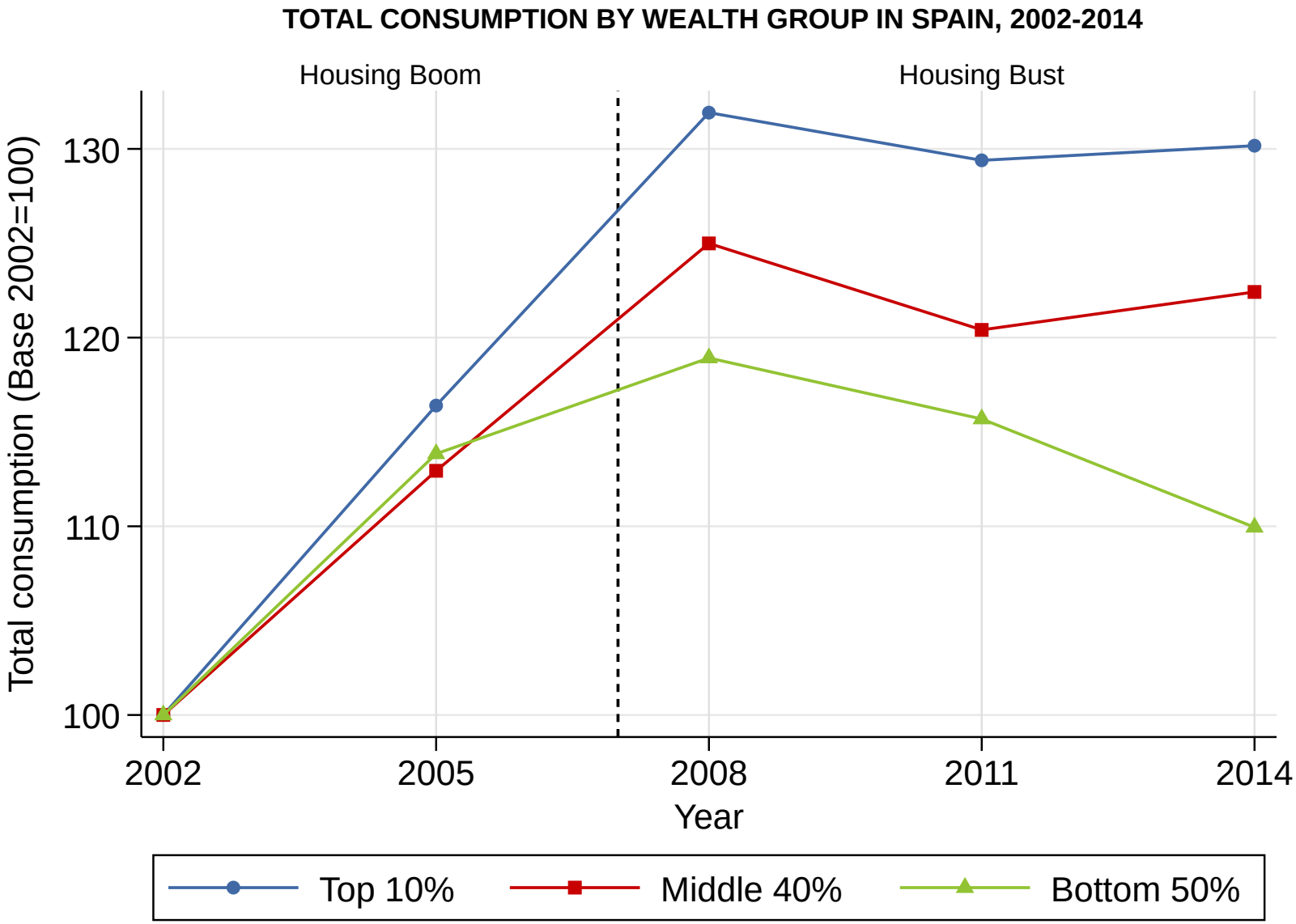
Back


SIMULATED TOP 10% WEALTH SHARE, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Wealth shares
(as a % of total net wealth, in %)
70
65
60
55
50
1985
1991
1995
1998
2007
2014
Year
Top 10% (Benchmark)
Top 10% (No saving)

Back

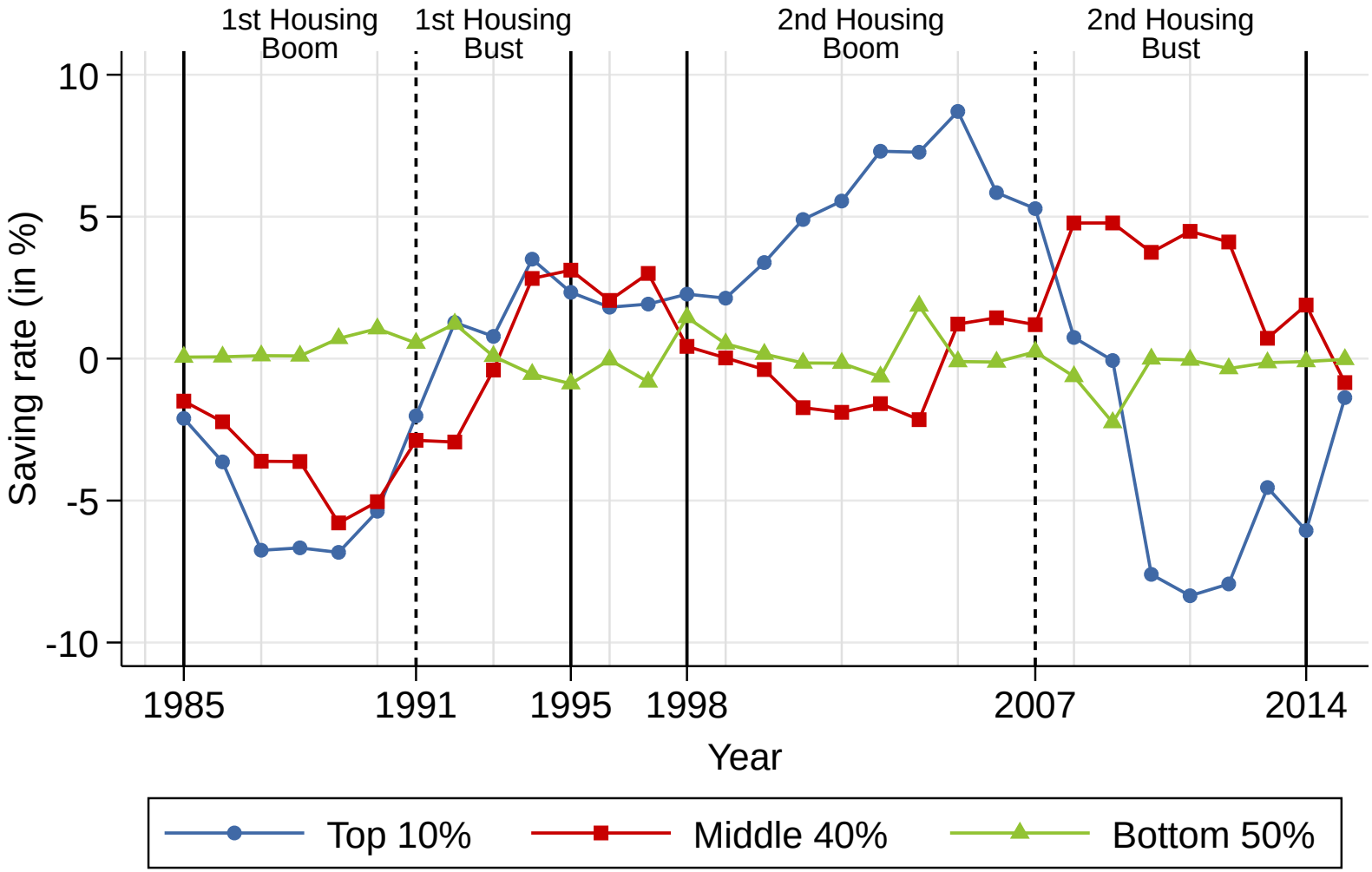

AVERAGE INCOME BY WEALTH GROUP IN SPAIN, 1984-2015
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Average income (in 2015 euros)
80,000
60,000
40,000
20,000
0
1985
1991
1995
1998
2007
2014
Year
Top 10%
Middle 40%
Bottom 50%

Back

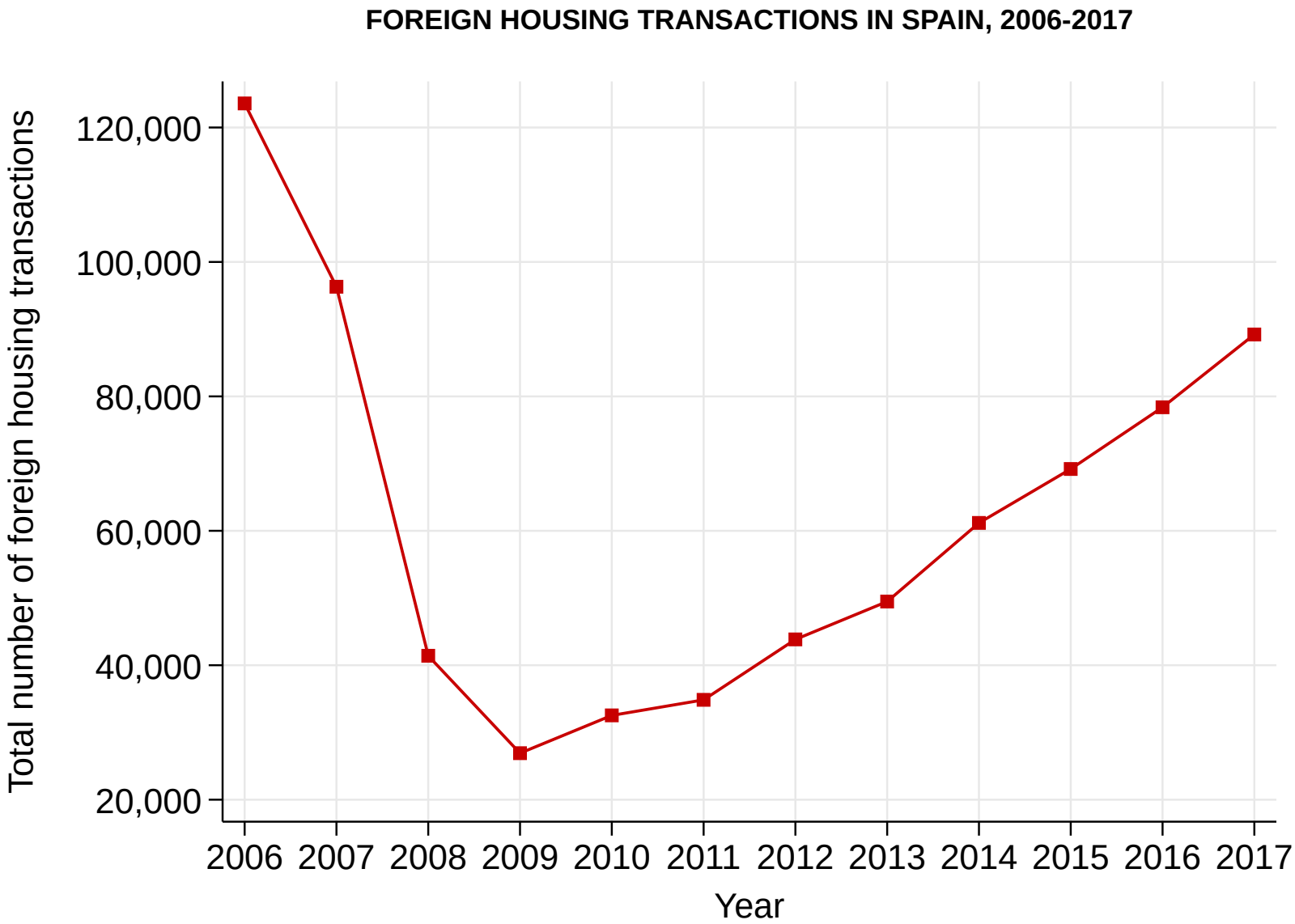

TOTAL CONSUMPTION BY WEALTH GROUP IN SPAIN, 2002-2014
Housing Boom
Housing Bust
Total consumption (Base 2002=100)
130
120
110
100
2002
2005
2008
2011
2014
Year
Top 10%
Middle 40%
Bottom 50%

Back

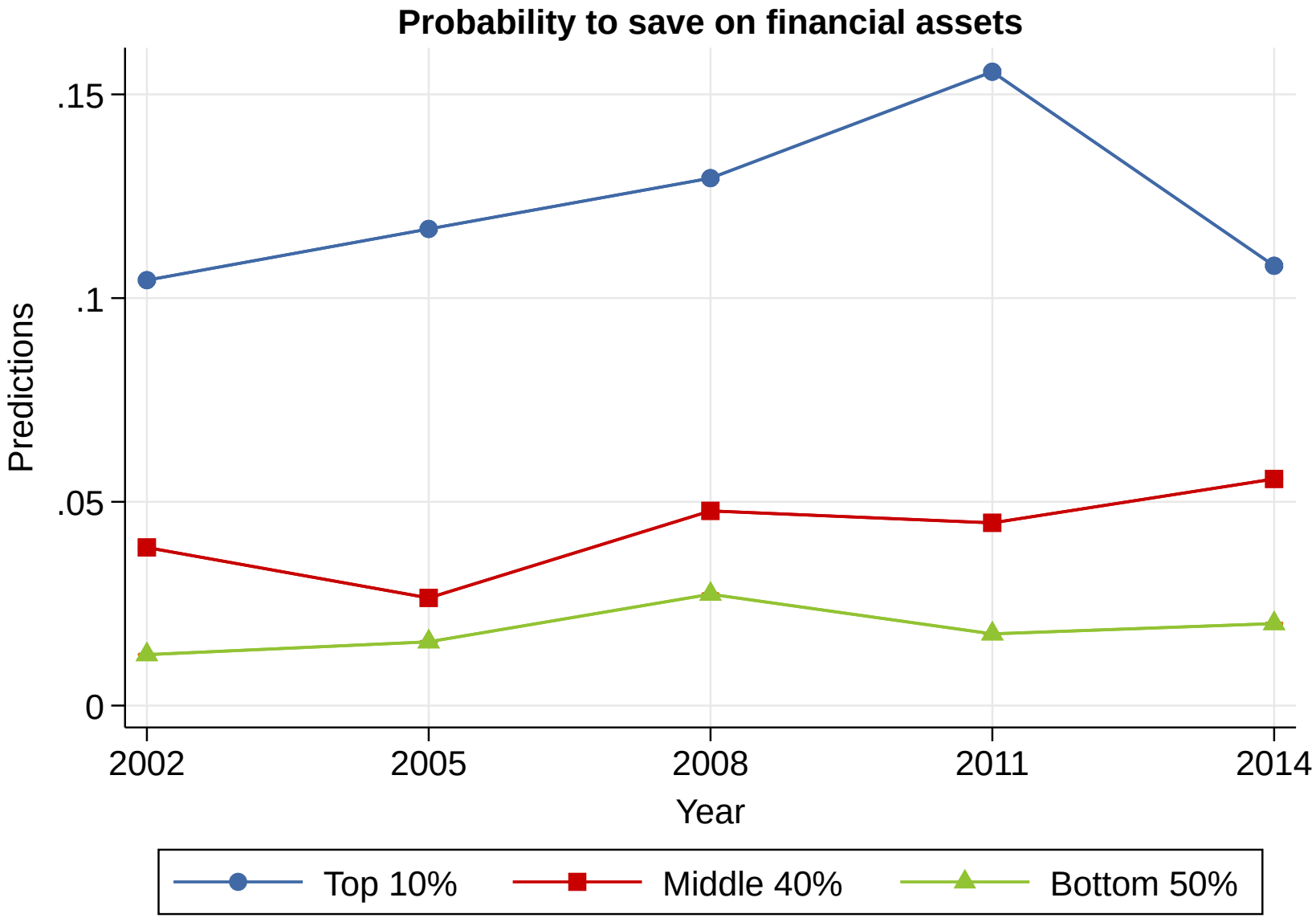
SAVING RATES ON BUSINESS ASSETS BY WEALTH GROUP IN SPAIN, 1985-2015
(5-year moving average)



Back


FOREIGN HOUSING TRANSACTIONS IN SPAIN, 2006-2017
Total number of foreign housing transactions
120,000
100,000
80,000
60,000
40,000
20,000
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year

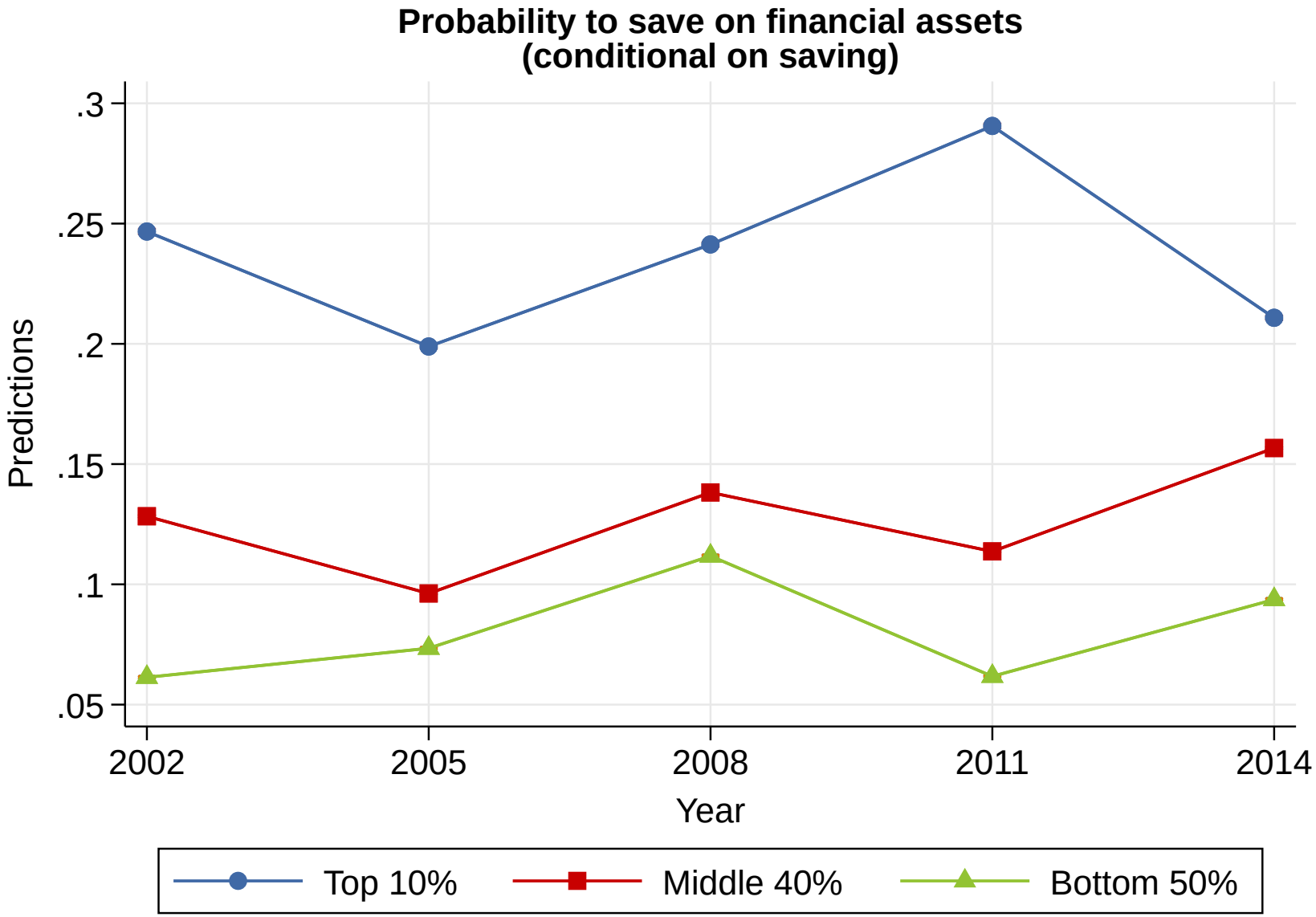
Back


Probability to save on financial assets
Predictions
.15
.1
.05
0
2002
2005
2008
2011
2014
Year
Top 10%
Middle 40%
Bottom 50%

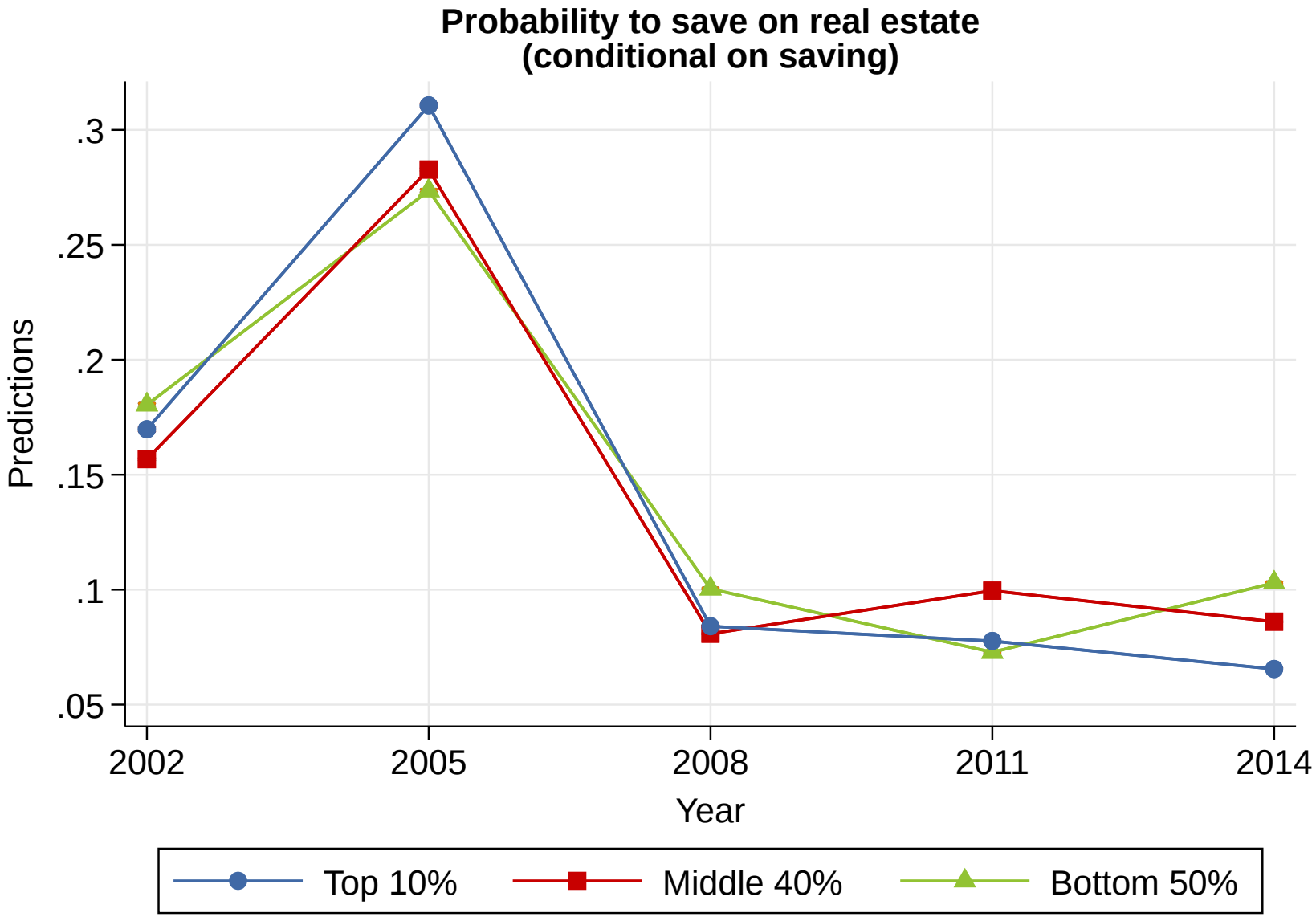
Back


Probability to save on real estate
Predictions
.2
.15
.1
.05
0
2002
2005
2008
2011
2014
Year
Top 10%
Middle 40%
Bottom 50%

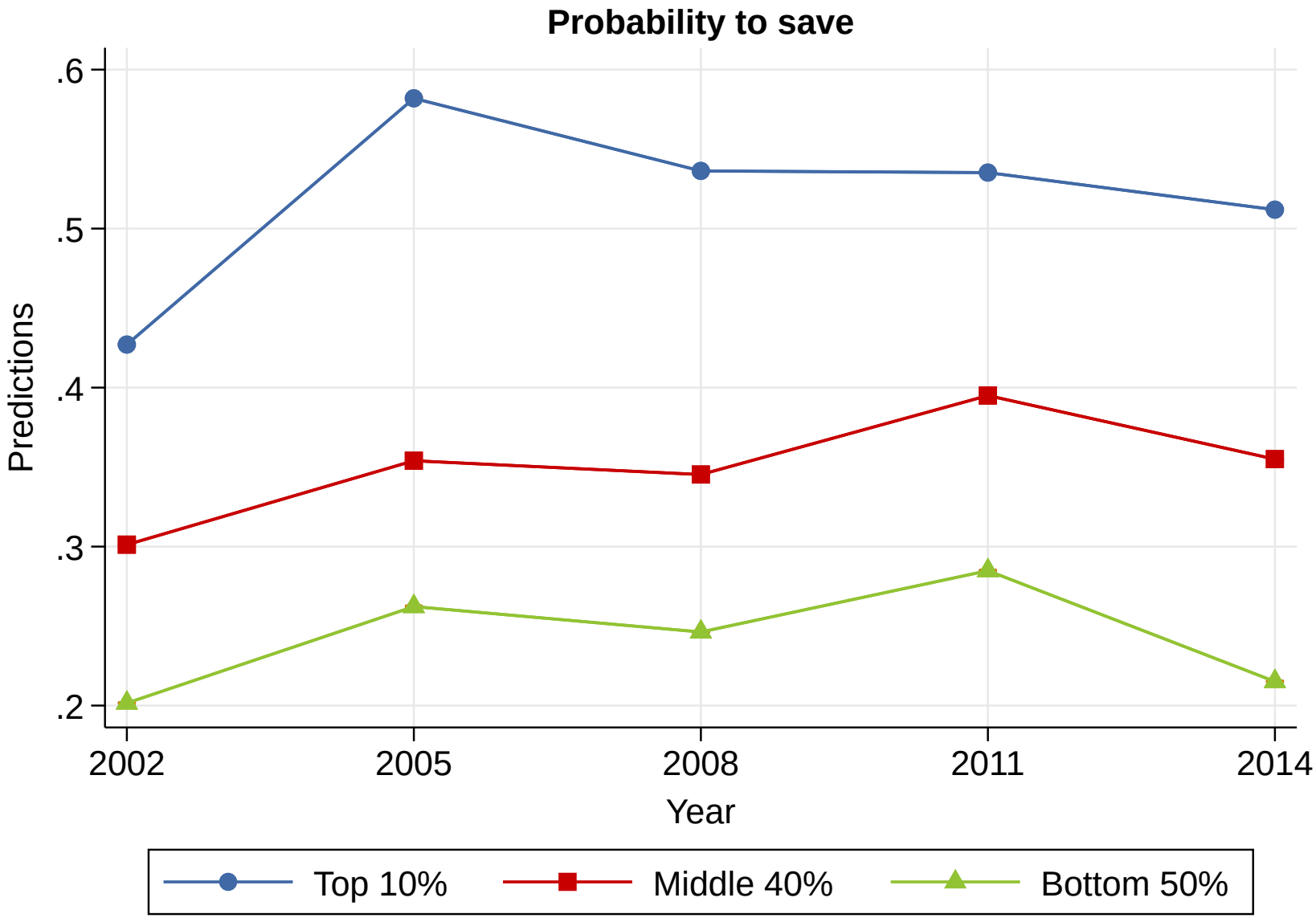
Back


Probability to save on financial assets
(conditional on saving)
Predictions
.3
.25
.2
.15
.1
.05
2002
2005
2008
2011
2014
Year
Top 10%
Middle 40%
Bottom 50%

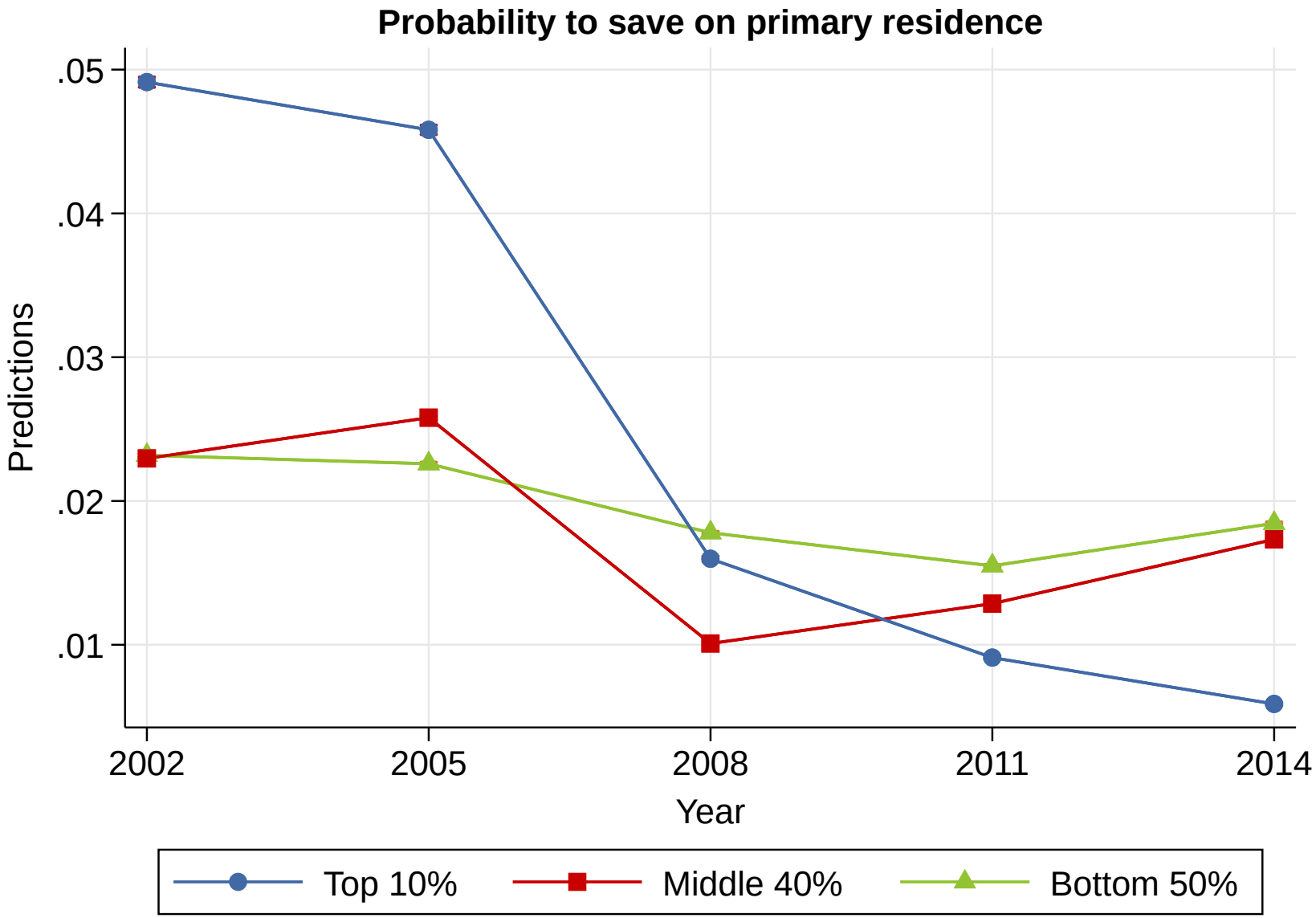
Back


Probability to save on real estate
(conditional on saving)
Predictions
.3
.25
.2
.15
.1
.05
2002
2005
2008
2011
2014
Year
Top 10%
Middle 40%
Bottom 50%

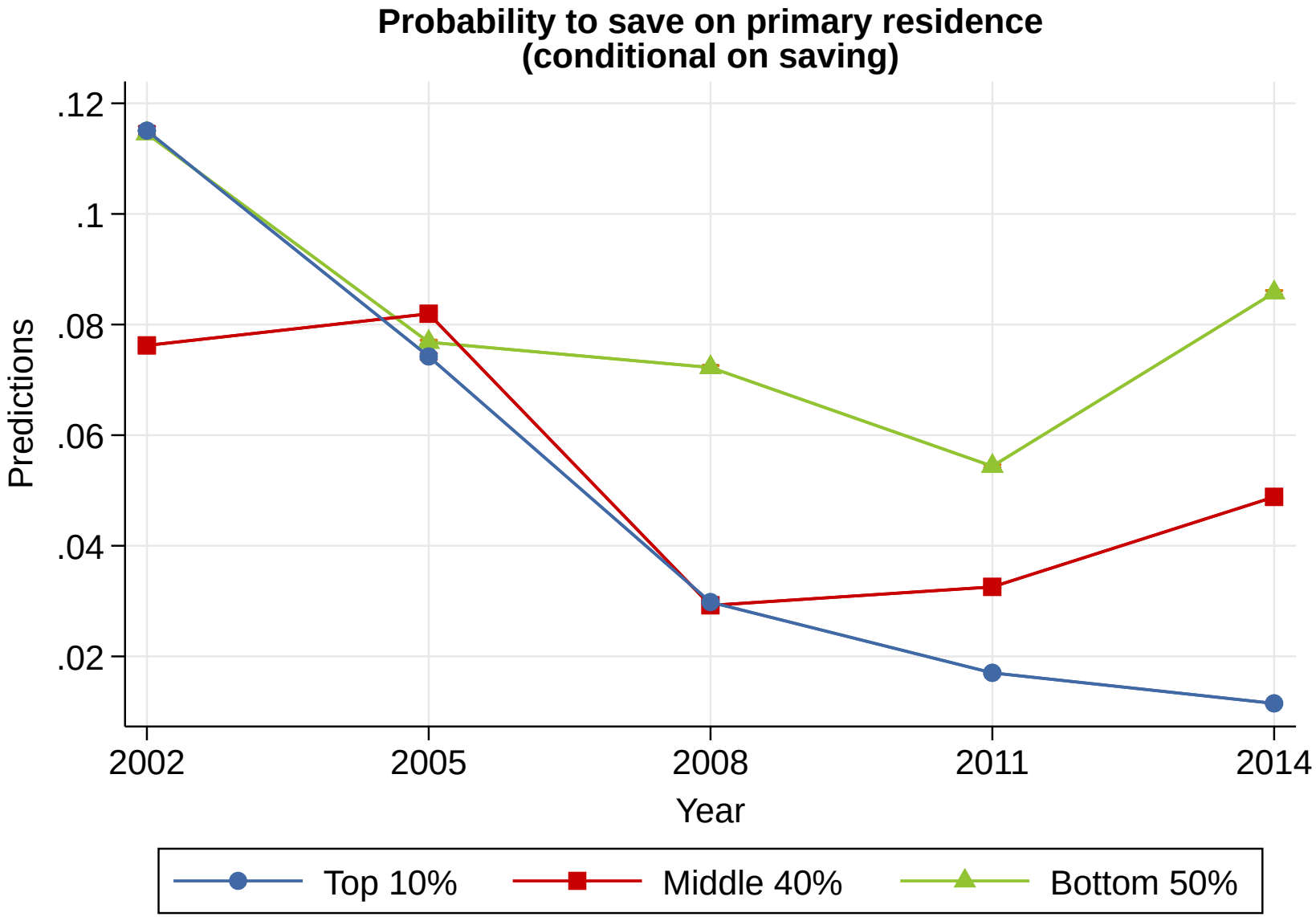
Back


Probability to save
Predictions
.6
.5
.4
.3
.2
2002
2005
2008
2011
2014
Year
Top 10%
Middle 40%
Bottom 50%

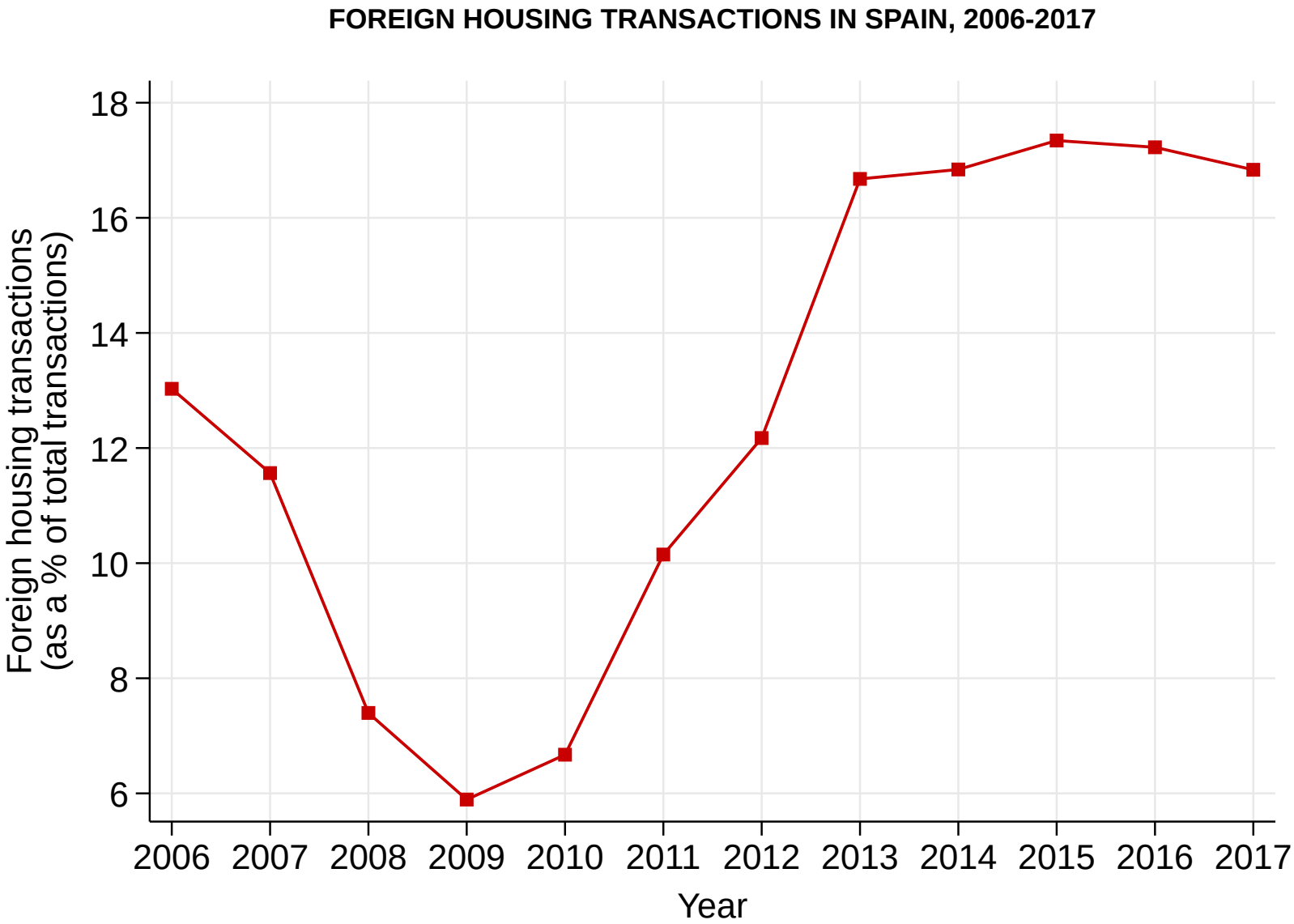
Back


Probability to save on primary residence
Predictions
.05
.04
.03
.02
.01
2002
2005
2008
2011
2014
Year
Top 10%
Middle 40%
Bottom 50%

Back


Probability to save on primary residence
(conditional on saving)
Predictions
.12
.1
.08
.06
.04
.02
2002
2005
2008
2011
2014
Year
Top 10%
Middle 40%
Bottom 50%

Back


FOREIGN HOUSING TRANSACTIONS IN SPAIN, 2006-2017
Foreign housing transactions
(as a % of total transactions)
18
16
14
12
10
8
6
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year

Back

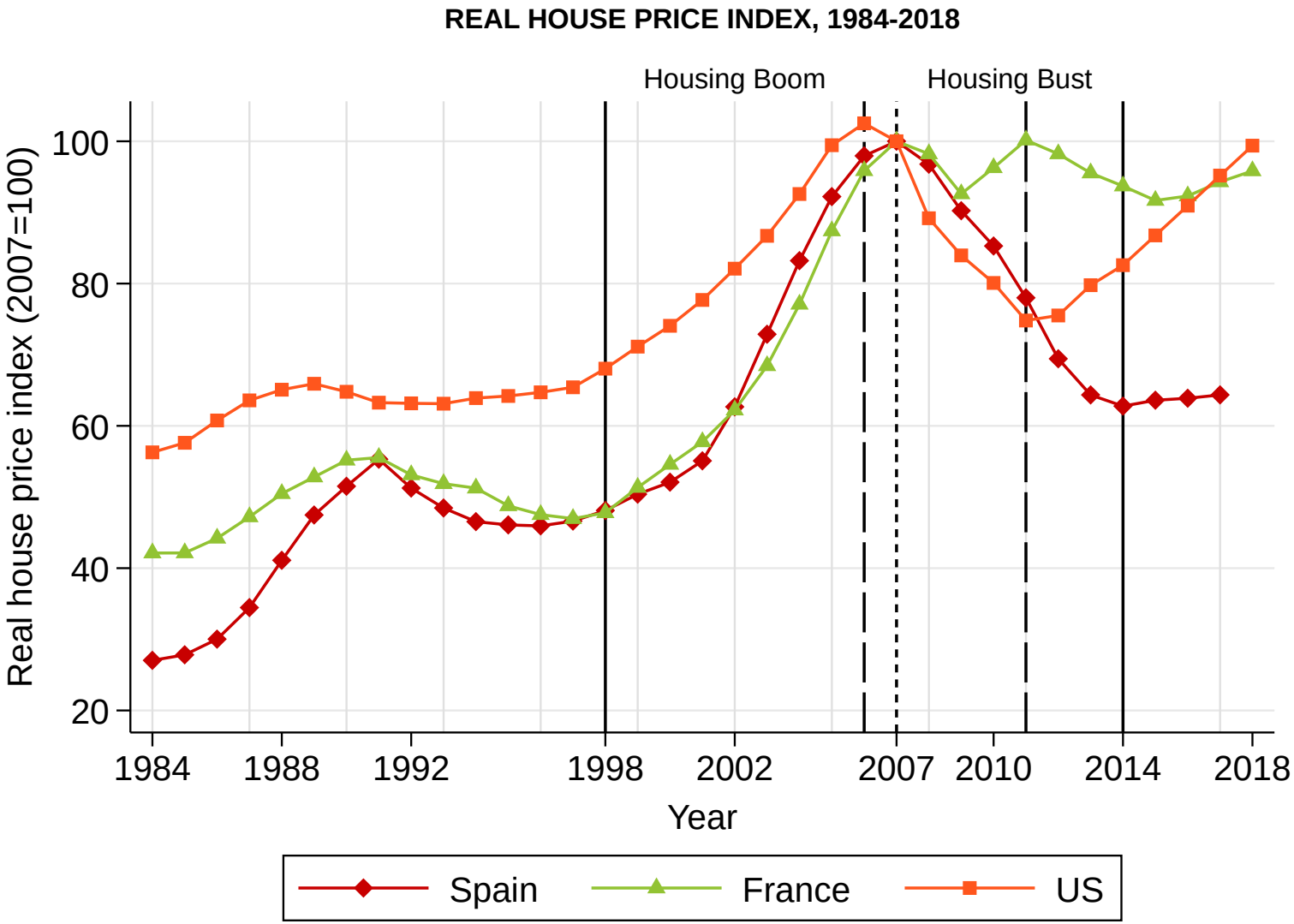


FIGURE – Source: International House Price Database, Federal Reserve Bank of Dallas and OECD Statistics

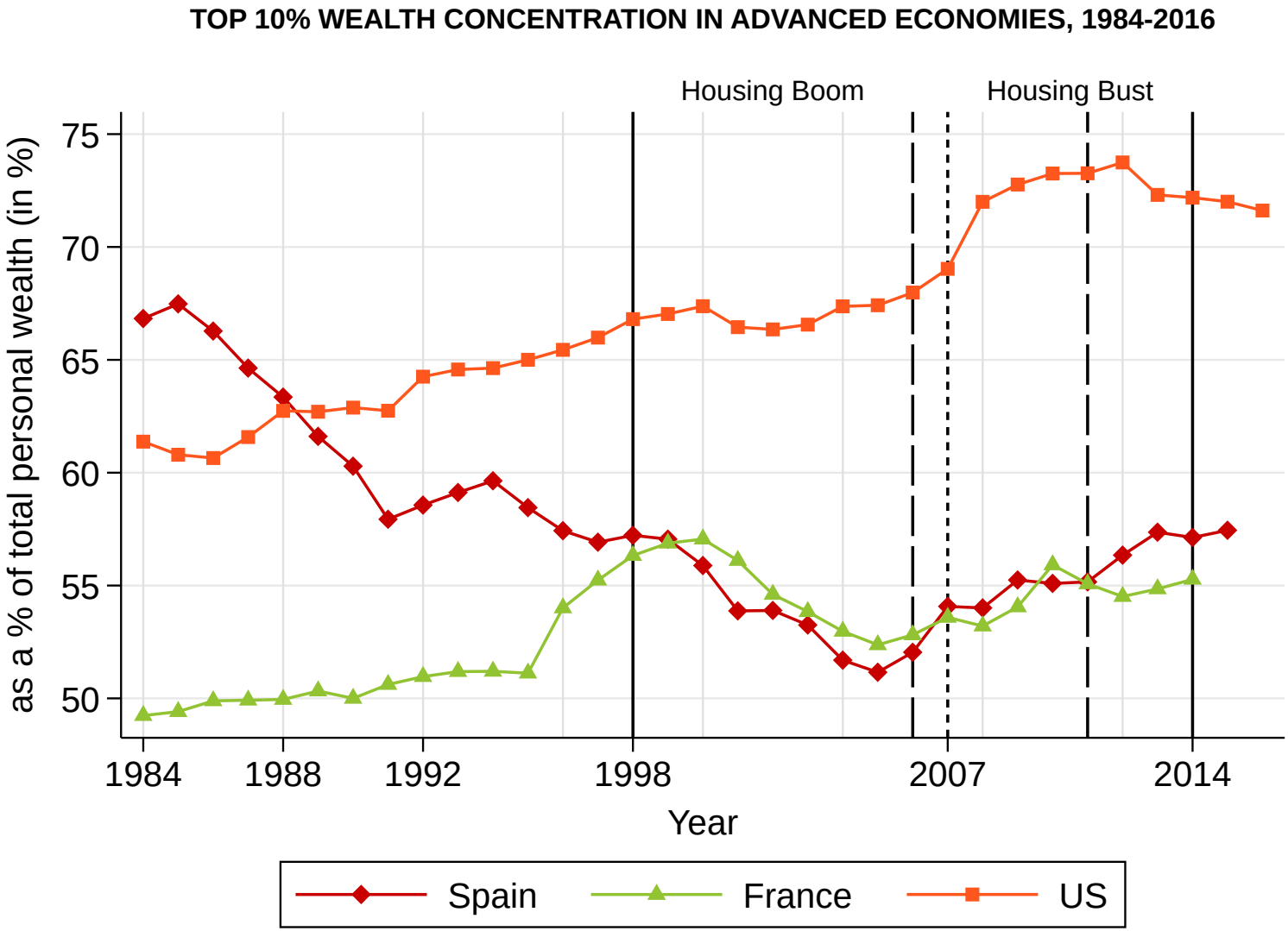


FIGURE – Source: Saez and Zucman [2016], Garbinti et al. [2018] and own elaboration

Back

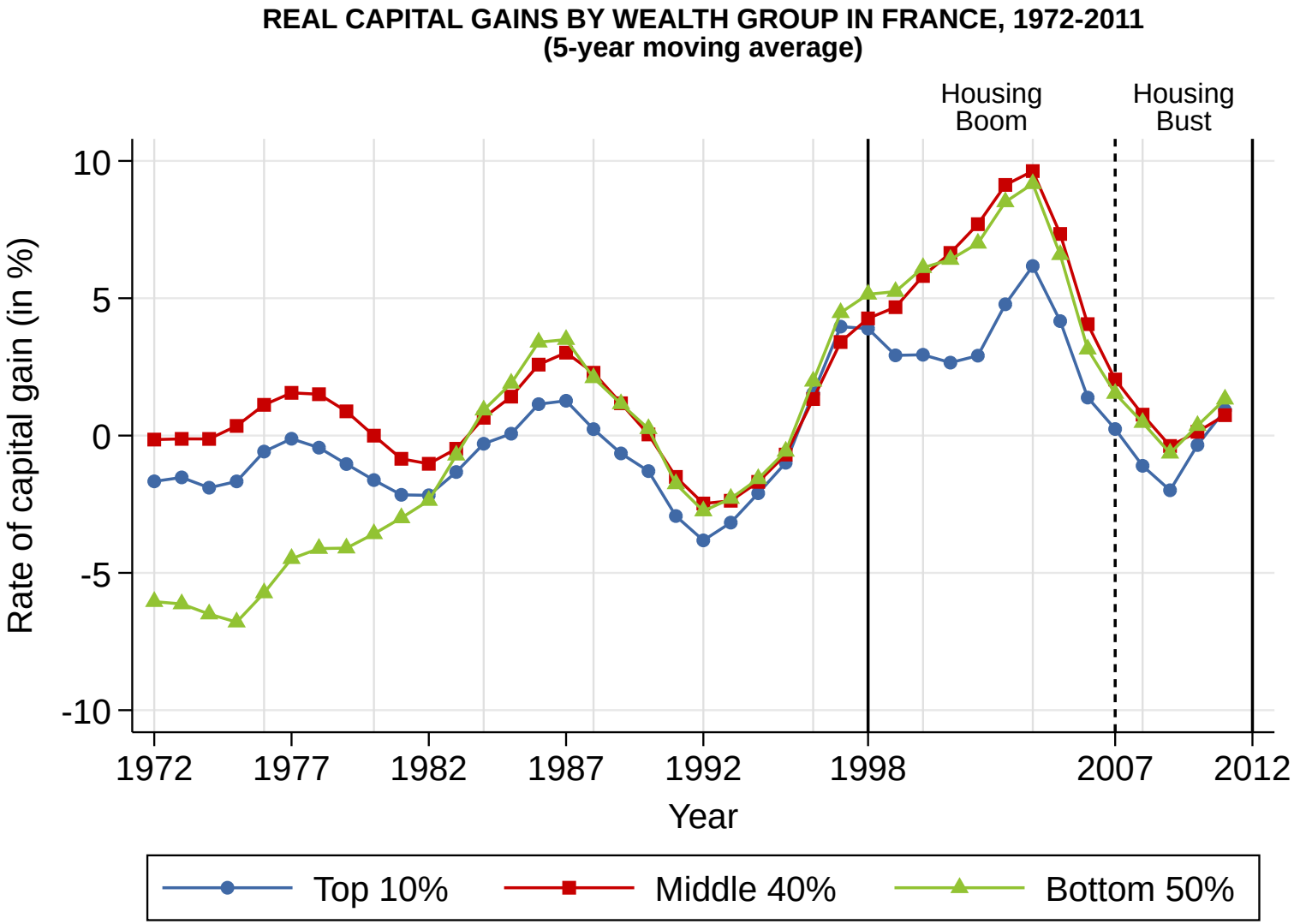


FIGURE – Source: Own elaboration with Garbinti et al. [2018] wealth distribution series

Back

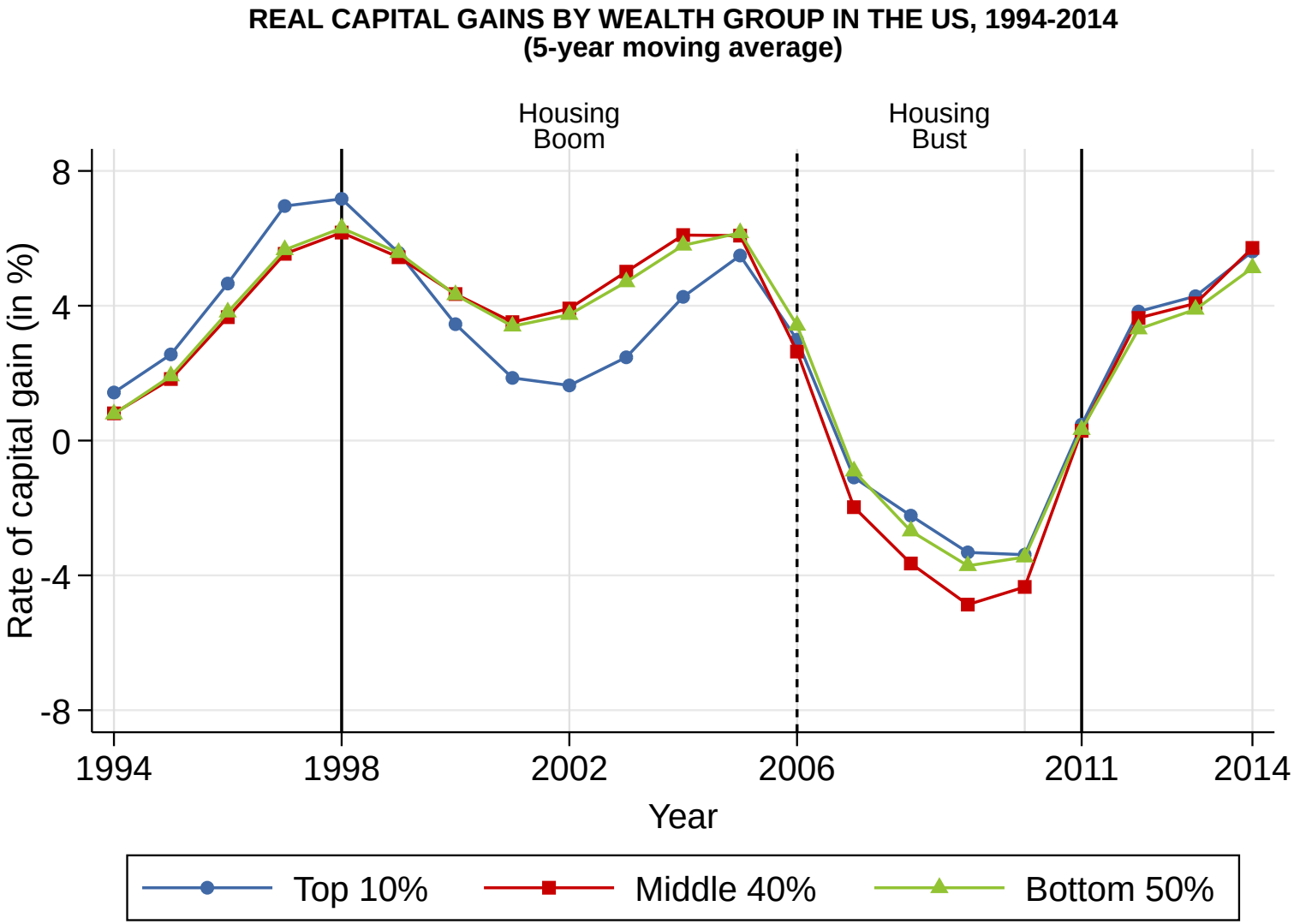


FIGURE – Source: Own elaboration with Saez and Zucman [2016] wealth distribution series

Back

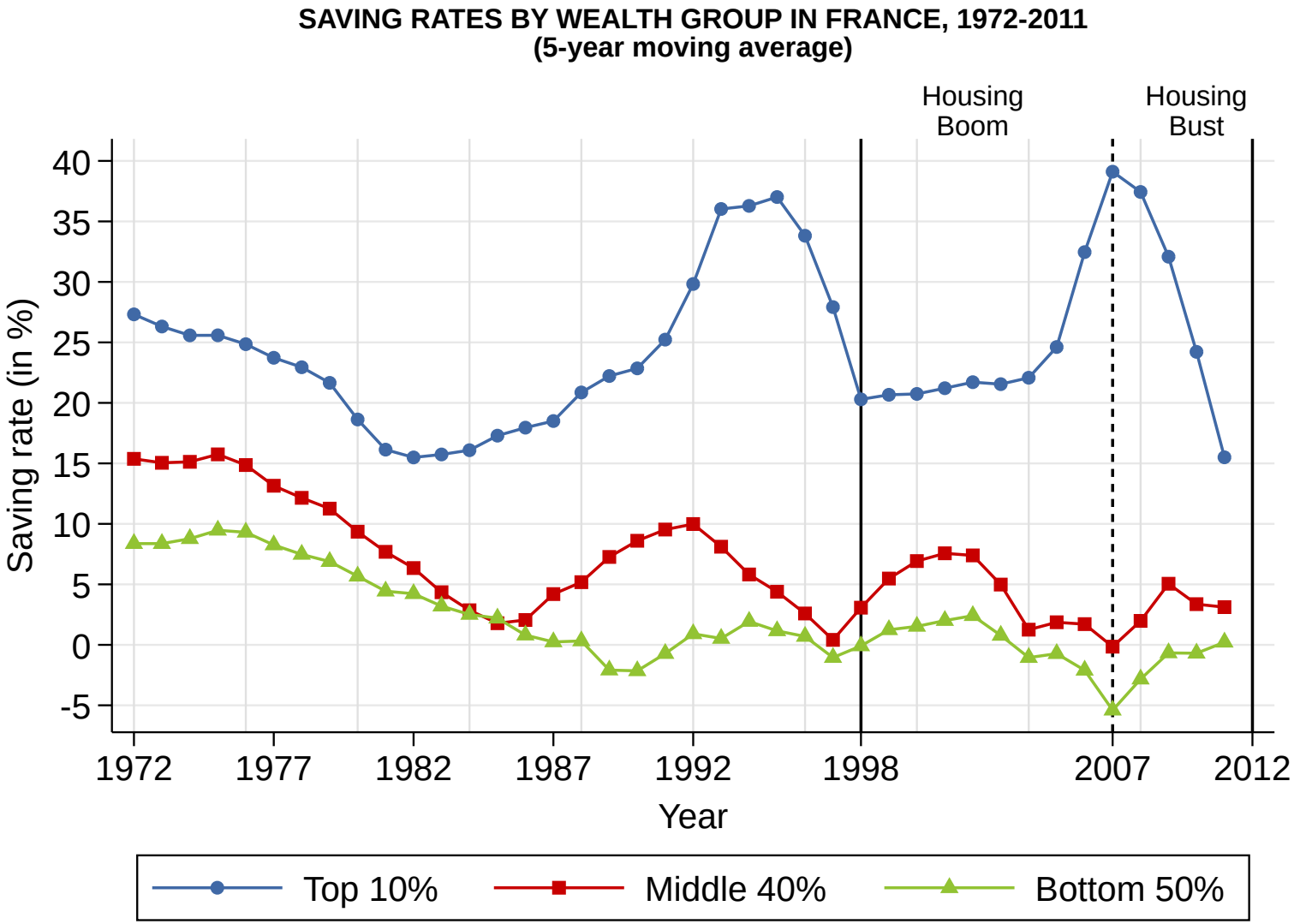


FIGURE – Source: Own elaboration with Garbinti et al. [2018] wealth distribution series

Back

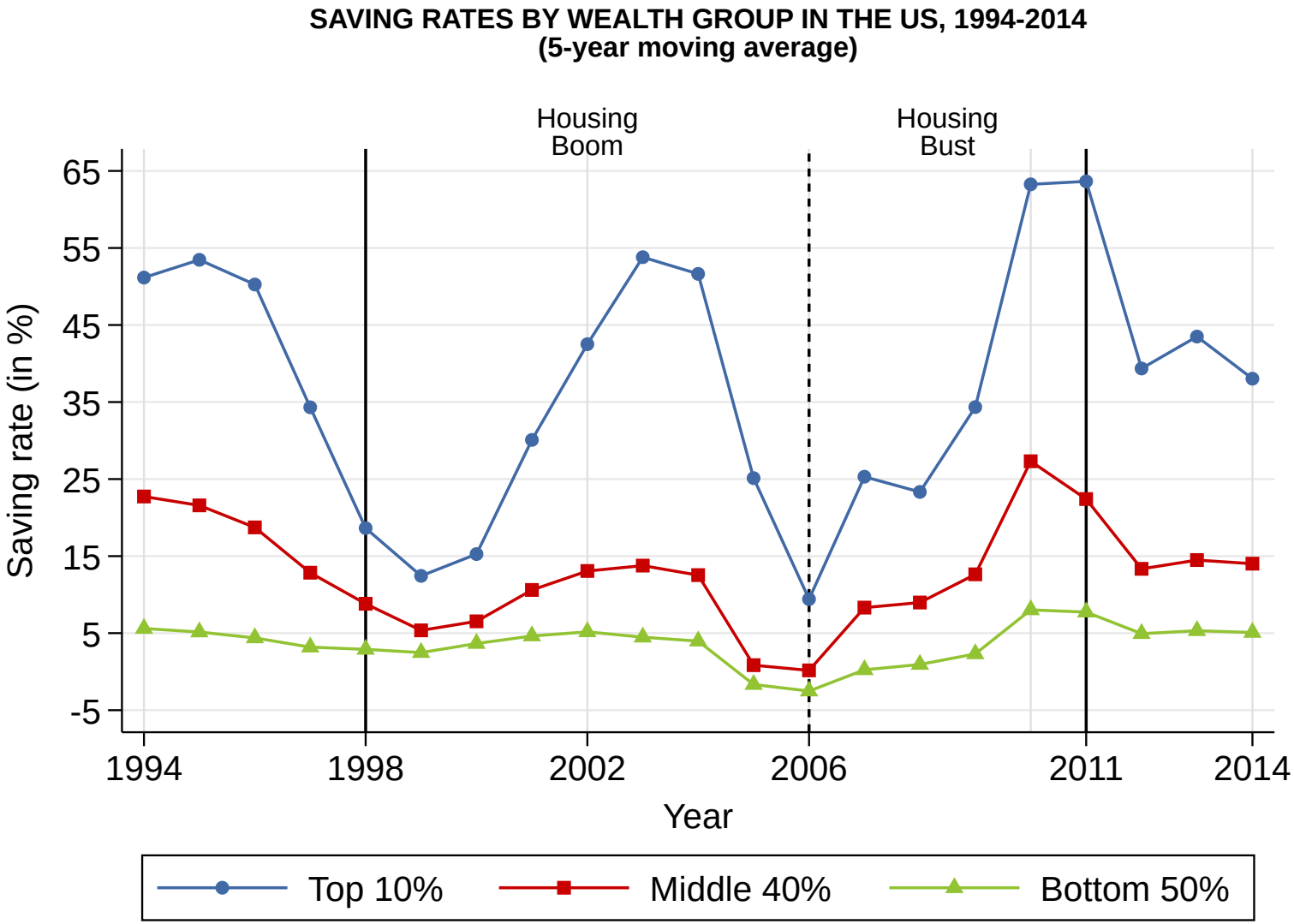


FIGURE – Source: Own elaboration with Saez and Zucman [2016] wealth distribution series

Back

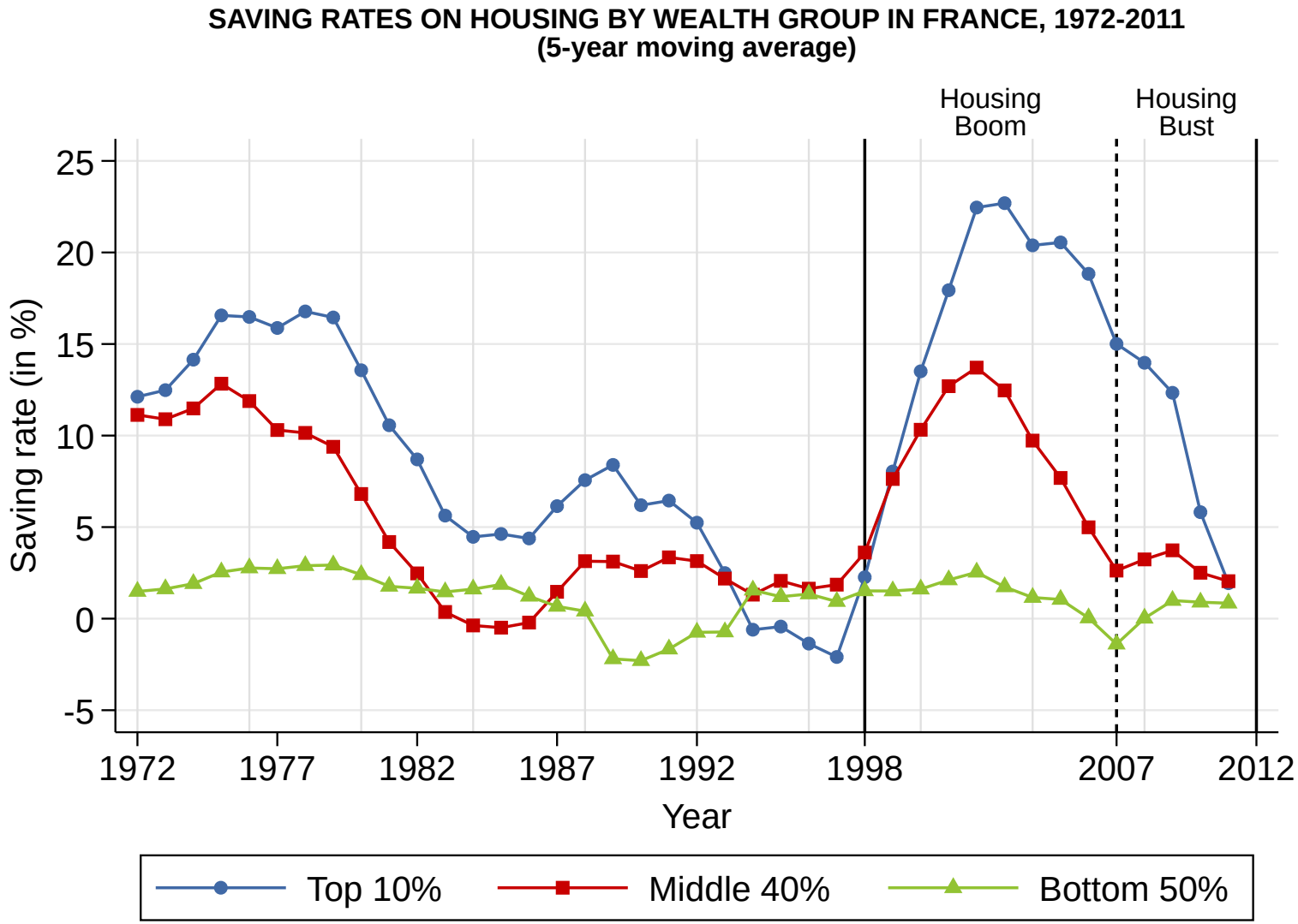


FIGURE – Source: Own elaboration with Garbinti et al. [2018] wealth distribution series

Back

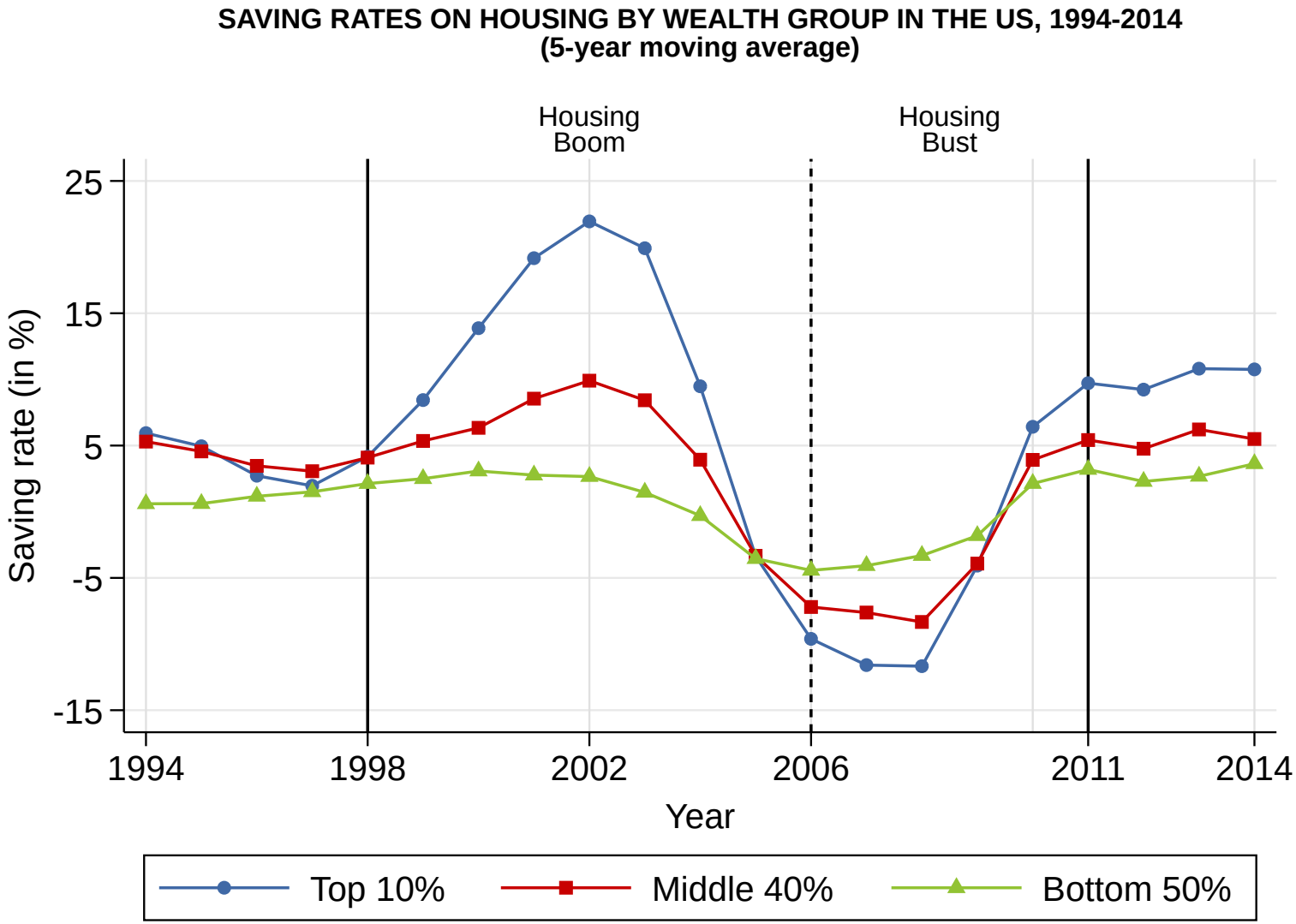


FIGURE – Source: Own elaboration with Saez and Zucman [2016] wealth distribution series

Back

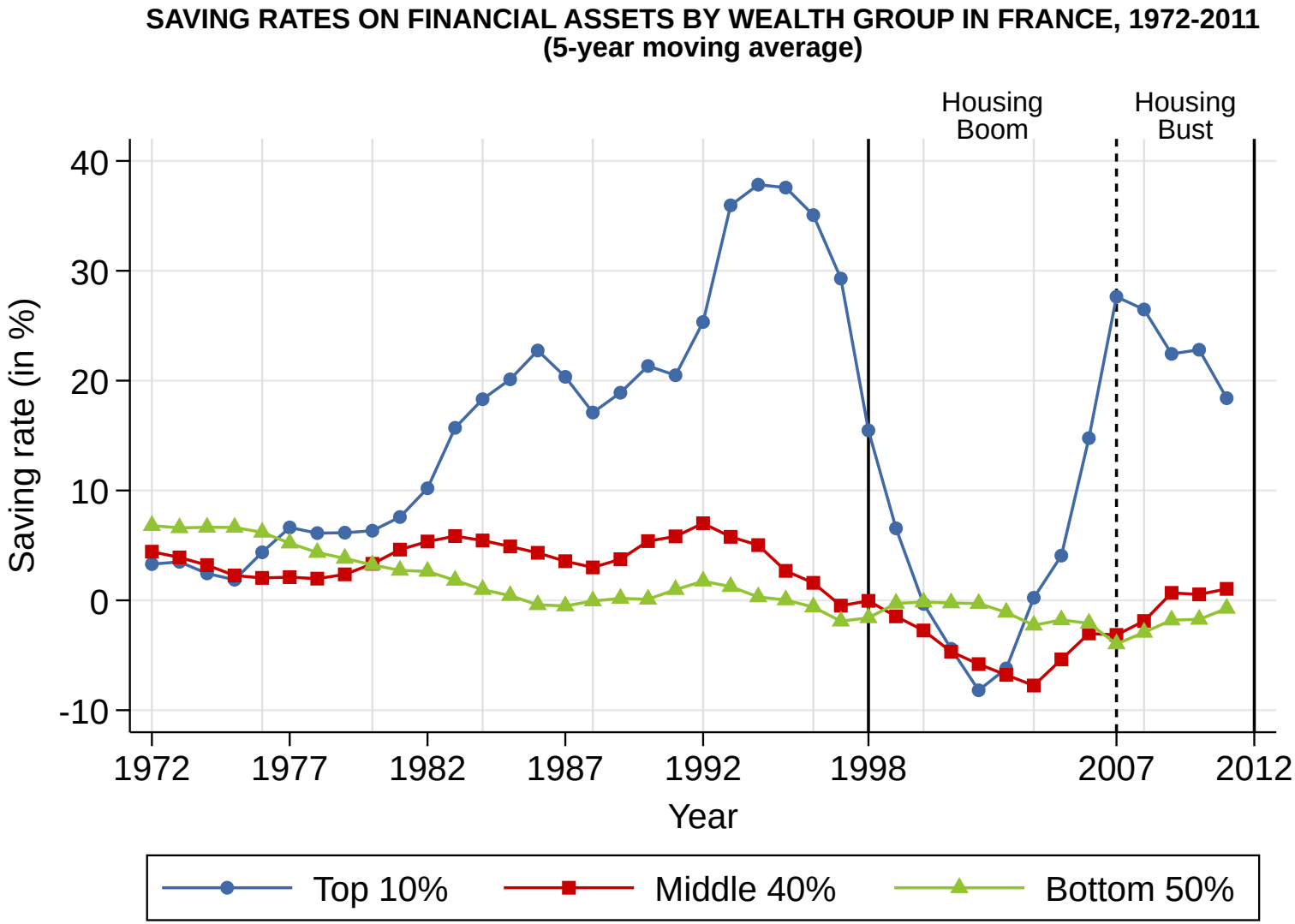


FIGURE – Source: Own elaboration with Garbinti et al. [2018] wealth distribution series

Back

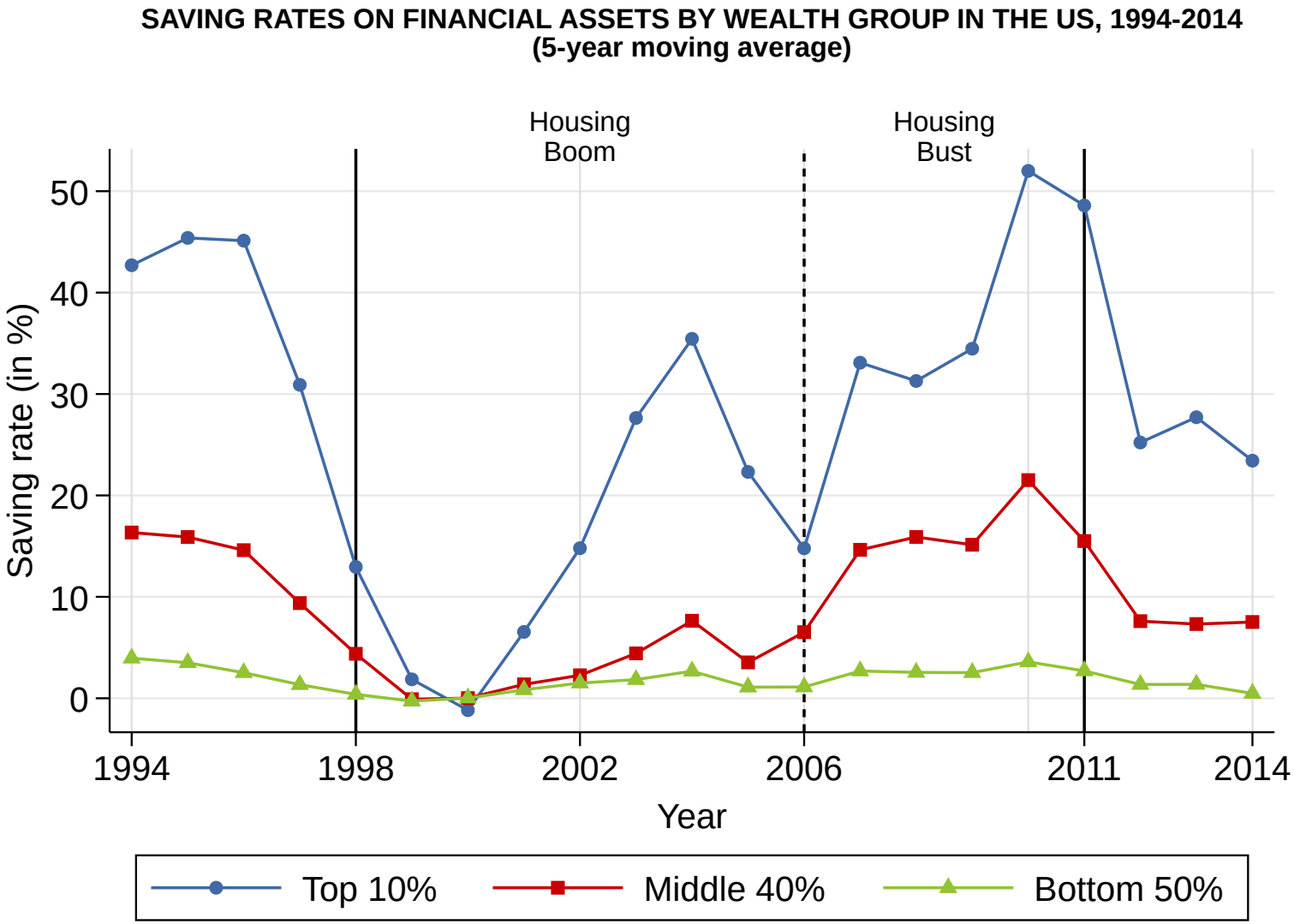
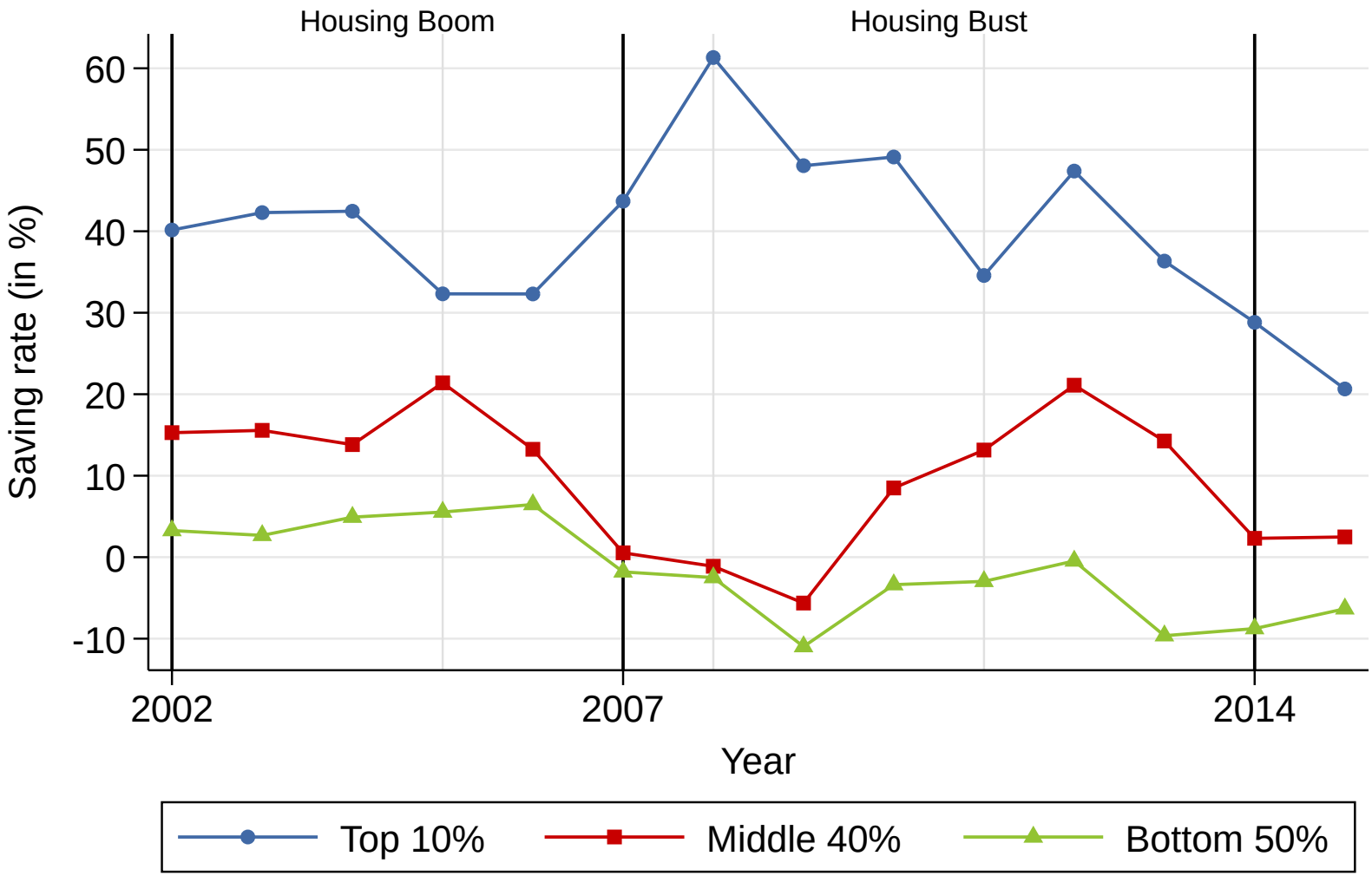


FIGURE – Source: Own elaboration with Saez and Zucman [2016] wealth distribution series

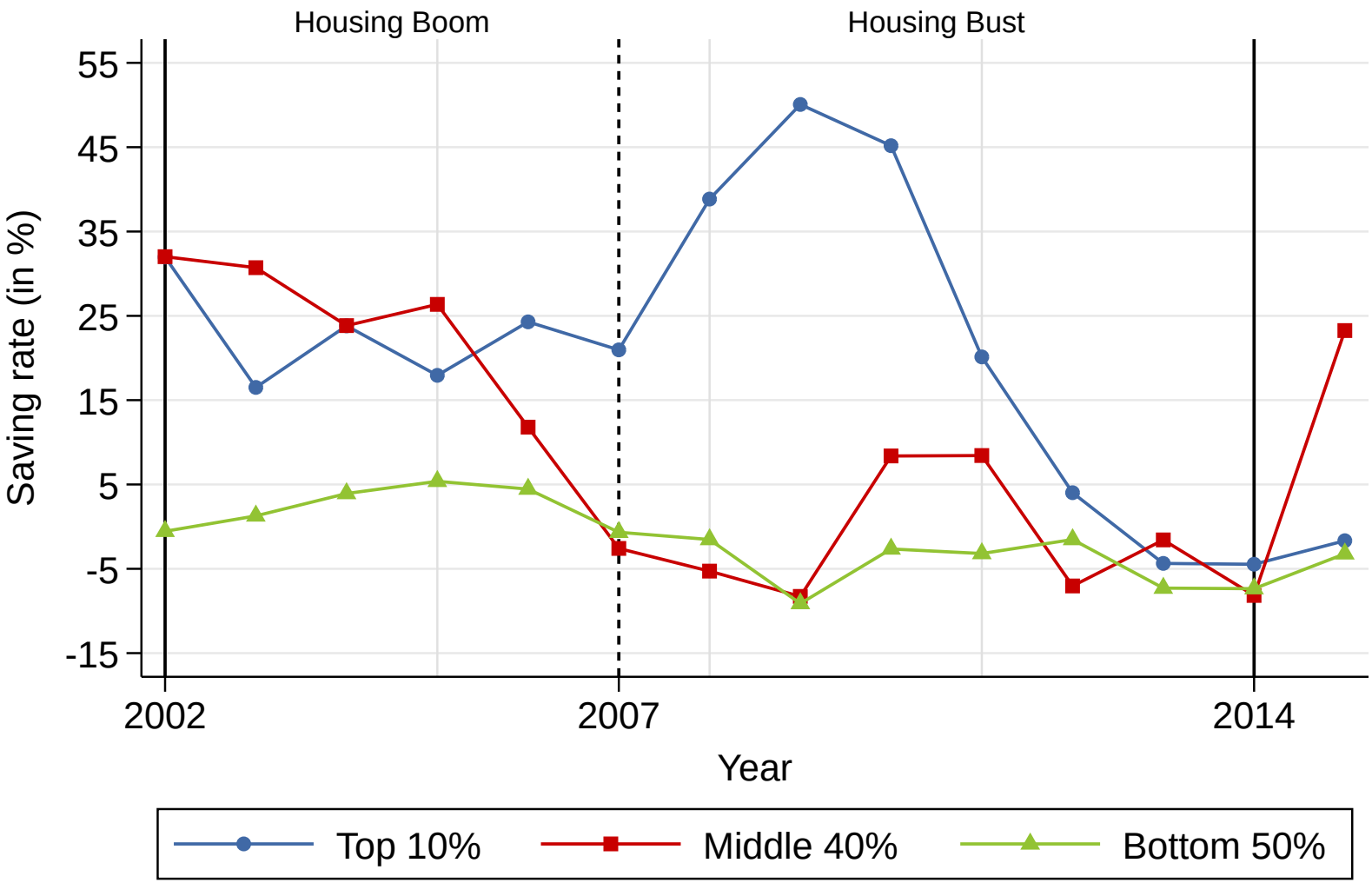
Back

SAVING RATES BY WEALTH GROUP IN SPAIN, 2002-2015
(restricted sample, 3-year moving average)



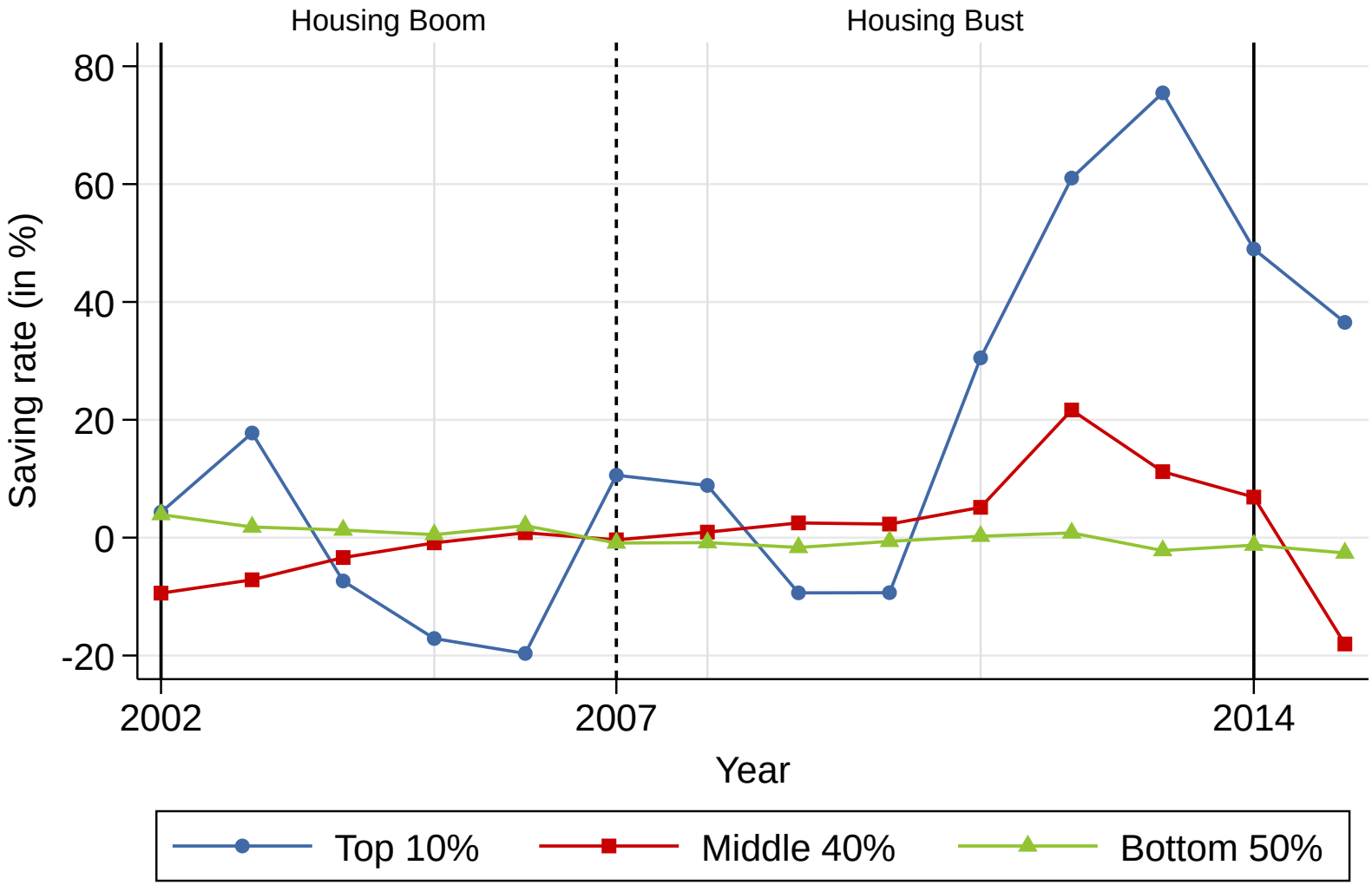
Back

SAVING RATES ON HOUSING BY WEALTH GROUP IN SPAIN, 2002-2015
(restricted sample, 3-year moving average)

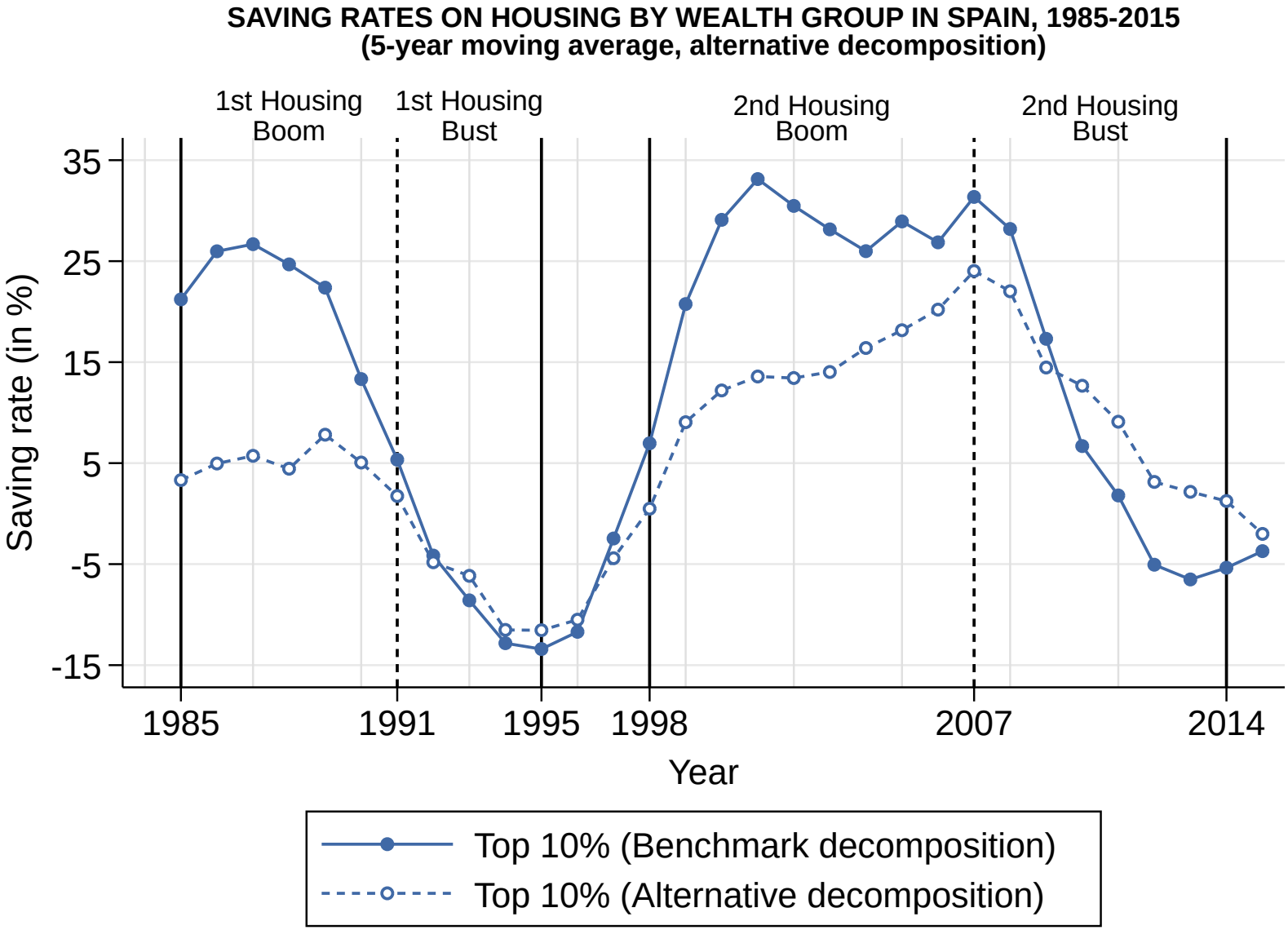


Back

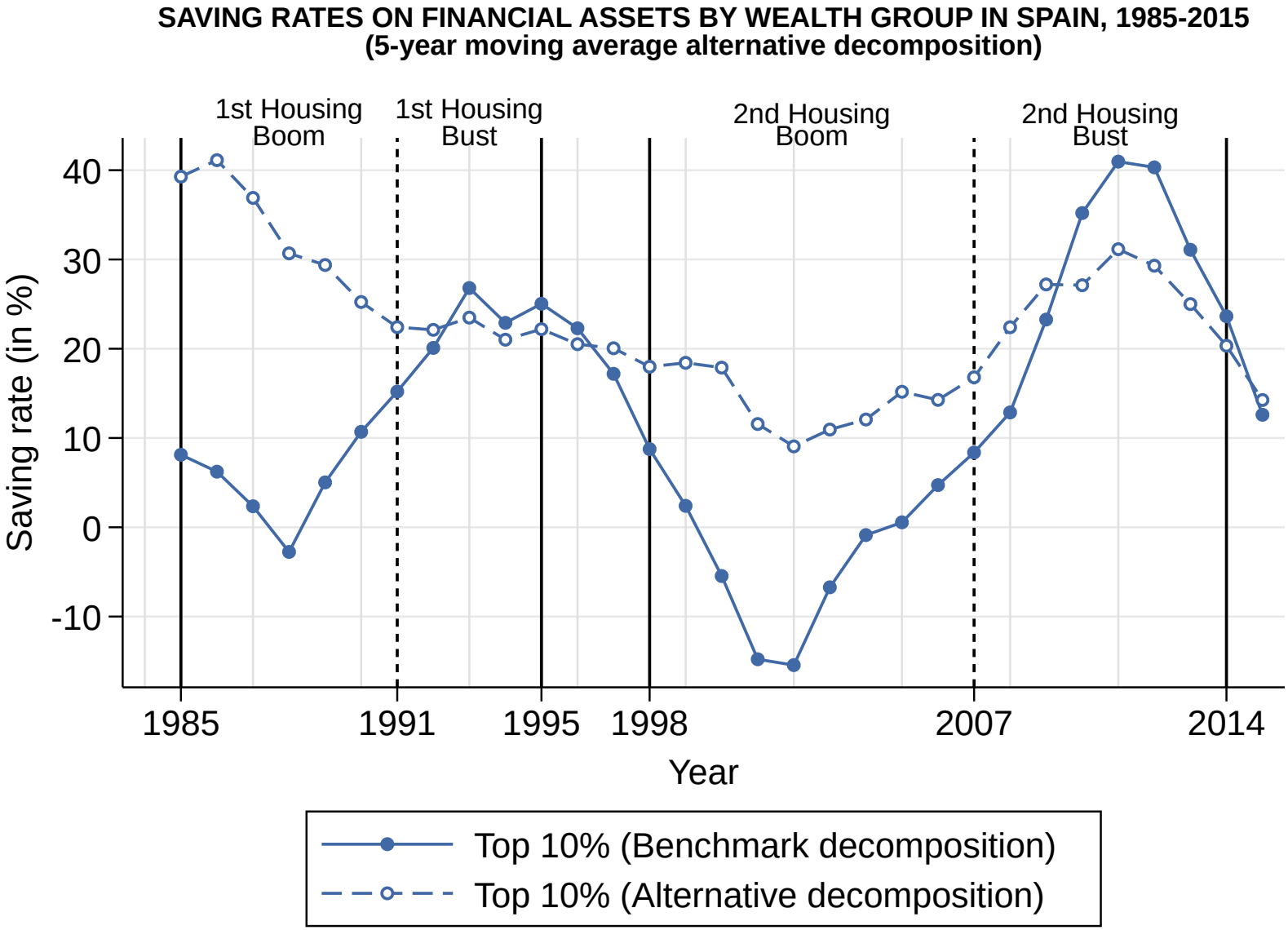
SAVING RATES ON FINANCIAL ASSETS BY WEALTH GROUP IN SPAIN, 2002-2015
(restricted sample, 3-year moving average)



Back


SAVING RATES ON HOUSING BY WEALTH GROUP IN SPAIN, 1985-2015
(5-year moving average, alternative decomposition)
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Saving rate (in %)
35
25
15
5
-5
-15
1985
1991
1995
1998
2007
2014
Year
Top 10% (Benchmark decomposition)
Top 10% (Alternative decomposition)

Back


SAVING RATES ON FINANCIAL ASSETS BY WEALTH GROUP IN SPAIN, 1985-2015
(5-year moving average alternative decomposition)
1st Housing Boom
1st Housing Bust
2nd Housing Boom
2nd Housing Bust
Saving rate (in %)
40
30
20
10
0
-10
1985
1991
1995
1998
2007
2014
Year
Top 10% (Benchmark decomposition)
Top 10% (Alternative decomposition)

Back

ATTITUDES TOWARDS RISK BY WEALTH GROUP IN SPAIN, 2002-2014

		Fraction of risk averse			Difference		
Year	N	T10%	M40%	B50%	T10%-M40%	T10%-B50%	M40%-B50%
2002	5,141	0.61	0.80	0.84	-0.19***	-0.24***	-0.05***
2005	5,950	0.64	0.83	0.87	-0.20***	-0.23***	-0.04***
2008	6,194	0.58	0.84	0.90	-0.26***	-0.32***	-0.06***
2011	6,103	0.70	0.87	0.92	-0.18***	-0.23***	-0.05***
2014	6,116	0.62	0.86	0.92	-0.24***	-0.30***	-0.06***

FIGURE – Source: Own elaboration with Spanish Survey of Household Finances

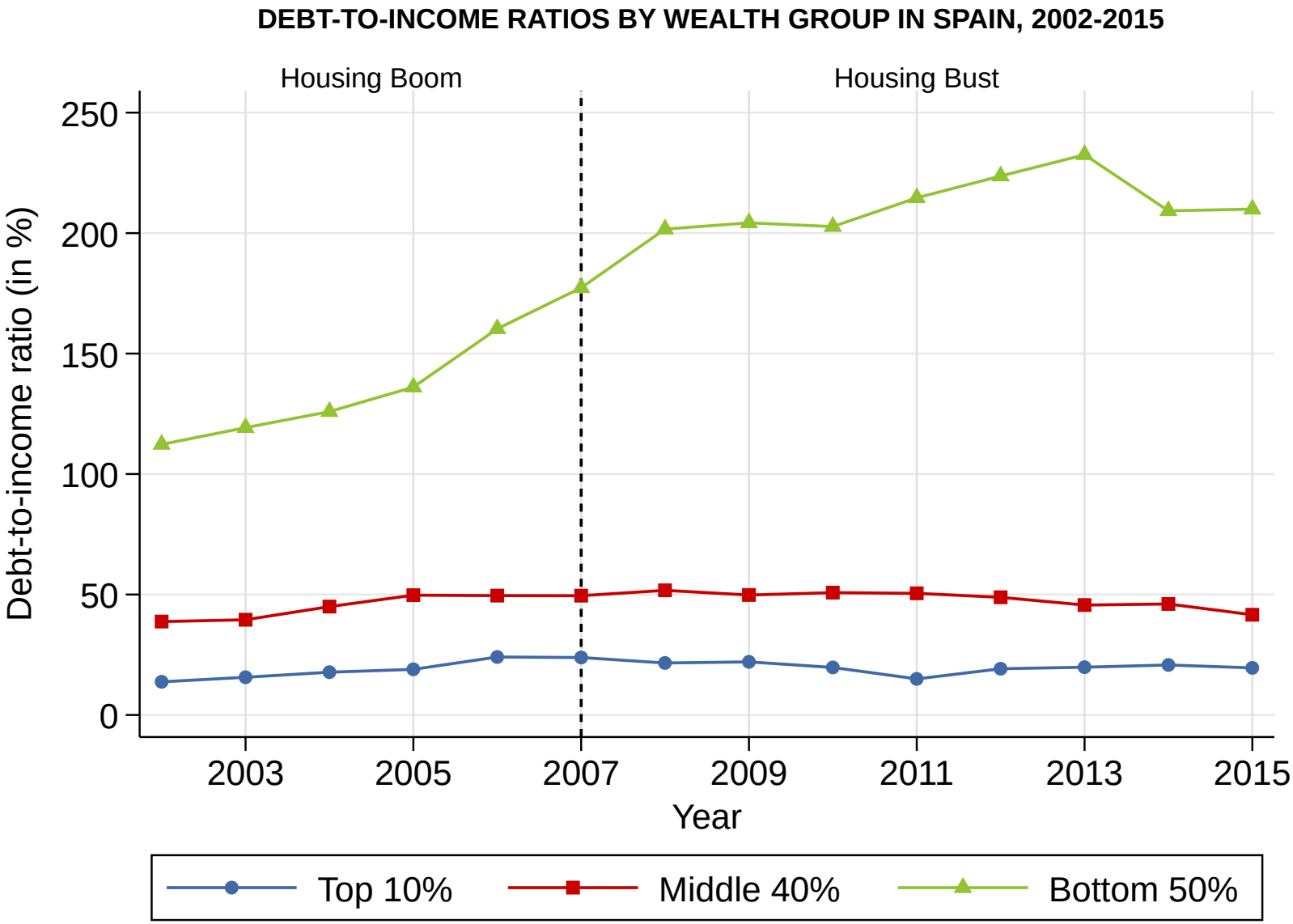
Back

FINANCIAL INFORMATION BY INCOME GROUP IN SPAIN, 2016

	Income group			Difference		
	T10%	M40%	B50%	T10%-M40%	T10%-B50%	M40%-B50%
Knowledge						
Diversification	0.70	0.51	0.41	0.19***	0.30***	0.11***
Interest rates	0.59	0.48	0.40	0.11***	0.20***	0.08***
Inflation	0.76	0.62	0.47	0.14***	0.29***	0.15***
Advisor	0.03	0.02	0.01	0.01***	0.02***	0.01***

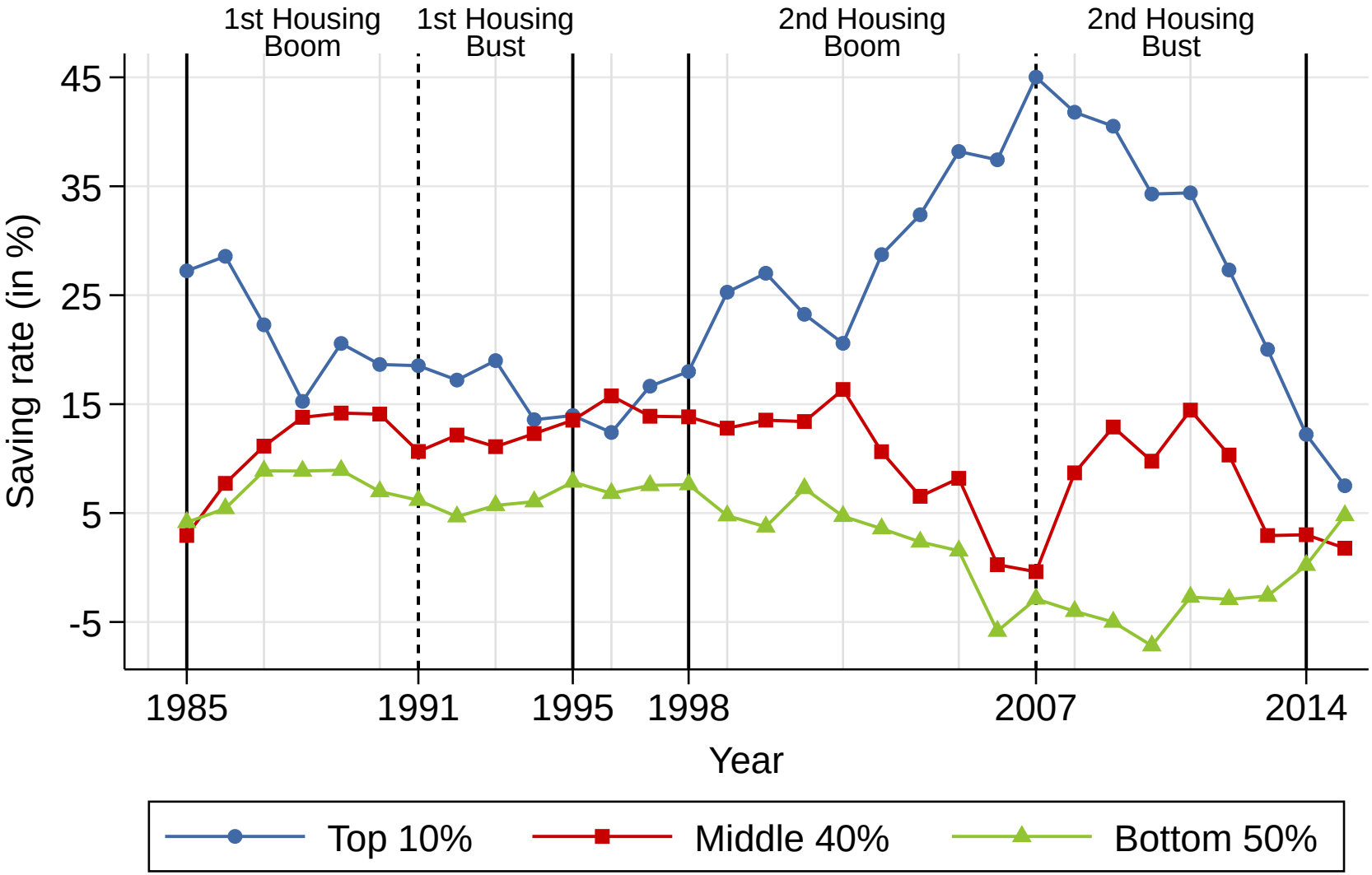
FIGURE – Source: Own elaboration with Spanish Survey of Financial Competences [2016]

Back

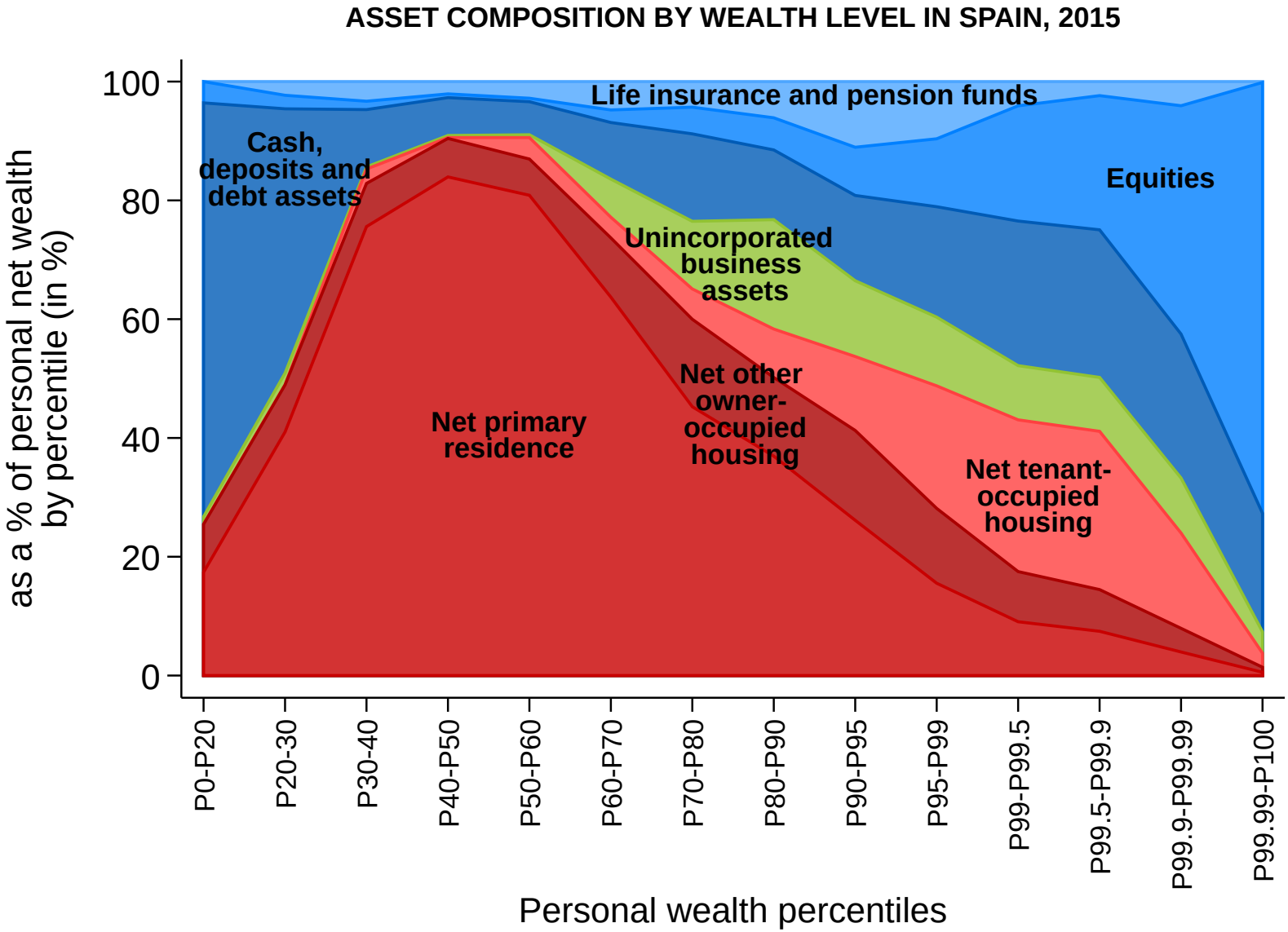

DEBT-TO-INCOME RATIOS BY WEALTH GROUP IN SPAIN, 2002-2015
Housing Boom
Housing Bust
Debt-to-income ratio (in %)
250
200
150
100
50
0
2003
2005
2007
2009
2011
2013
2015
Year
Top 10%
Middle 40%
Bottom 50%

Back

SAVING RATES BY WEALTH GROUP IN SPAIN, 1985-2015
(5-year moving average)

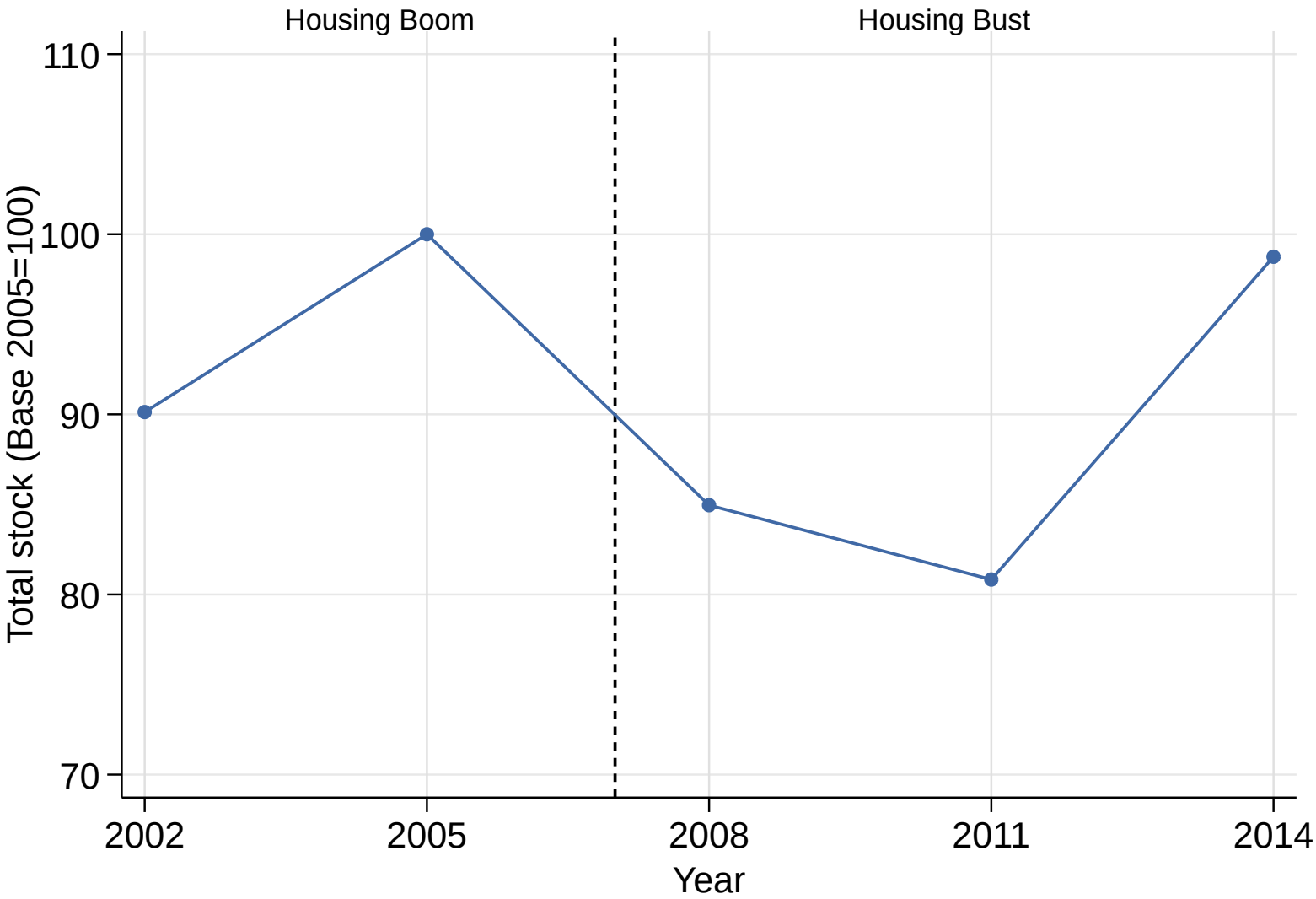


Back


ASSET COMPOSITION BY WEALTH LEVEL IN SPAIN, 2015
as a % of personal net wealth by percentile (in %)
100
80
60
40
20
0
Life insurance and pension funds
Cash, deposits and debt assets
Equities
Unincorporated business assets
Net other owner-occupied housing
Net primary residence
Net tenant-occupied housing
P0-P20
P20-30
P30-40
P40-P50
P50-P60
P60-P70
P70-P80
P80-P90
P90-P95
P95-P99
P99-P99.5
P99.5-P99.9
P99.9-P99.99
P99.99-P100
Personal wealth percentiles

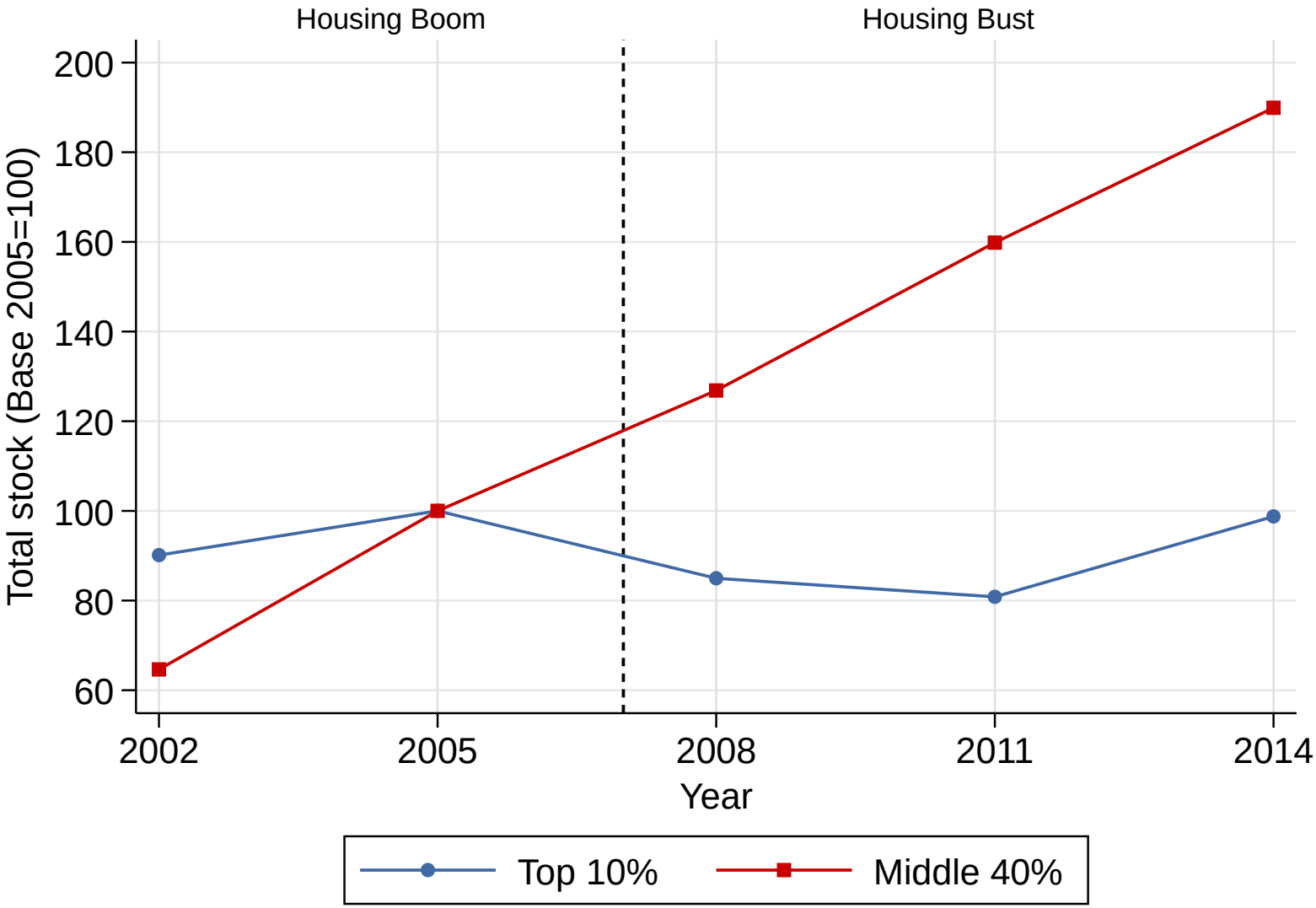
Back

CHANGE IN STOCK OF TENANT-OCCUPIED REAL ESTATE FOR TOP 10% WEALTH GROUP, 2002-201

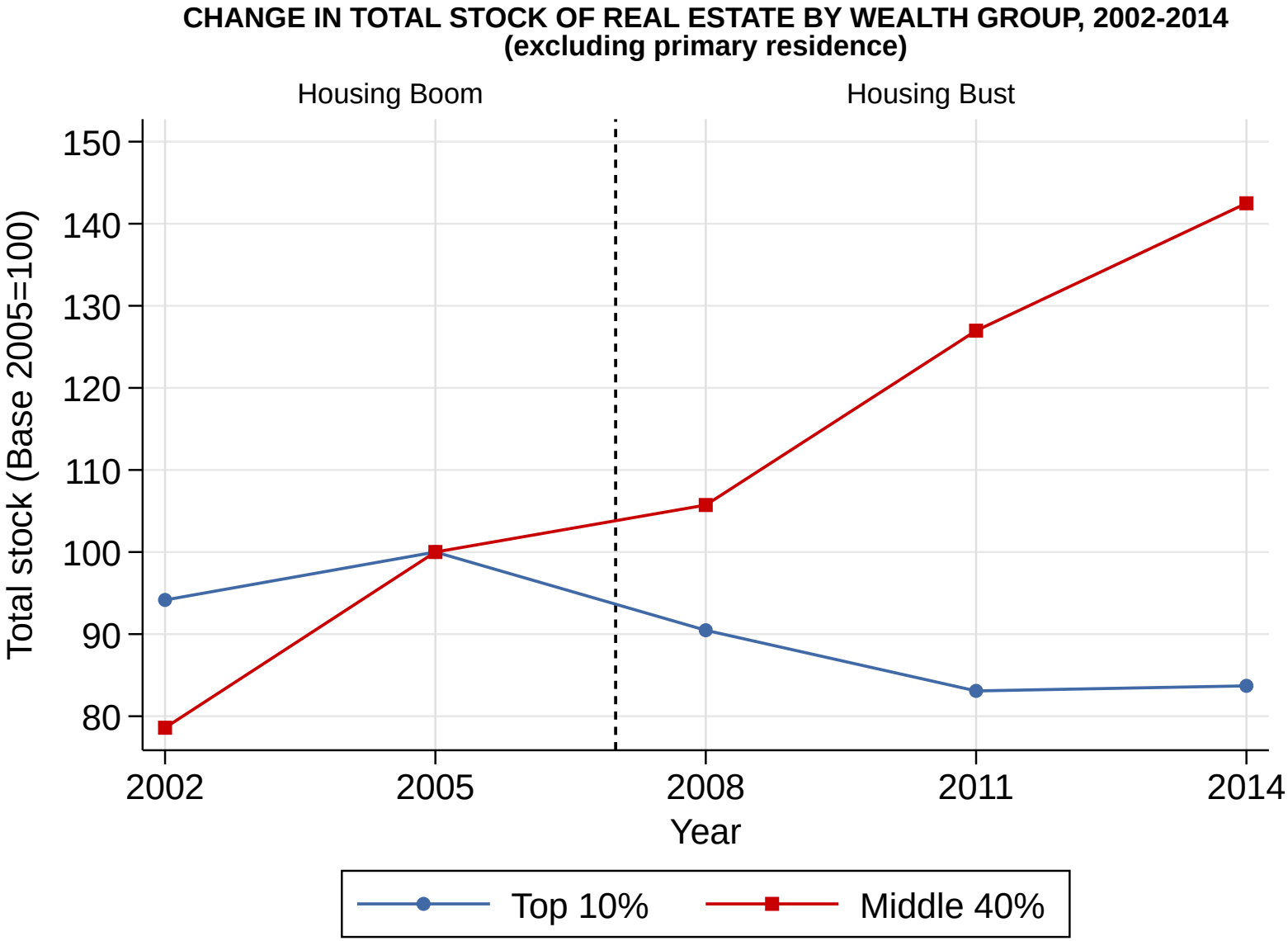


Back

CHANGE IN STOCK OF TENANT-OCCUPIED REAL ESTATE BY WEALTH GROUP, 2002-2014

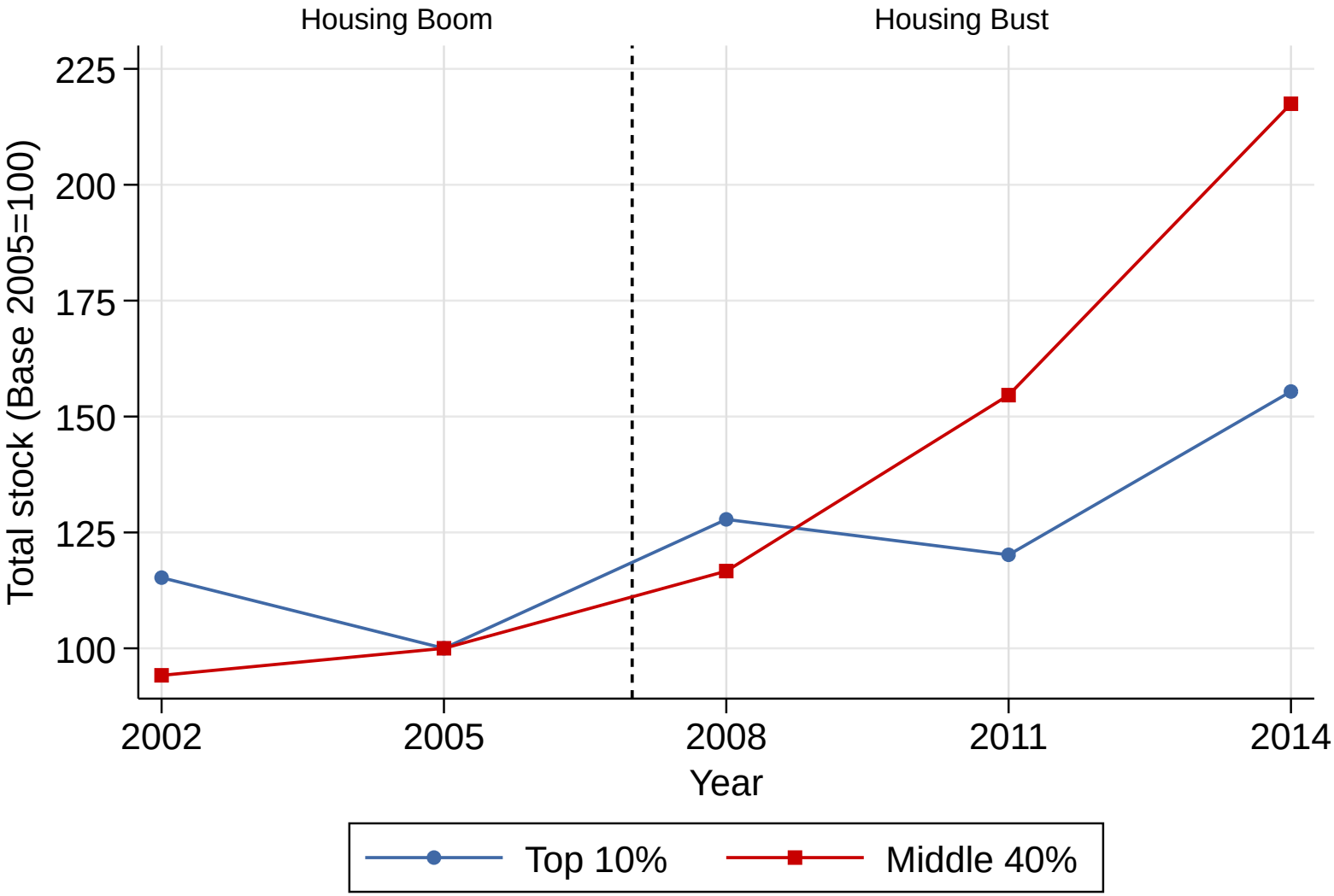


Back


CHANGE IN TOTAL STOCK OF REAL ESTATE BY WEALTH GROUP, 2002-2014
(excluding primary residence)
Housing Boom
Housing Bust
Total stock (Base 2005=100)
150
140
130
120
110
100
90
80
2002
2005
2008
2011
2014
Year
Top 10%
Middle 40%

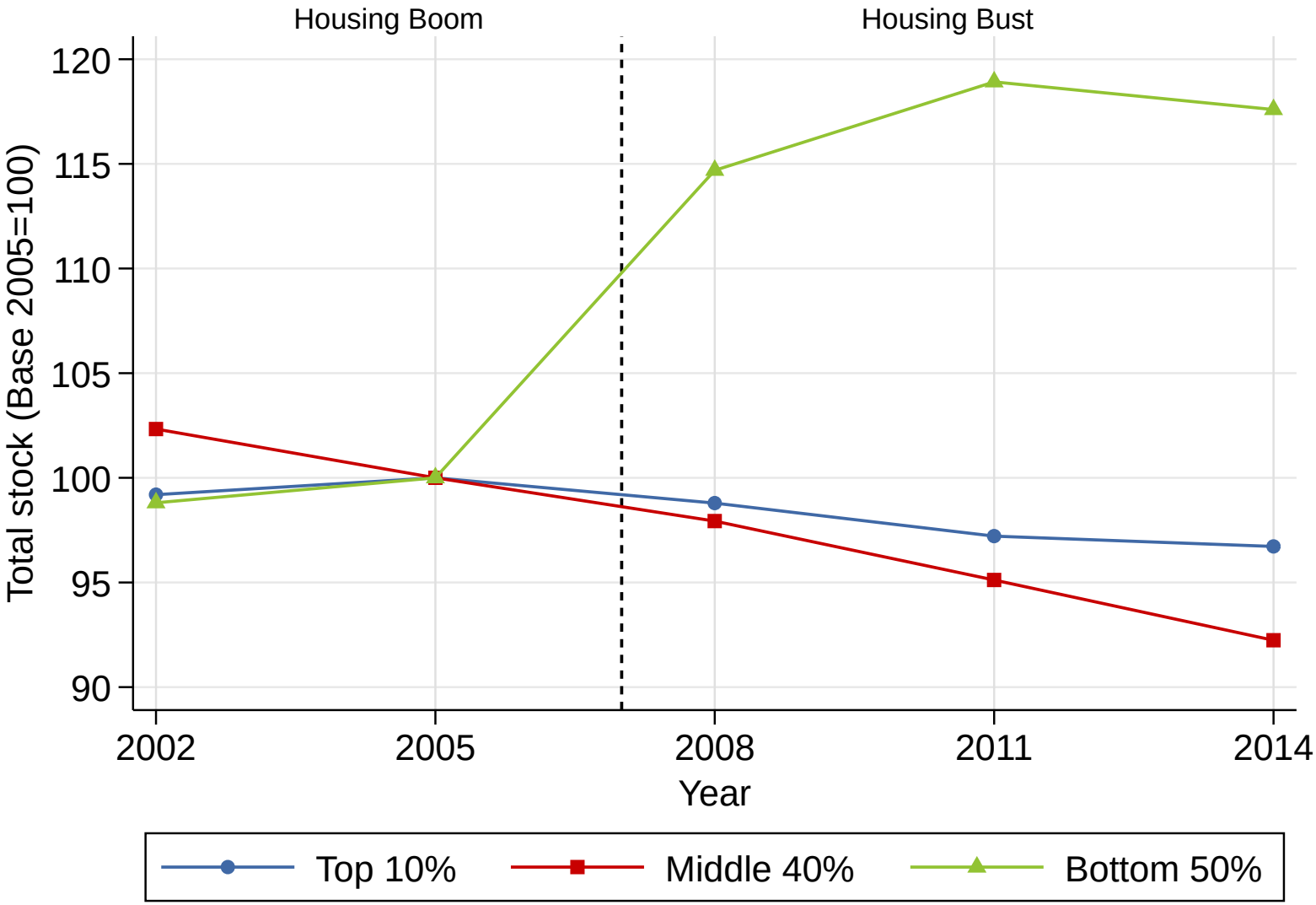
Back

CHANGE IN STOCK OF OWNER-OCCUPIED REAL ESTATE BY WEALTH GROUP, 2002-2014
(excluding primary residence)



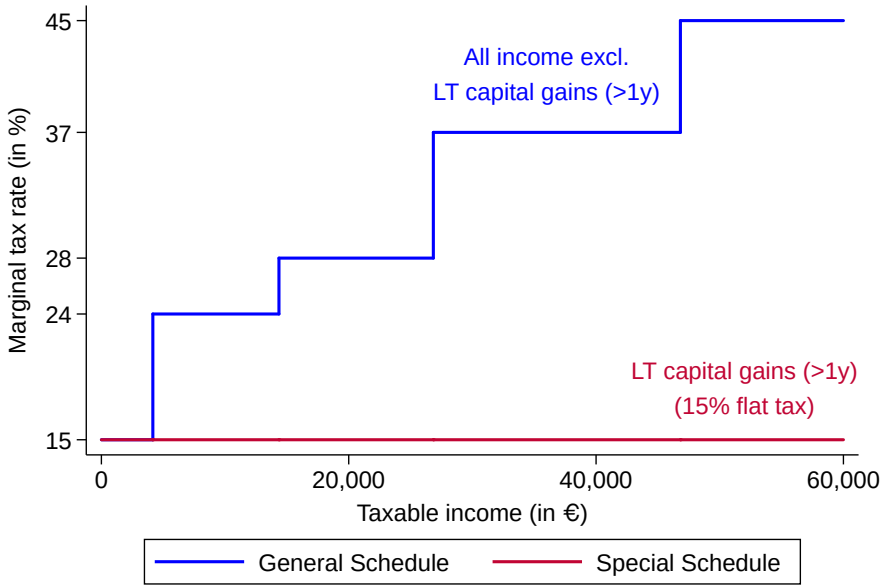
Back

CHANGE IN STOCK OF OWNER-OCCUPIED PRIMARY RESIDENCE BY WEALTH GROUP, 2002-2014

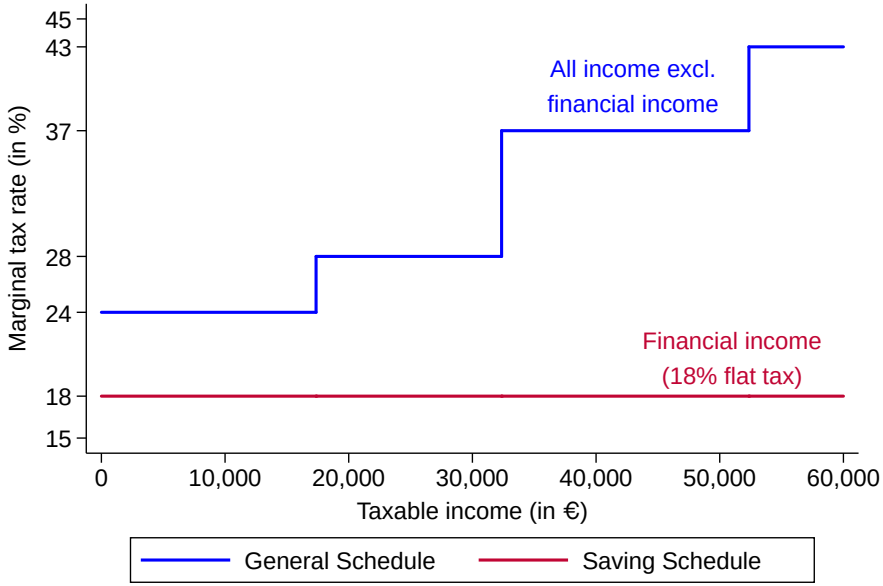


Back

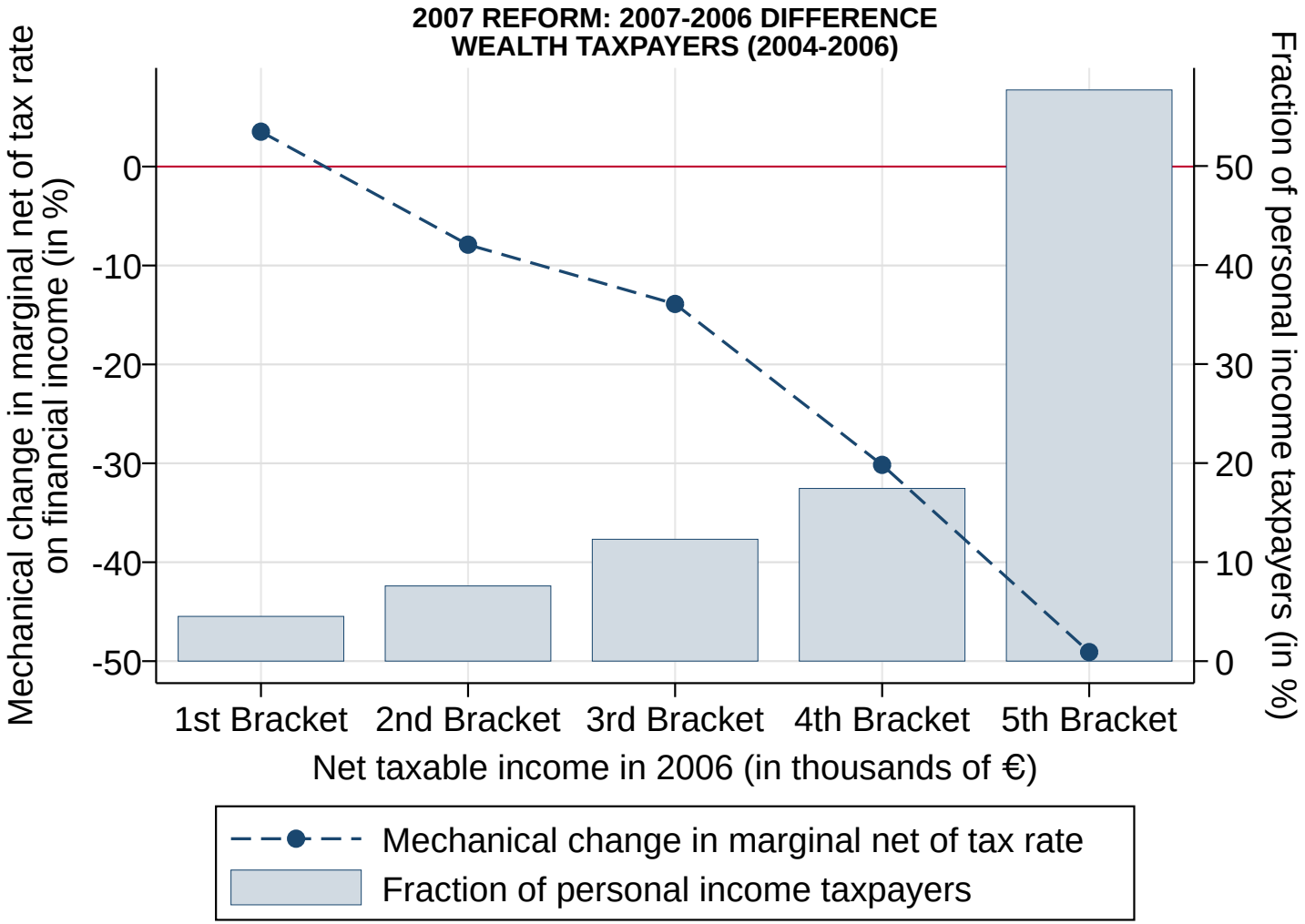
DUAL PERSONAL INCOME TAX PRIOR TO THE REFORM (2006)



DUAL PERSONAL INCOME TAX AFTER THE REFORM (2007)



Mechanical Variation in the Marginal Net-of-Tax Rate on Financial Income for Wealth Taxpayers

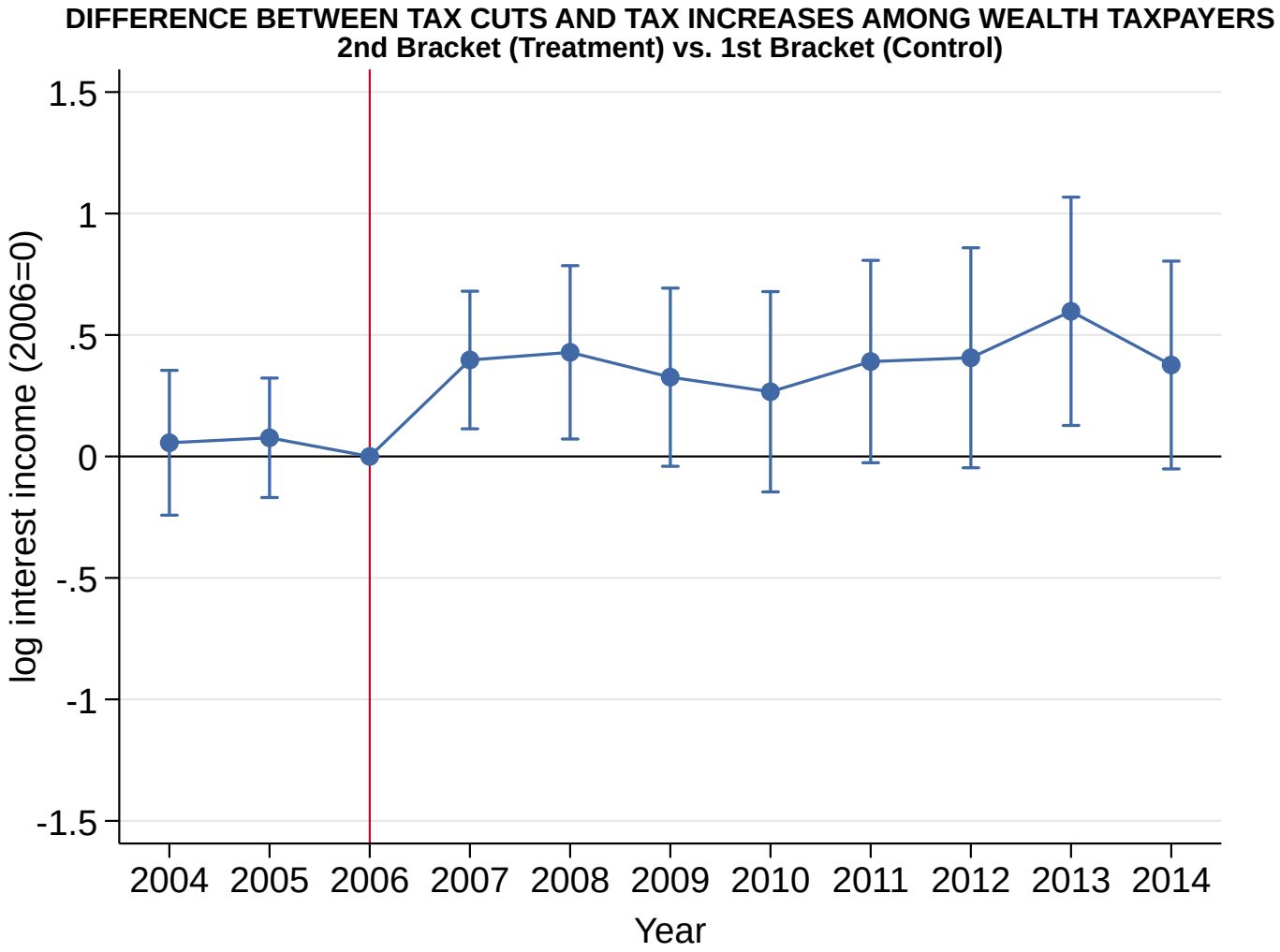


Back

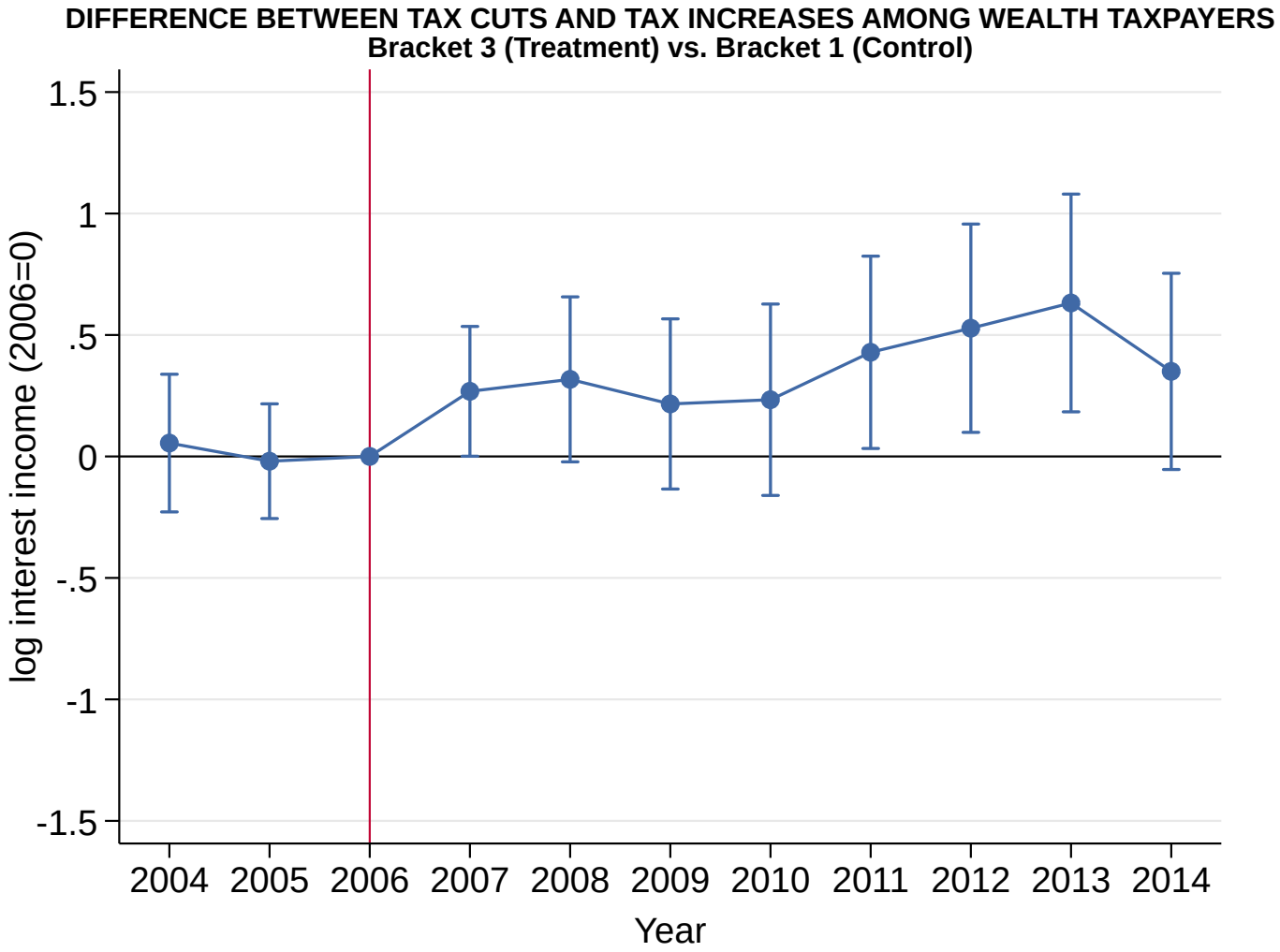
SUMMARY STATISTICS BY INCOME BRACKET, 2004-2006

	Control	Treatment			
	1st Br.	**2nd Br.**	**3rd Br.**	**4th Br.**	**5th Br.**
Taxable wealth	265,217	363,615	397,458	497,604	1,489,324
Taxable income	9,266	16,667	26,101	38,331	248,022
Taxable labor income	3,167	5,370	11,132	17,273	64,724
Taxable debt assets	12,356	15,117	16,304	17,536	43,221
Asset Share in Housing	0.33	0.37	0.38	0.38	0.31
Asset Share in Financial Assets	0.63	0.56	0.57	0.55	0.61
Age	65.46	62.67	62.04	60.54	56.68
Fraction Men	0.40	0.47	0.54	0.58	0.77
Fraction Married	0.62	0.68	0.68	0.71	0.79
Fraction Self-employed	0.14	0.23	0.22	0.24	0.42
N	693	3,192	5,661	8,208	53,457

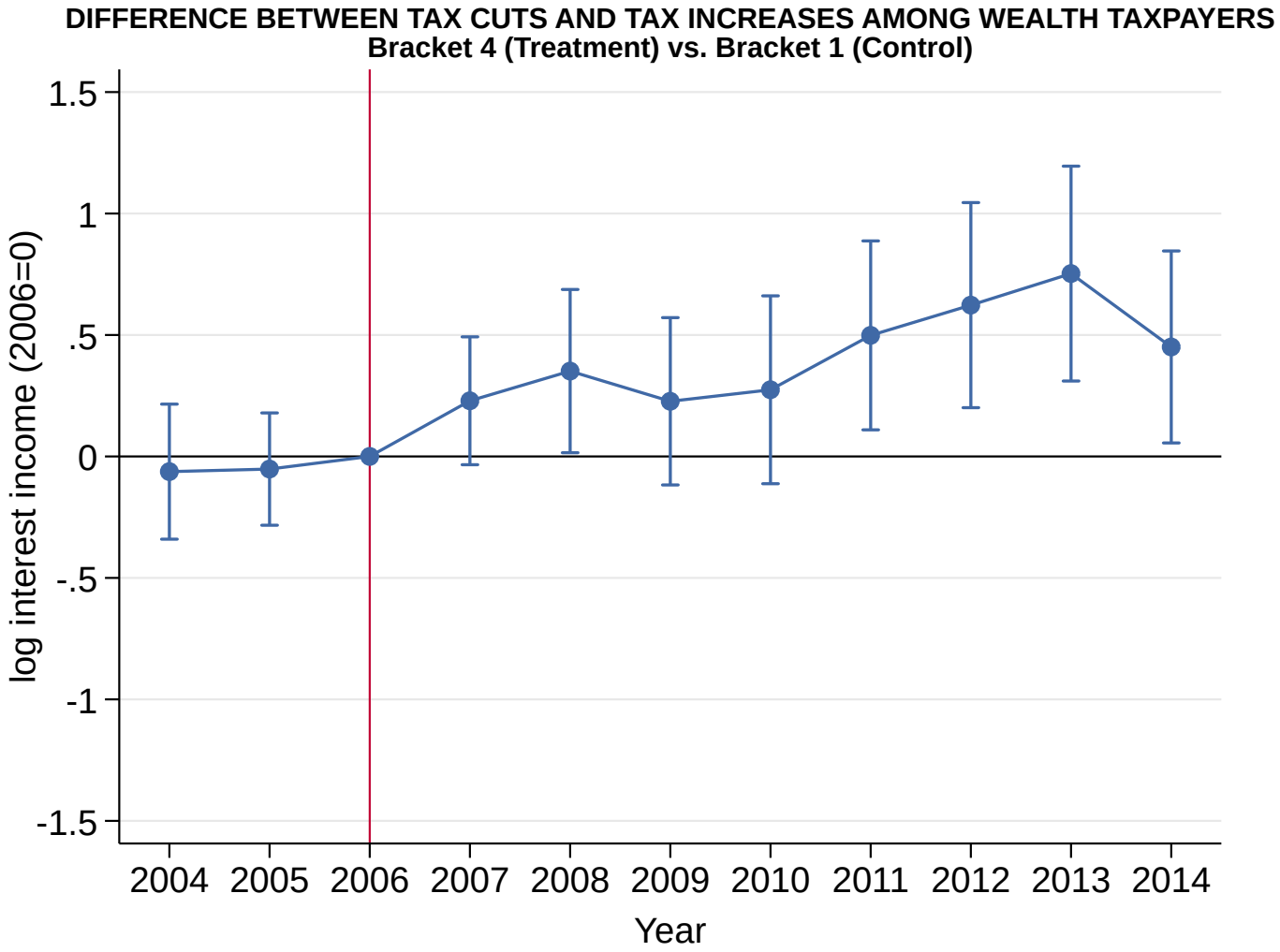
Back


DIFFERENCE BETWEEN TAX CUTS AND TAX INCREASES AMONG WEALTH TAXPAYERS
2nd Bracket (Treatment) vs. 1st Bracket (Control)
log interest income (2006=0)
1.5
1
.5
0
-.5
-1
-1.5
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year

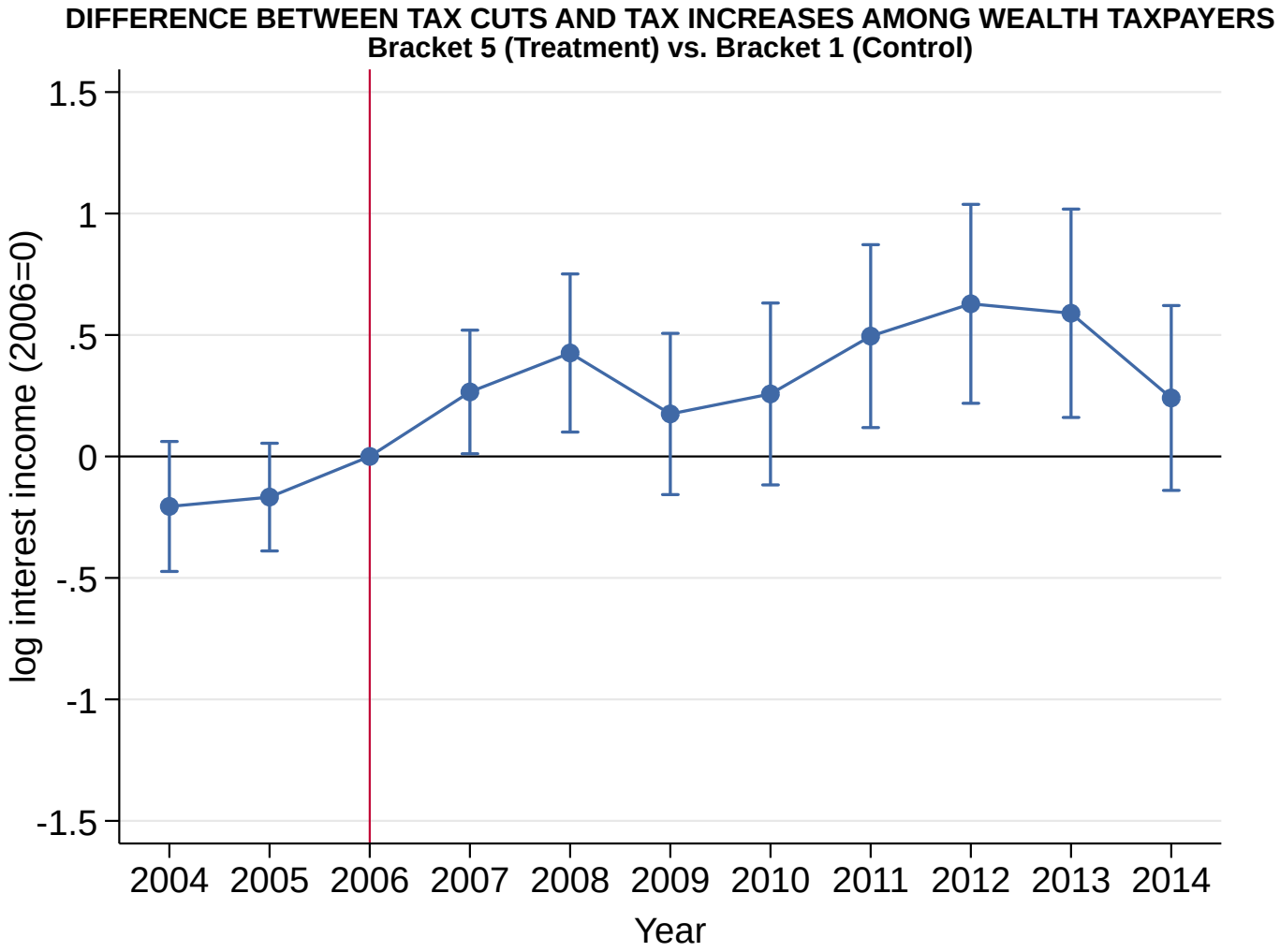
Back


DIFFERENCE BETWEEN TAX CUTS AND TAX INCREASES AMONG WEALTH TAXPAYERS
Bracket 3 (Treatment) vs. Bracket 1 (Control)
log interest income (2006=0)
1.5
1
.5
0
-.5
-1
-1.5
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year

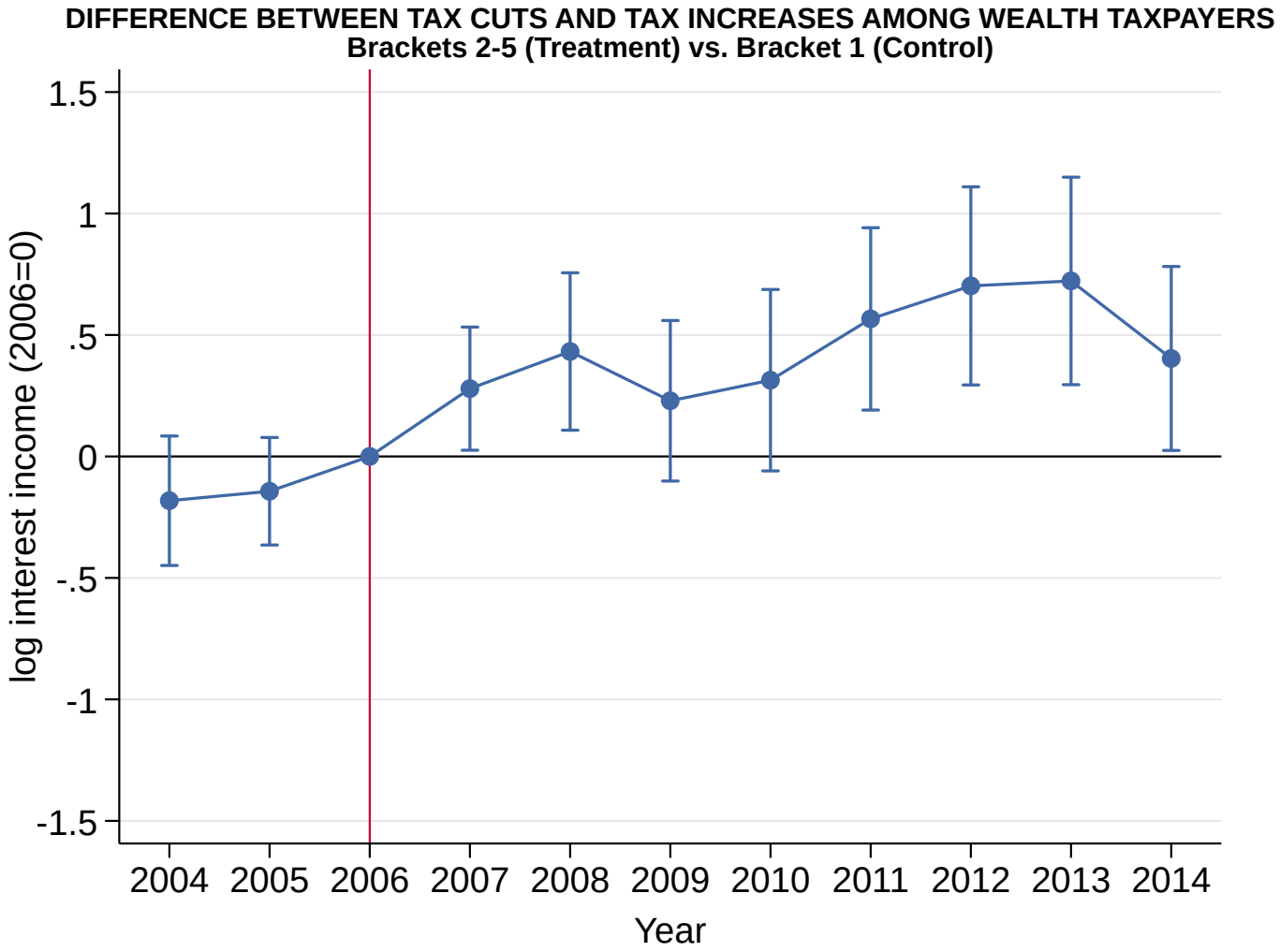
Back


DIFFERENCE BETWEEN TAX CUTS AND TAX INCREASES AMONG WEALTH TAXPAYERS
Bracket 4 (Treatment) vs. Bracket 1 (Control)
log interest income (2006=0)
1.5
1
.5
0
-.5
-1
-1.5
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year

Back


DIFFERENCE BETWEEN TAX CUTS AND TAX INCREASES AMONG WEALTH TAXPAYERS
Bracket 5 (Treatment) vs. Bracket 1 (Control)
log interest income (2006=0)
1.5
1
.5
0
-.5
-1
-1.5
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year

Back


DIFFERENCE BETWEEN TAX CUTS AND TAX INCREASES AMONG WEALTH TAXPAYERS
Brackets 2-5 (Treatment) vs. Bracket 1 (Control)
log interest income (2006=0)
1.5
1
.5
0
-.5
-1
-1.5
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year

Back

DIFFERENCES-IN-DIFFERENCES RESULTS

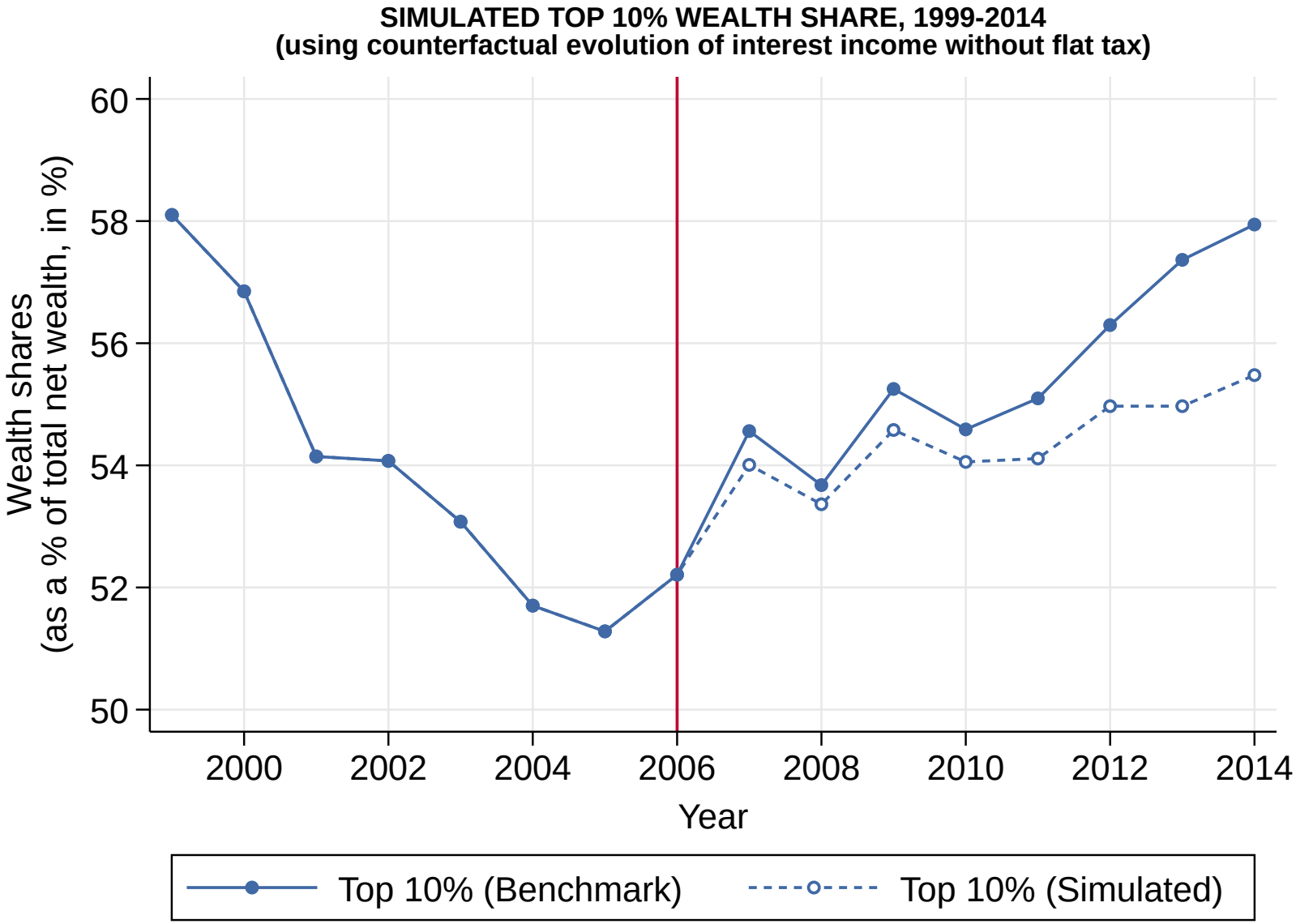
	(1)	(2)
Post	0.517***	0.516***
	(3.89)	(3.70)
Treat	0.322**	
	(2.05)	
Post·Treat	0.560***	0.564***
	(3.68)	(4.03)
Individual fixed effects		X
N	260,089	260,089

Back

DIFFERENCES-IN-DIFFERENCES RESULTS BY INCOME BRACKET

	T2 (2nd Br.)	T3 (3rd Br.)	T4 (4th Br.)	T5 (5th Br.)
	(1)	(2)	(3)	(4)
Post	0.516***	0.516***	0.516***	0.516***
	(3.70)	(3.70)	(3.70)	(3.70)
Post·Treat	0.354**	0.360**	0.463***	0.614***
	(2.28)	(2.43)	(3.18)	(4.38)
Individual fixed effects	X	X	X	X
N	14,200	23,244	32,566	197,687

Back


SIMULATED TOP 10% WEALTH SHARE, 1999-2014
(using counterfactual evolution of interest income without flat tax)
Wealth shares
(as a % of total net wealth, in %)
60
58
56
54
52
50
2000
2002
2004
2006
2008
2010
2012
2014
Year
Top 10% (Benchmark)
Top 10% (Simulated)

Back

REAL ESTATE DEMAND: RICH DISTRICTS VS. REST, 2009

	Districts with highest price		Rest of districts			
	Mean	SD	Mean	SD	Diff.	P-value
Sale price per m2	2675.01	1094.68	1956.00	795.22	-719.01	0.00
Surface per m2	107.63	59.47	127.00	82.05	19.37	0.00
Demand index	0.01	0.02	0.01	0.01	0.00	0.11
Available stock	5.22	5.64	3.92	2.65	-1.30	0.00
Rental price per m2	8.43	5.81	7.01	3.98	-1.42	0.01
N	363		1,192			

FIGURE – Source: Own elaboration with data from *El Idealista* [2009]

Back

Decomposition of the Total Rate of Return

Flow rate of return:

$$r_t^g = \frac{W_{H,t}^g}{W_t^g} \cdot r_{H,t} + ... + \frac{W_{B,t}^g}{W_t^g} \cdot r_{B,t} \tag{4}$$

Rate of capital gain:

$$q_t^g = \frac{W_{H,t}^g}{W_t^g} \cdot q_{H,t} + ... + \frac{W_{B,t}^g}{W_t^g} \cdot q_{B,t} \tag{5}$$

- g_t: wealth group (e.g., top 10%, bottom 50%)
- W_t^g: average real wealth of wealth group g at time t
- r_t^g: average rate of return of group g at time t
- q_t^g: average rate of real capital gain of wealth group g at time t
- Assets: Housing (H), unincorporated business assets (B), deposits and debt assets, equities, life insurance and pension funds

Back