Mandatory Retirement for Judges Improved the Performance of U.S. State Supreme Courts

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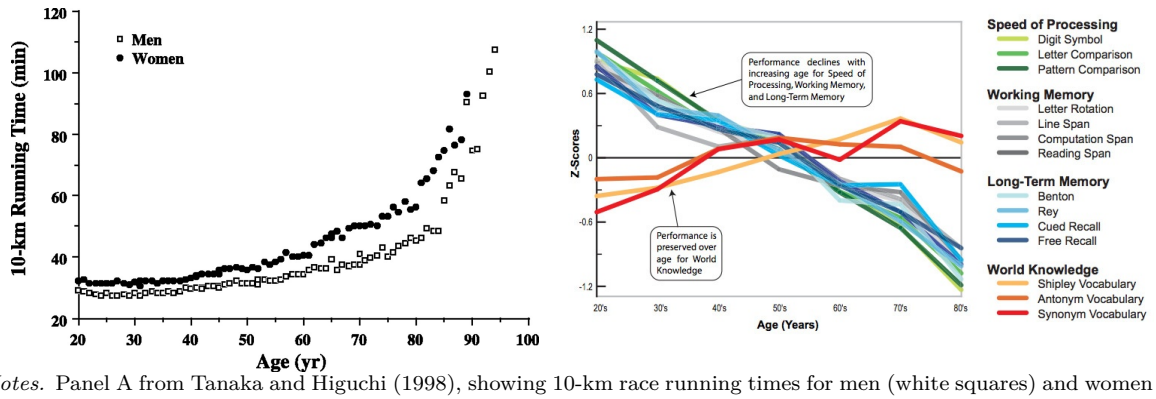
Online Appendix

A Background and Data

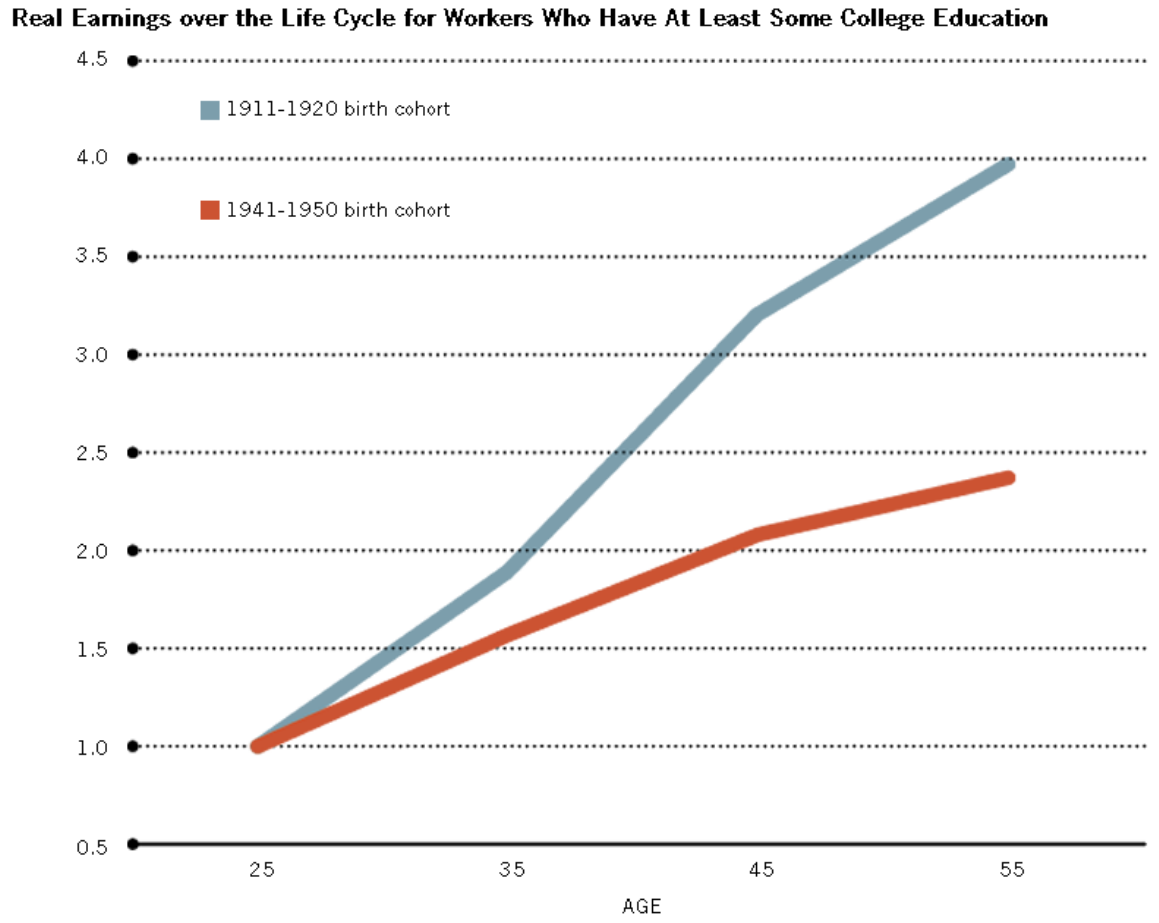
A.1 Aging and Retirement Decisions

Figure A.1: Performance vs. Age for Physical and Cognitive Tasks



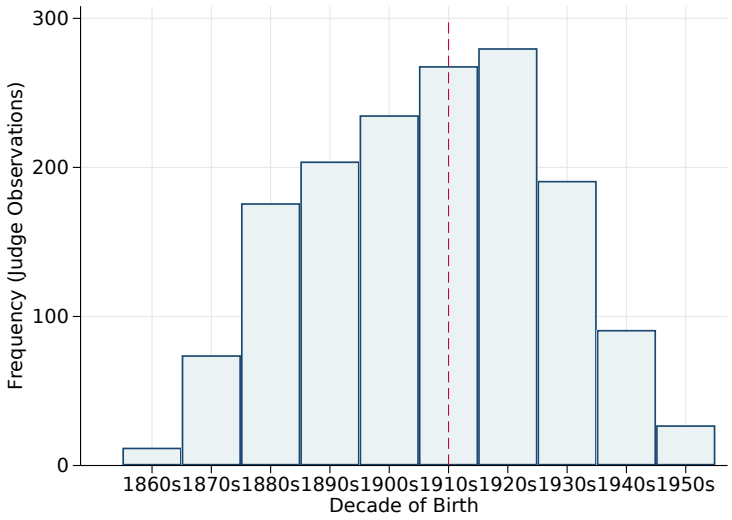
Notes. Panel A from Tanaka and Higuchi (1998), showing 10-km race running times for men (white squares) and women (black squares) by age. Panel B from Ballesteros et al. (2009) showing how measures of different factors of intelligence or cognitive performance from psychological tests vary by age. The green lines measure processing speed, the gray lines working memory, blue lines long-term memory, and red lines world knowledge. All are decreasing into old age except knowledge.

Figure A.2: Earnings over the Life Cycle



Real earnings over the life cycle for workers with college, 1911-1920 birth cohorts vs 1941-1950 birth cohorts. Source: Kong and Ravikumar (2012).

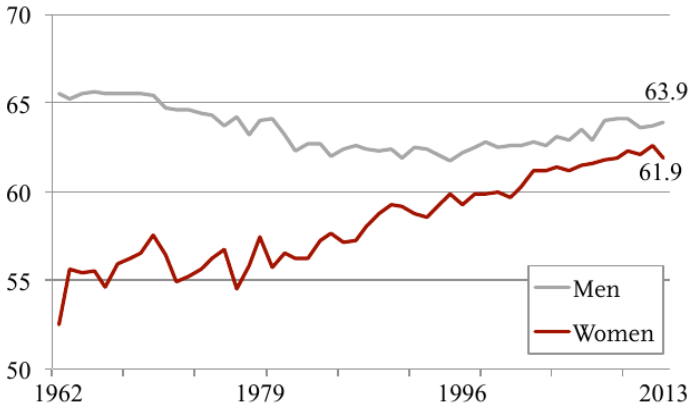
Figure A.3: Distribution of Judge Birth Decades



Number of judges in each birth decade cohort. Vertical dashed line at median.

Figure A.4: Average Retirement Age for U.S. Workers and Judges,

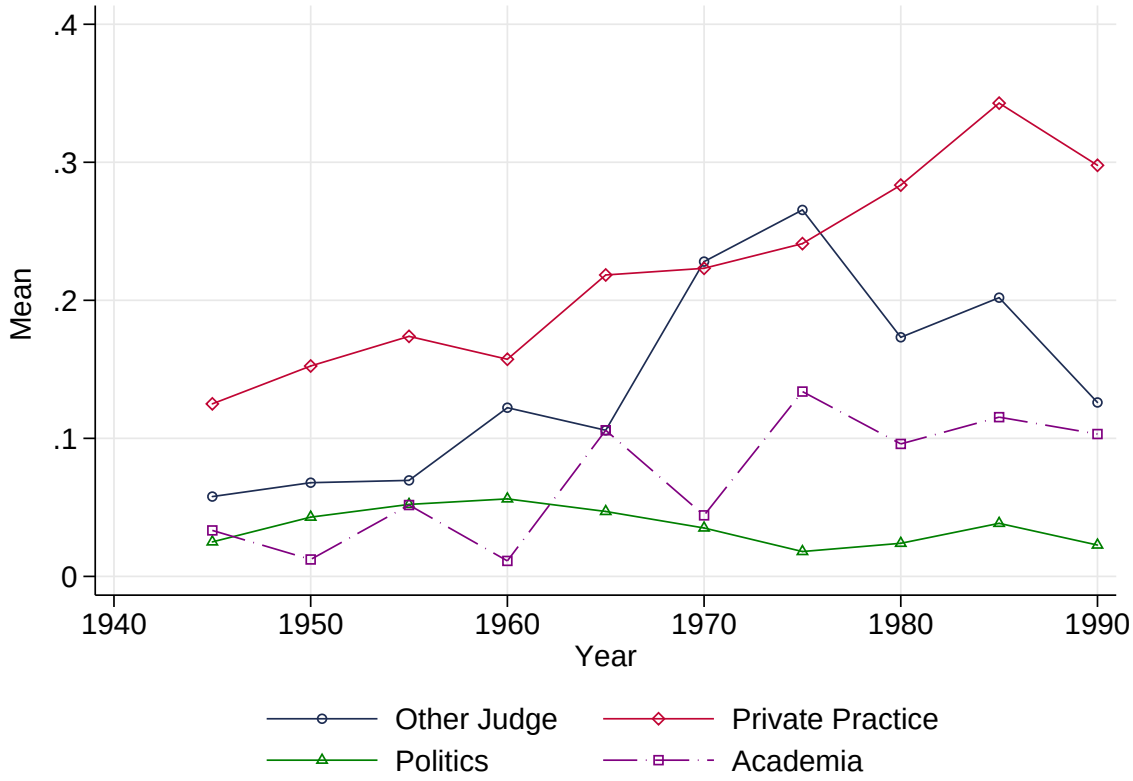
(A) Average Retirement Age for U.S. Workers, by Gender, 1962-2013



(B) Average Retirement Age for State Supreme Court Judges, 1948-1994

Panel (A): Average retirement age by gender for U.S. workers, computed from CPS by Munnell (2015). Panel (B): Average retirement age of state supreme court judges, by year. Error spikes give 25th and 75th percentiles.

Figure A.5: Post-Judgeship Careers



Proportion of judges with documented careers after their state supreme court judgeship, including other judgeship, private practice, politics, and academia. Plotted by five-year bins.

What do judges do after retirement? Figure A.5 shows the trends in these career choices. At the beginning of the sample, few judges took on more work after their judgeship. That has become more common in recent years. If they do take another career, it is usually in private practice as an attorney.

A.2 Mandatory Retirement

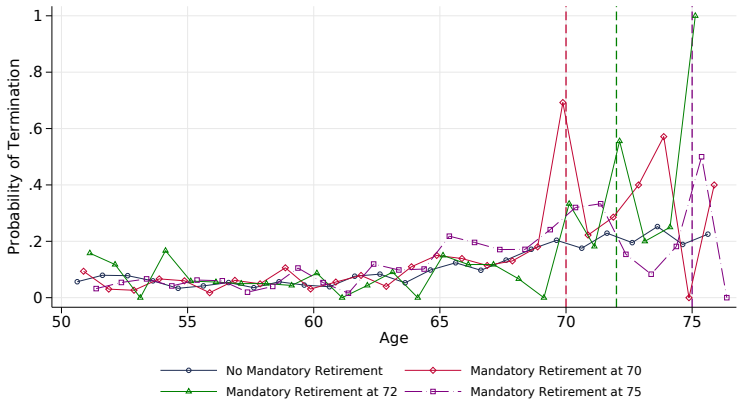
Table A.1: Tabulations on Treatment and Control Judges

	# of	Number of Obs (Judge-Year)			Number of Obs (Court-Year)			Number of Judges		
Reform	Reforms	Controls	Treated	Total	Controls	Treated	Total	Controls	Treated	Total
Retire at 70	9	11843	1390	13233	2014	202	2216	1291	172	1463
Retire at 72	2	13233	511	13744	2216	62	2278	1412	51	1463
Retire at 75	5	13744	1266	15010	2278	170	2448	1448	143	1591
Any Reform	16	11843	3167	15010	2014	434	2448	1291	366	1657

Notes. Summary tabulations on Retirement Reform Judges. The column gives the number of courts that experience a change in the retirement rule. The second set of columns gives the number of judge-year observations in the control and treatment groups (and total) when a change in retirement rule occurs in that year. The third list of columns gives the number of judges in these respective groups.

Appendix Table A.1 provides tabulations on the relevant treatment variation in the data for mandatory retirement reforms. The first set of columns gives the number of judge-years where at least one treated (selected post-reform) and one control judge (selected pre-reform) is on the court that year. The second set of columns gives the number of court-year observations in the control and treatment groups (and total). The third list of columns gives the number of distinct judges in these respective groups.

Figure A.6: Retirement Rates by Age, by Mandatory Retirement Age



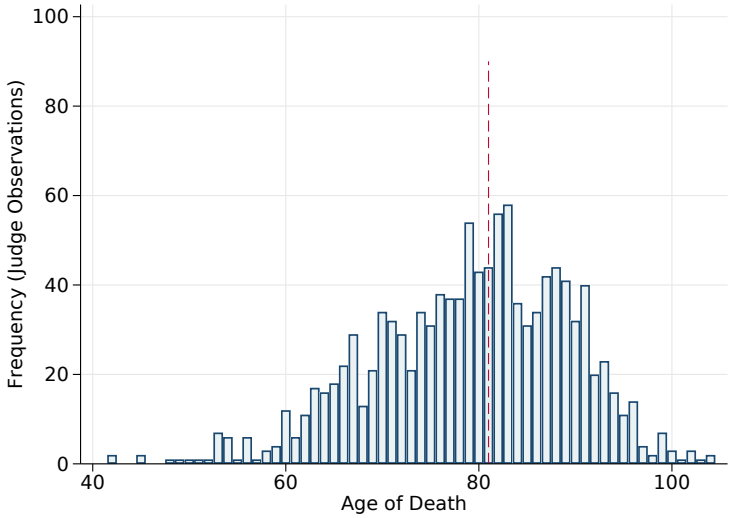
Notes. Probability that a judge retires at a particular age, conditional on working at that age. Plotted separately by mandatory retirement rule.

Appendix Figure A.7 shows further evidence on judges' life cycle, including some statistics on the timing of judge deaths. Panel A shows that the judges have relatively long lifespans, with most living into their eighties. Panel B looks at how judge retirement is related to judge longevity, separately for mandatory retirement (left panel) and voluntary retirement (right panel). The figure shows that with voluntary retirement, judges are much more likely to die within a year of leaving office. This difference supports the idea that mandatory retirement is an impactful policy: judges are more likely to stay in their jobs until death under voluntary retirement. On the other hand, there is still a relatively high chance of death in the first year out of office under mandatory retirement (left panel), which may hint at a causal impact of retirement on mortality (as found in Sullivan and von Wachter, 2009). This is a promising area for future work.[36]

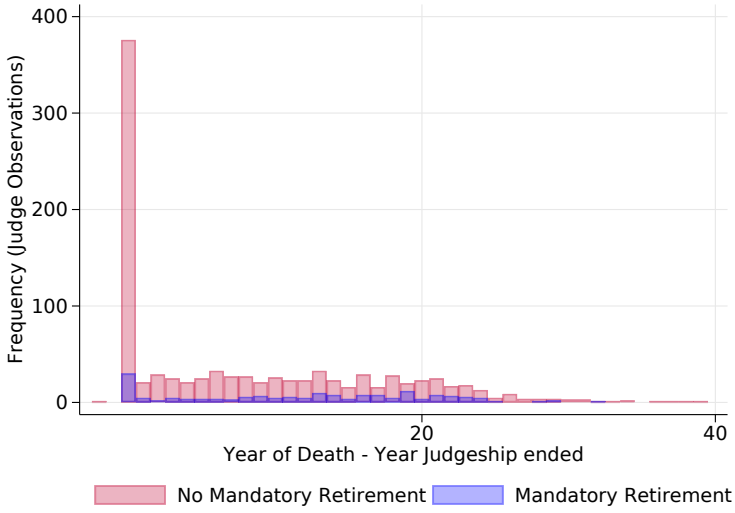
[36]Meng et al. (2017) review the mixed evidence about the cognitive impacts of retirement, noting that there is a "major knowledge gap in regards to the impact of retirement on cognitive decline."

Figure A.7: Mandatory Retirement and Deaths on the Job

(A) Judge Age-at-Death Distribution



(B) Distribution of Years Between Termination and Death, With/Without Mandatory Retirement



Notes. Distributions of judge age at death (panel A, vertical dashed line at median) and death year minus year judgeship ended (panel B).

Table A.2: Rules on Judge Senior Status, by State

State	Retirement Age	Seniority	Note
Alabama	70	Yes	Supernumerary judge
Alaska	70	No	Only to work on temporary assignments
Arizona	70	No	Only to work on temporary assignments
Arkansas	none	—	No retirement benefits if seek reelection past age 70
California	none	—	
Colorado	72	No	
Connecticut	70	Yes	State referee
Delaware	none	—	
Florida	75	No	Allows temporary assignments
Georgia	none	—	
Hawaii	70	No	
Idaho	none	—	
Illinois	none	—	Retirement Act for age 75, declared unconstitutional in 2009
Indiana	75	No	
Iowa	72	Yes	
Kansas	75	No	
Kentucky	none	—	
Louisiana	70	No	
Maine	none	—	
Maryland	70	No	
Massachusetts	70	No	
Michigan	70	No	
Minnesota	70	No	
Mississippi	none	—	
Missouri	70	Yes	Senior judge
Montana	none	—	
Nebraska	none	—	
Nevada	none	—	
New Hampshire	70	No	
New Jersey	70	No	
New Mexico	none	—	
New York	70	Yes	May serve after 70 until 76
North Carolina	72	No	Only to work on temporary assignments
North Dakota	none	—	
Ohio	70	No	
Oklahoma	none	—	
Oregon	75	No	Legislature may ask retired judges to work on temporary assignments
Pennsylvania	75	Yes	Senior judge
Rhode Island	none	—	
South Carolina	72	—	
South Dakota	70	No	
Tennessee	none	—	
Texas	75	No	Conditions may vary based on Art. 5 of Texas Constitution
Utah	75	No	
Vermont	90	No	
Virginia	73	No	
Washington	75	No	
West Virginia	none	—	
Wisconsin	70	Yes	Can serve a judge on a temporary basis
Wyoming	70	Yes	

A.3 Case Assignment

Table A.3: Summary Statistics on Area of Law and Related Industries

Area of Law	Freq.	Percent	Related Industrial Sector	Freq.	Percent
Criminal Law	191810	21.85	Real Estate	28527	13.64
Civil Procedure	74757	8.52	Law Enforcement	10758	5.14
Evidence	66377	7.56	Automobiles	10206	4.88
Torts	57915	6.6	Insurance	9158	4.38
Damages & Remedies	45073	5.14	Tax	8509	4.07
Contracts	40888	4.66	Construction & Engineering	6332	3.03
Real Property	36408	4.15	Worker's Compensation	5397	2.58
Constitutional Law	34038	3.88	Banking	4917	2.35
Family Law	32191	3.67	Legal & Compliance Services	4682	2.24
Worker's Compensation	22955	2.62	Automobile Insurance	4124	1.97
Insurance Law	19375	2.21	Property Management	4108	1.96
Administrative Law	18264	2.08	Transportation	3890	1.86
Wills, Trusts & Estates	18179	2.07	Child Welfare	3689	1.76
Tax & Accounting	16978	1.93	Employment Services	3679	1.76
Employment Law	14601	1.66	Health & Medical	3478	1.66
Habeas Corpus	13426	1.53	Oil & Gas	3189	1.52
Appellate Procedure	13140	1.5	Railroads	2777	1.33
Professional Responsibility	12052	1.37	Hospitals	2719	1.3
Motor Vehicles & Traffic Law	9644	1.1	Education	2586	1.24
Land Use Planning & Zoning	9122	1.04	Trucking	2097	1
Government	8942	1.02	Bridges & Roads	1751	0.84
Mortgages & Liens	7531	0.86	Agriculture & Farming	1729	0.83
Landlord & Tenant	5499	0.63	Mortgage Lending	1680	0.8
Construction Law	4997	0.57	Manufacturing	1612	0.77
Elections & Politics	4972	0.57	Real Estate Agents & Brokers	1573	0.75
Eminent Domain	4943	0.56	Unions	1485	0.71
Labor Law	4790	0.55	Financial Services	1469	0.7
Government Employees	4773	0.54	Judiciary	1448	0.69
Debtor Creditor	4260	0.49	Politics	1336	0.64
Employee Benefits	4208	0.48	Teachers	1300	0.62
Medical Malpractice	4113	0.47	Medical Procedures	1273	0.61
Personal Property	3994	0.46	Public Works	1223	0.58
Corporate Law	3958	0.45	Life Insurance & Annuities	1155	0.55
Negotiable Instruments	3843	0.44	Apartment Leasing	1127	0.54
Education Law	3803	0.43	Mining & Natural Resources	1115	0.53
Banking & Finance	3380	0.39	Drug Trafficking	1105	0.53
Alcohol & Beverage	3213	0.37	Sewer & Water	990	0.47
Civil Rights	3138	0.36	Electric	985	0.47
Health Law	2950	0.34	Water & Sewer	972	0.46
Transportation Law	2839	0.32	Physicians	966	0.46
Partnerships	2333	0.27	Firearms & Weapons	962	0.46
Natural Resources	2301	0.26	Motorcycles	919	0.44
Legal Malpractice	2285	0.26	Water	904	0.43
Products Liability	2280	0.26	Food & Beverage	888	0.42
Alternative Dispute Resolution	2144	0.24	Commercial Real Estate	883	0.42
Communications & Media	2048	0.23	Property & Casualty Insurance	854	0.41
Environmental Law	1857	0.21	Administration	837	0.4

Table A.4: Case Assignment Rules on State Supreme Courts

Discretionary	Random	Rotating
Arizona	Idaho	Alaska
California	Louisiana	Alabama
Colorado	Mississippi	Arkansas
Connecticut	New Hampshire	Florida
Delaware	New York	Georgia
Hawaii	Ohio	Iowa
Indiana	South Dakota	Illinois
Kansas	Tennessee	Maine
Kentucky	Texas	Minnesota
Massachusetts	Virginia	Missouri
Maryland	Washington	Montana
New Jersey	Wisconsin	North Carolina
Oregon		North Dakota
Pennsylvania		Nebraska
Wyoming		New Mexico
		Nevada
		Oklahoma
		Rhode Island
		South Carolina
		Utah
		Vermont
		West Virginia

List of states by rules for case assignment in state supreme courts. Rules collected by Christensen et al. (2012).

A.4 Judge Performance

Table A.5: Summary Statistics on Outcomes

A. Court-Year Data

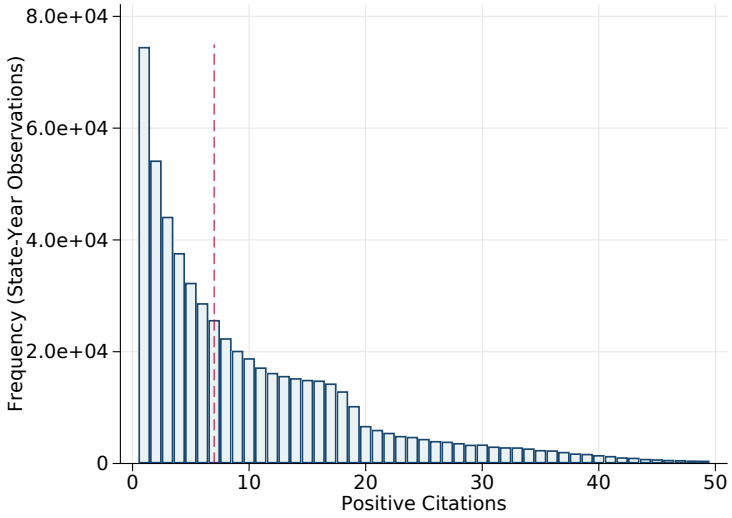
	Levels		Logs	
	Mean	S.D.	Mean	S.D.
Positive Cites	1825.6	1534.5	7.185	0.904
All Cites	2182.4	1823.1	7.348	0.922
Out-of-State Cites	330.5	709.8	5.316	0.907
Discussion Cites	480.1	351.4	5.897	0.827
# of Opinions	415.5	594.7	5.541	0.916
Cites per Opinion	6.79	4.71	1.879	0.611
# of Words Written	55791.0	25301.6	10.82	0.468
Addendum Opinions	39.24	44.13	3.154	1.136

B. Judge-Year Data

	Levels		Logs	
	Mean	S.D.	Mean	S.D.
Positive Cites	297.7	273.5	5.360	0.954
All Cites	355.9	322.5	5.521	0.982
Out-State Cites	44.60	81.27	3.297	0.998
Discussion Cites	66.77	53.54	3.912	0.878
# of Opinions	25.73	15.86	3.131	0.565
Cites per Opinion	13.05	12.52	2.419	0.668
# of Words Written	56352.7	32538.4	10.77	0.622
Addendum Opinions	6.400	9.253	1.492	0.995

Notes. Summary statistics (mean and standard deviation) on judicial opinion outcomes, at the court-year level (Panel A) and judge-year level (Panel B).

Figure A.8: Distribution of Citations by Case



Notes. Histogram of the number of positive cites per case in the dataset. Vertical dashed line at the median.

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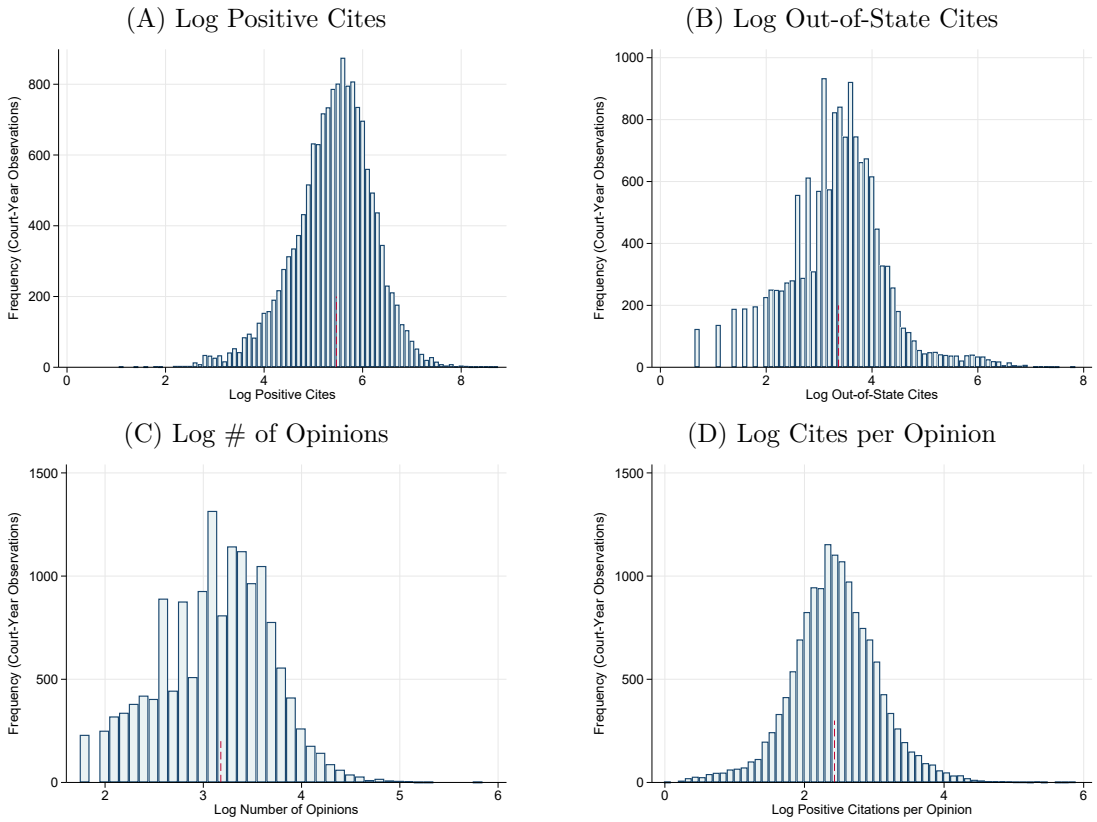
Figure A.9: Distributions of Outcome Variables - Court-Year



Notes. Histograms of court-year performance measures. Vertical dashed line at median.

B Additional Analysis of Mandatory Retirement Reforms

Table B.1: Balance Tests for Retirement Reform Treatments

	(1)	(2)	(3)	(4)
Init X^0	Is Reform State		Reform Year	
Judge Age	0.0263+	0.0319*	-0.689	
	(0.0153)	(0.0142)	(1.347)	
Log Population	-0.0655		-11.48	
	(0.0809)		(6.742)	
Log Income per Capita	0.867*	0.491+	-23.49	
	(0.379)	(0.268)	(28.82)	
Repub Governor	-0.153		11.82	
	(0.154)		(9.747)	
Log Positive Cites	-0.0102		5.735	
	(0.0928)		(12.97)	
Case Type PCA 1	0.0888		0.401	
	(0.109)		(5.060)	
Case Type PCA 2	-0.0887	-0.105+	4.681	
	(0.0875)	(0.0560)	(6.382)	
Case Type PCA 3	0.0683		0.239	
	(0.0798)		(4.864)	
Case Type PCA 4	0.0200		4.100	
	(0.0864)		(7.389)	
Case Type PCA 5	-0.219+		-2.051	
	(0.130)		(12.39)	
N	49	49	16	16
R-sq	0.285	0.204	0.703	

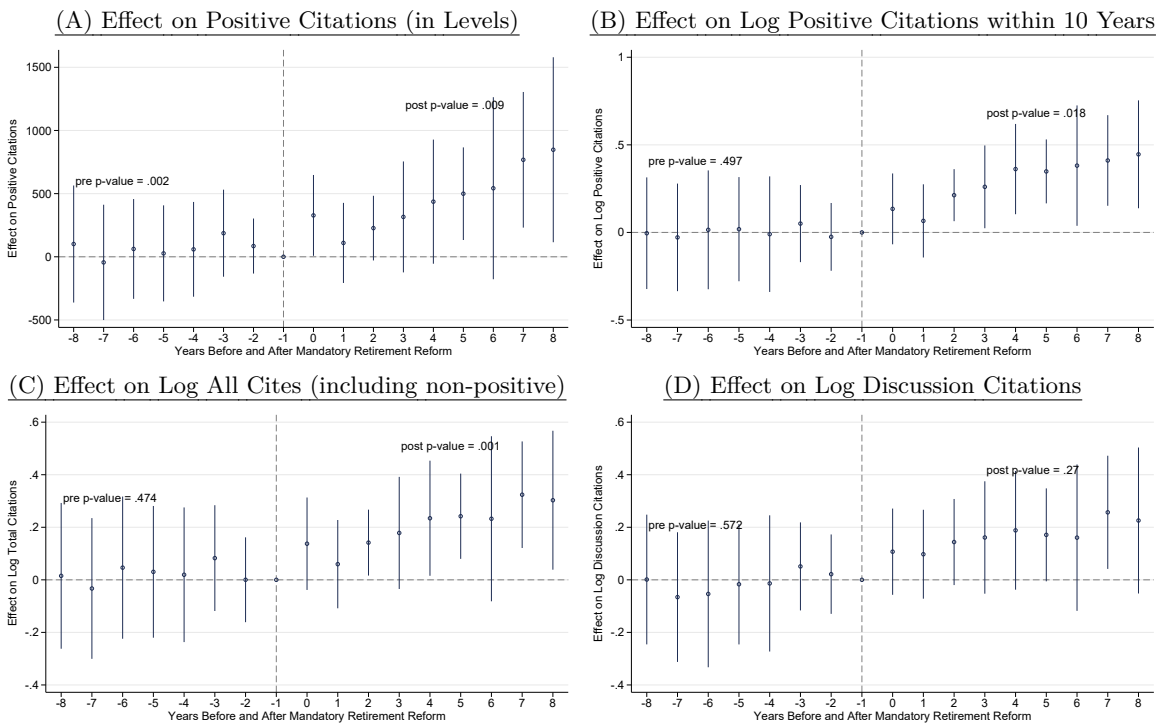
Notes. Regression coefficients from regressing "is this a treated state" (Cols 1-2), or the year of the reform (Cols 3-4), on initial-period covariates (that is from 1947). Covariates include the average judge age on the court, Log population of the state, Log income per capita, an indicator for having a Republican governor, log positive cites to the court, and the 5 principal components on the areas of law of the cases that year. Population, income, and governor party come from the IPPSR's Correlates of State Policy dataset. Columns 2 and 4 only include the predictors selected by LASSO, no predictors were selected for column 4. Standard errors in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Table B.2: Effect of Reform on Pre/Post Growth Trend in Positive Citations

	(1)	(2)	(3)	(4)	(5)
	Effect on Log Positive Cites per Court-Year				
Retirement Reform	0.171+	0.178*	0.0619	0.116	0.171+
	(0.0867)	(0.0866)	(0.0839)	(0.0823)	(0.0996)
Pre-Reform × Time	0.00348	0.0154			
	(0.0194)	(0.0225)			
Post-Reform × Time			0.0321*	0.0344*	0.0442+
			(0.0130)	(0.0136)	(0.0226)
Court FE, Year FE	X	X	X	X	X
Court Trends/Windows		X		X	X
Init Court Rules × Year FE					X
Init Case Types × Year FE					X
N	2448	2448	2448	2448	2448
R-sq	0.732	0.828	0.845	0.863	0.872

Notes. DD effect of mandatory retirement reform on log positive citations to a court in eight years after reform, relative to eight years before reform. Observation is a court-year. "Retirement Reform" is a treatment indicator for the eight years after the introduction of mandatory retirement. "Pre-Reform × Time" Is a linear time trend, interacted with an indicator for the 8 years before the reform. "Post-Reform × Time" Is a linear time trend, interacted with an indicator for the 8 years after the reform. Treat Windows means court-specific treatment windows (eight years before and after reform). "Init X" × year FE means initial values are interacted with year. "Init Court Rules" includes a state's 1947 rules for judge selection/retention system, admin office, intermediate appellate court, number of judges, and term length. "Init Case Types" includes a court's 1947 average values for case characteristics (legal area and related industries). "Init Age" includes the initial mean and standard deviation for judge age on the court. Standard errors clustered by state in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Figure B.1: Event-Study Effect on Performance: Alternative Cite Measures



Judge performance before and after reforms implementing retirement ages of 70, 72 or 75. Panel A: outcome is number of positive citations of a judge in a year (in levels, rather than logs). Panel B: outcome is the log positive citations of a judge in a year that were made within eight years of a case. Panel C: outcome is the log total citations of a judge in a year (including non-positive negative cites). Panel D: outcome is the log discussion citations of a judge in a year. Time series is a coefficient plot from the event study regression (2), with coefficients estimated relative to the year before the reform. Regression includes court and year fixed effects. 95% confidence intervals constructed with standard errors clustered by court.

Table B.3: Effect of Reform on Citations: Additional Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Cites in Levels		Has Cite		Cites After 10 years		Drop 5% Outliers	
Ret. Reform	386.2*	437.2**	0.446	0.616+	0.283**	0.318**	0.239*	0.267*
	(192.7)	(181.9)	(0.330)	(0.311)	(0.0954)	(0.121)	(0.0915)	(0.109)
Year / Court FE	X	X	X	X	X	X	X	X
Trends/Windows		X		X		X		X
N	2448	2448	2448	2448	2448	2448	2448	2448
R-sq	0.588	0.695	0.783	0.860	0.744	0.848	0.772	0.866

Notes. Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. "Cites in Levels" means the outcome is not logged. "Has Cite" means the proportion of cases with at least one positive citation. "Cites after 10 Years" means the log of the positive cites to a judge's cases in a year, from cases more than ten years later. "Drop 5% Outliers" is the baseline outcome (log of positive cites to a judge's cases in a year) but for each court-year, the top 5% of cases by cite count are dropped. + p<.0.1, * p<0.05, ** p<0.01.

Table B.4: Effect of Reform on Citations: Different Windows

	(1)	(2)	(3)	(4)	(5)	(6)
	Effect on Log Positive Cites					
Treatment Window	6		14		All	
Retirement Reform	0.140*	0.167*	0.211*	0.255**	0.0547	0.349**
	(0.0652)	(0.0659)	(0.0893)	(0.0949)	(0.118)	(0.123)
Year FE, Court FE	X	X	X	X	X	X
Court Trends/Windows		X		X		X
N	2448	2448	2448	2448	2448	2448
R-sq	0.732	0.825	0.733	0.827	0.731	0.821

Notes. Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. Court Treat Windows means court-specific treatment windows (specified by the associated number, 6, or 14, or no window for column 6). Standard errors clustered by court in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Table B.5: Effect of Reform on Log Cites: Senior Status Rules

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Effect on Log Citations							
Retirement Reform	0.111	0.265+	0.228**	0.230*	0.195*	0.225*	0.130	0.263*
	(0.122)	(0.150)	(0.081)	(0.111)	(0.091)	(0.109)	(0.109)	(0.126)
× Grandfather Rule	0.167	-0.122						
	(0.161)	(0.179)						
× Finish Term			-0.383	-0.079				
			(0.318)	(0.159)				
× Finish Term Half					-0.374**	-0.022		
					(0.0958)	(0.134)		
× Finish Year							0.194	-0.176
							(0.147)	(0.142)
Year FE, Court FE	X	X	X	X	X	X	X	X
Court Trends/Windows		X		X		X		X
N	1546	1546	1546	1546	1546	1546	1546	1546
R-sq	0.710	0.822	0.711	0.821	0.710	0.821	0.710	0.822

Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. Coefficients are interacted with respective senior status rules (respectively: the rule not applying to sitting judges, being allowed to finish the term, being allowed to finish terms that are over halfway finished, and being able to finish out the year). Court Treat Windows means court-specific treatment windows (eight years before and after reform). Standard errors clustered by court in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Table B.6: Effect of Reform on Citations: Alternative Clustering

	(1)	(2)	(5)	(6)
Clustering Group	State and Year		None (Robust)	
Retirement Reform	0.186**	0.243**	0.186**	0.243**
	(0.0538)	(0.0443)	(0.0538)	(0.0443)
Court FE, Year FE	X	X	X	X
Court Trends/Windows		X		X
N	2448	2448	2448	2448
R-sq	0.732	0.828	0.732	0.828

Notes. Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. Court Treat Windows means court-specific treatment windows (eight years before and after reform). Standard errors clustered by court in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Table B.7: Effect of Reform on Log Cites, Alternative Weighting

	(1)	(2)	(3)	(4)
	Effect on Log Positive Cites			
Retirement Reform	0.096	0.224*	0.218**	0.254**
	(0.102)	(0.103)	(0.079)	(0.097)
Weighting	# of Opinions		# of Judges	
Court FE, Year FE	X	X	X	X
Court Trends/Windows		X		X
N	2448	2448	2448	2448
R-sq	0.733	0.828	0.724	0.824

Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. Court Treat Windows means court-specific treatment windows (eight years before and after reform). Standard errors clustered by court in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Table B.8: Effect of Reform on Log Cites, with Time-Varying Controls

	(1)	(2)	(3)	(4)	(5)	(6)
	Effect on Log Positive Cites					
Retirement Reform	0.091	0.154+	0.237*	0.250**	0.095*	0.148**
	(0.068)	(0.080)	(0.098)	(0.082)	(0.045)	(0.060)
Court FE, Year FE	X	X	X	X	X	X
Court Trends/Windows		X		X		X
Case Controls	X	X				
Rule Controls			X	X		
Lagged Dep. Var.					X	X
N	2448	2448	2446	2446	2391	2391
R-sq	0.817	0.869	0.738	0.831	0.840	0.860

Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. Court Treat Windows means court-specific treatment windows (eight years before and after reform). Case controls means the first five principal components of the matrix of controls for legal topic and related industries. "Rule controls" means rules for selection and retention of judges and other institutional items. Lagged Dep. Var. means the court-year lag of the dependent variable (log positive cites in the previous year). Standard errors clustered by court in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Table B.9: Effect of Reform on Log Cites, Additional Institutional Controls

	(1)	(2)	(3)	(4)	(5)	(6)
	Effect on Log Positive Cites per Court-Year					
Retirement Reform	0.181*	0.253**	0.188*	0.253**	0.187*	0.234*
	(0.082)	(0.099)	(0.085)	(0.101)	(0.092)	(0.103)
Court FE, Year FE	X	X	X	X	X	X
Court Trends/Windows		X		X		X
Assign Rule × Year FE	X	X				
Select Rule × Year FE			X	X		
IAC × Year FE					X	X
N	2448	2448	2448	2448	2448	2448
R-sq	0.738	0.833	0.737	0.830	0.750	0.832

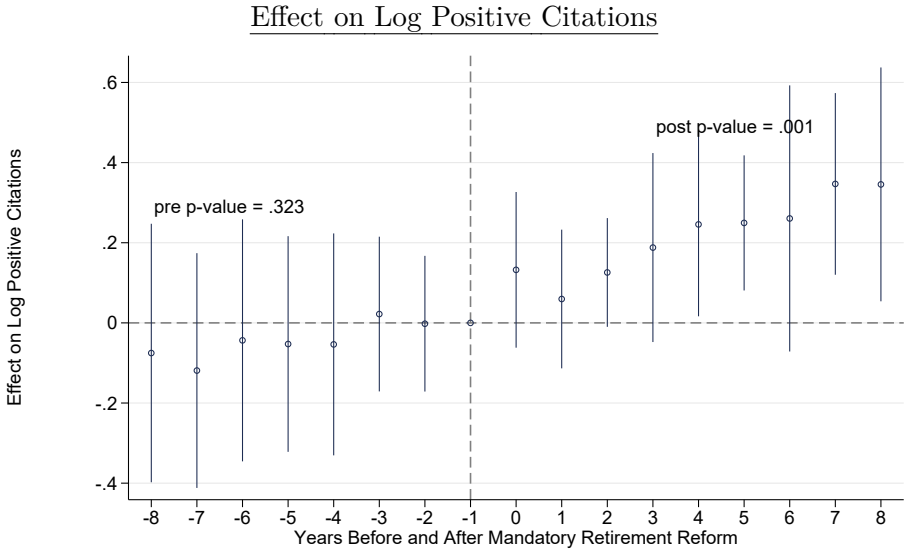
Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. Court Treat Windows means court-specific treatment windows (eight years before and after reform). "Assign × year" means that the regressions include the assignment rule, interacted with year fixed effects, as covariates. Standard errors clustered by court in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Table B.10: Effect of Reform on Citations: Separately by Maximum Age Imposed

	(1)	(2)	(3)	(4)	(5)	(6)
	Effect on Log Positive Cites					
Maximum Age	70		72		75	
Retirement Reform	0.221+	0.293+	0.258**	0.225**	0.0784	0.158*
	(0.116)	(0.166)	(0.078)	(0.056)	(0.125)	(0.072)
Court FE, Year FE	X	X	X	X	X	X
Court Trends/Windows		X		X		X
N	2448	2448	2448	2448	2448	2448
R-sq	0.732	0.827	0.732	0.819	0.731	0.819

Notes. Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. Court Treat Windows means court-specific treatment windows (eight years before and after reform). Standard errors clustered by court in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Figure B.2: Event-Study Effect of Reform with Court-Specific Trends



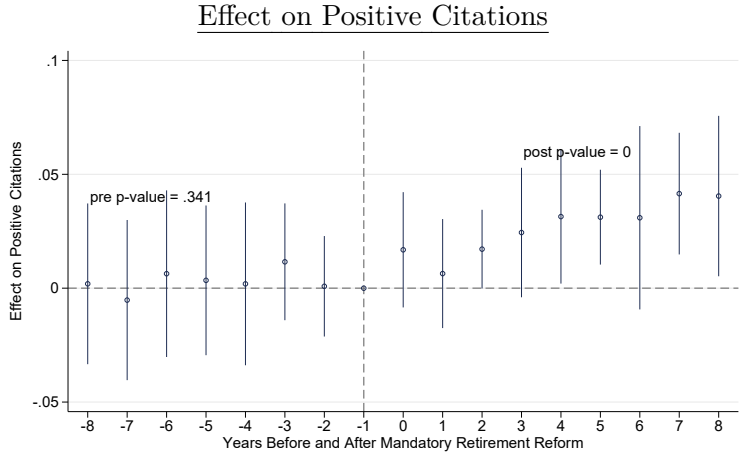
Court performance before and after reforms implementing retirement ages of 70, 72 or 75. The outcome is the log positive citations of a judge in a year. Time series is a coefficient plot from the event study regression (2), with coefficients estimated relative to the year before the reform. Regression includes court and year fixed effects, but with court-specific trends. 95% confidence intervals constructed with standard errors clustered by court.

Table B.11: Effect of Reform on Inverse Hyperbolic Sine of Citations

	(1)	(2)	(3)	(4)	(5)
	Inverse Hyperbolic Sine of Positive Cites				
Retirement Reform	0.186*	0.243*	0.260*	0.332**	0.322**
	(0.0808)	(0.100)	(0.111)	(0.114)	(0.135)
Court FE, Year FE	X	X	X	X	X
Court Trends/Windows		X	X	X	X
Init Court Rules × Year FE			X	X	X
Init Case Types × Year FE				X	X
Init Age × Year FE					X
N	2448	2448	2448	2448	2448
R-sq	0.728	0.824	0.841	0.859	0.869

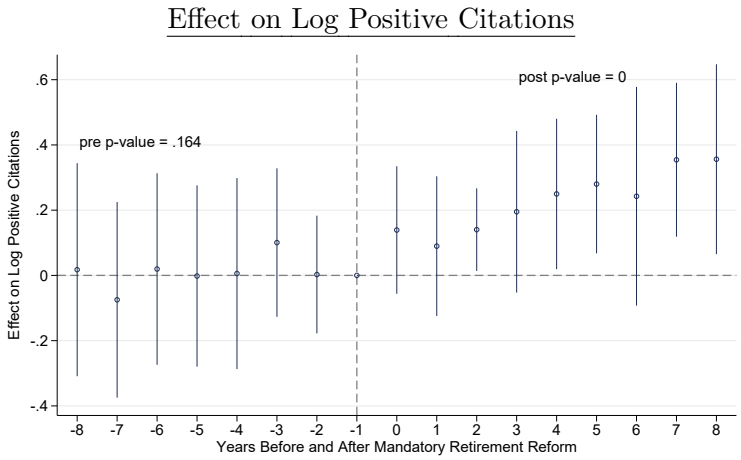
Notes. DD effect of mandatory retirement reform on inverse hyperbolic sine (asinh) positive citations to a judge's opinions in eight years after reform, relative to eight years before reform. Observation is a court-year. "Ret. Reform" is a treatment indicator for the eight years after the introduction of mandatory retirement. Court Treat Windows means court-specific treatment windows (eight years before and after reform). "Init X" × year FE means initial values are interacted with year. "Init Court Rules" includes a state's 1947 rules for judge selection/retention system, admin office, intermediate appellate court, number of judges, and term length. "Init Case Types" includes a court's 1947 average values for case characteristics (legal area and related industries). "Init Age" includes the initial mean and standard deviation for judge age on the court. Standard errors clustered by court in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Figure B.3: Event-Study Effect of Reform on Court Performance: Poisson Regression



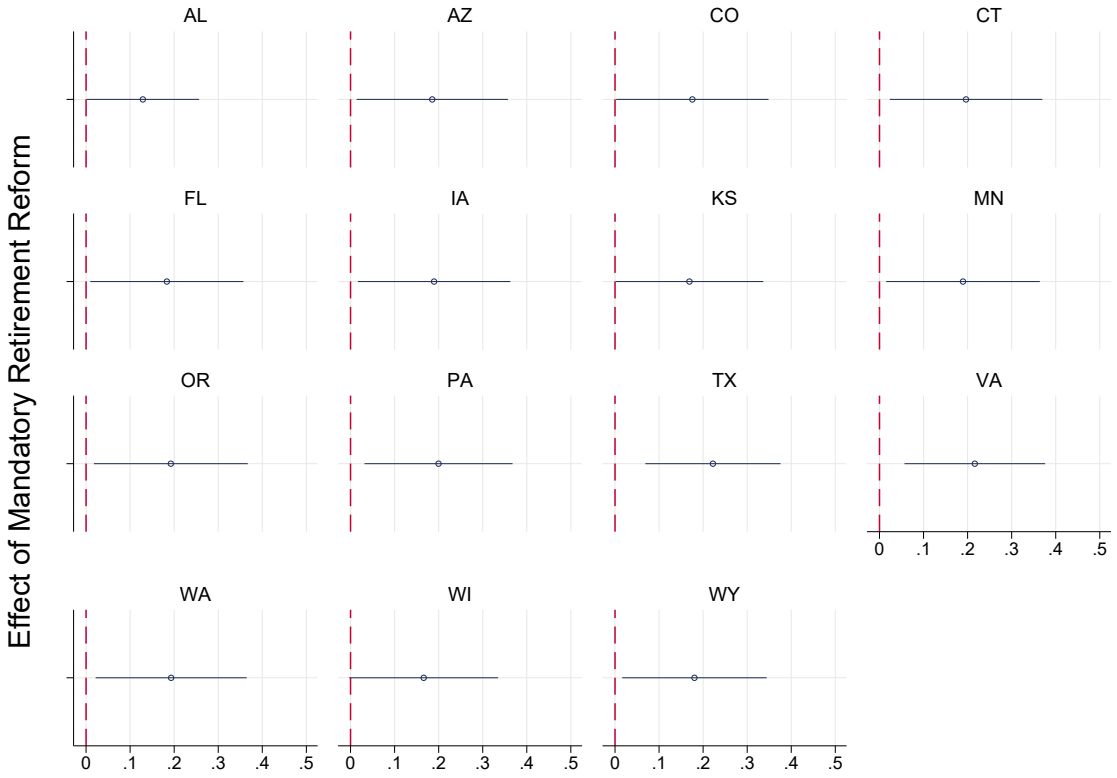
Court performance before and after reforms implementing retirement ages of 70, 72 or 75. Poisson regression with outcome as positive citation counts of a court in a year. Time series is a coefficient plot from the event study regression (2), with coefficients estimated relative to the year before the reform. Regression includes court and year fixed effects. 95% confidence intervals constructed with standard errors clustered by court.

Figure B.4: Event-Study Effect of Reform on Court Performance: Only Reform States



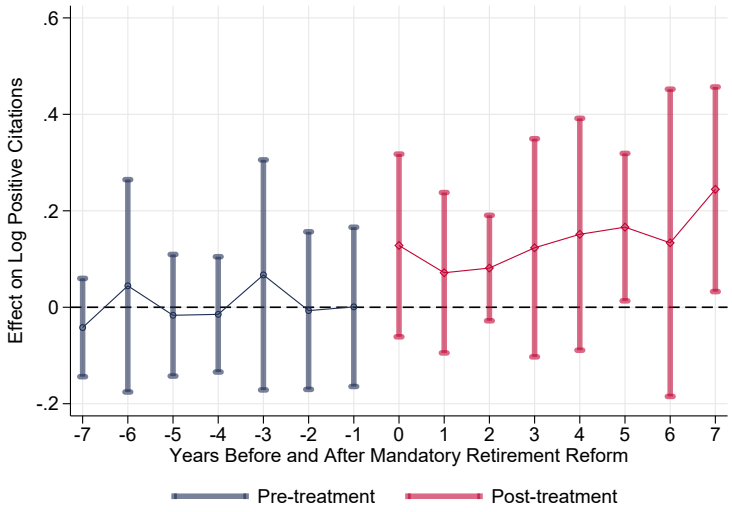
Court performance before and after reforms implementing retirement ages of 70, 72 or 75. Sample limited to reform states. The outcome is the log positive citations of a judge in a year. Time series is a coefficient plot from the event study regression (2), with coefficients estimated relative to the year before the reform. Regression includes court and year fixed effects. 95% confidence intervals constructed with standard errors clustered by court.

Figure B.5: DD Effect of Reform, Dropping each Treated State Individually



Coefficient for the effect of mandatory retirement at ages of 70, 72 or 75 on judge performance. The outcome is the log positive citations of a judge in a year. Each subfigure plots the coefficient from regression 1 excluding one treated state at a time. Includes court and year fixed effects, court-specific windows and trends.

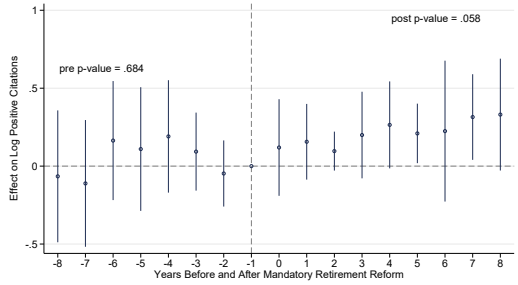
Figure B.6: Event-Study Effect on Performance: Adjustment for Staggered Treatment



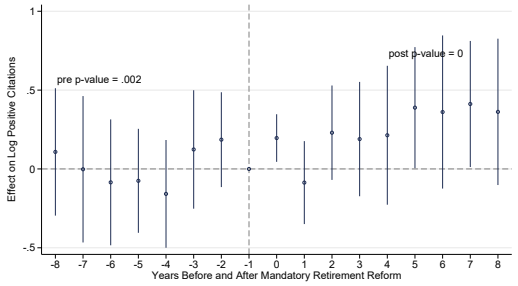
Log positive cites to court before and after reforms implementing retirement ages of 70, 72 or 75. Time series is a coefficient plot from the event study regression (2), with coefficients estimated relative to the year before the reform. Regression includes court and year fixed effects and court-specific event windows. Coefficients and standard errors (clustered by state) adjusted for staggered treatment timing, following the method in Sant'Anna and Zhao (2020), as described in Section 4.1. This is doubly robust diff-in-diff estimator based on inverse probability of tilting and weighted least squares. Produced using the csdid command in stata.

Figure B.7: Event-Study Effect, by Random and Discretionary Case Assignment

(A) Random Assignment



(B) Discretionary Assignment



Notes. Court performance before and after reforms implementing retirement ages of 70, 72 or 75. The outcome is the log positive citations to the court in a year. Panel A includes courts with random or rotating assignment of cases. Panel B includes courts with discretionary assignment of cases. Time series is a coefficient plot from the event study regression (2), with coefficients estimated relative to the year before the reform. Regression includes court and year fixed effects. 95% confidence intervals constructed with standard errors clustered by court.

Table B.12: Effect of Mandatory Retirement Reform, Other Behavioral Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Work Output		Caselaw Research		Overruled Rate		Addendum Ops		Dissent Rate	
Ret Reform	-0.0197	0.0086	-0.269	0.164	-0.0100*	-0.0014	0.312*	0.334*	0.0207*	0.0272*
	(0.0612)	(0.0648)	(0.345)	(0.198)	(0.0059)	(0.0051)	(0.133)	(0.127)	(0.0092)	(0.0100)
Year / Court FE	X	X	X	X	X	X	X	X	X	X
Trends/Windows		X		X		X		X		X
N	2448	2448	2448	2448	2448	2448	2448	2448	2448	2448
R-sq	0.492	0.705	0.629	0.806	0.380	0.496	0.718	0.805	0.457	0.646

Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. "Work Output" is log number of words written in a year. "Caselaw Research" is number of previous cases cites. "Overruled rate" is being overruled by a higher court. "Addendum Ops" is number of dissenting and concurring opinions (in logs). Court Treat Windows means court-specific treatment windows (eight years before and after reform). Standard errors clustered by state in court. + p<.0.1, * p<0.05, ** p<0.01.

C Additional Material on Mechanisms

C.1 Changes in the Caseload or Case Characteristics

Table C.1: Reform Effect on Caseload, Opinion Rate, and Citation Rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Case Load		Authored Opinion Rate		Cites per Case		Out-State Cites / Case	
Retirement Reform	0.0695	-0.0084	0.0401	0.0803*	0.102	0.194*	0.129	0.175*
	(0.070)	(0.041)	(0.037)	(0.030)	(0.074)	(0.074)	(0.086)	(0.081)
Year FE, Court FE	X	X	X	X	X	X	X	X
Court Trends/Windows		X		X		X		X
N	2448	2448	2448	2448	2448	2448	2448	2448
R-sq	0.761	0.898	0.652	0.833	0.573	0.789	0.816	0.891

Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. "Case Load" is the lof of the total number of appealed cases appearing in the court records, with or without an opinion. "Authored Opinion Rate" is the log number of authored opinions divided by the case load. "Cites per Case" is number of citations per published opinion. "Out-of-State Cites / Case" is number of out-of-state citations per published opinion. Court Treat Windows means court-specific treatment windows (eight years before and after reform). Standard errors clustered by court in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Table C.2: Effect of Retirement Reform, Intermediate Appellate Court Outcomes

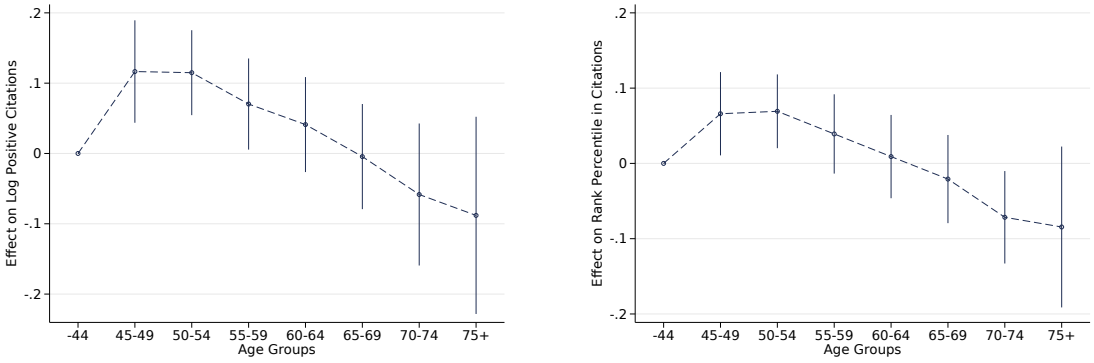
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	IAC Cases		IAC / SC Cases		IAC Words		IAC Cites	
Ret Reform	0.0918	-0.187	0.0162	-0.0630	0.0069	-0.0724	0.220*	-0.0398
	(0.229)	(0.135)	(0.0562)	(0.0605)	(0.0646)	(0.0654)	(0.103)	(0.0693)
Year / Court FE	X	X	X	X	X	X	X	X
Trends/Windows		X		X		X		X
N	1981	1981	1981	1981	1981	1981	1981	1981
R-sq	0.822	0.910	0.758	0.862	0.899	0.949	0.808	0.901

Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. IAC Cases is log number of cases in intermediate appellate courts in the state. IAC / SC cases is the log ratio of IAC cases to state supreme court cases. IAC words is the log words in IAC case opinions. IAC Cites is the log cites to IAC opinions. Court Treat Windows means court-specific treatment windows (eight years before and after reform). Standard errors clustered by state in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

C.2 Life Cycle Effects of Aging

Figure C.1: Dynamic Analysis of Judge Age and Judge Performance

(A) Log Positive Cites (B) Rank Percentile Positive Cites



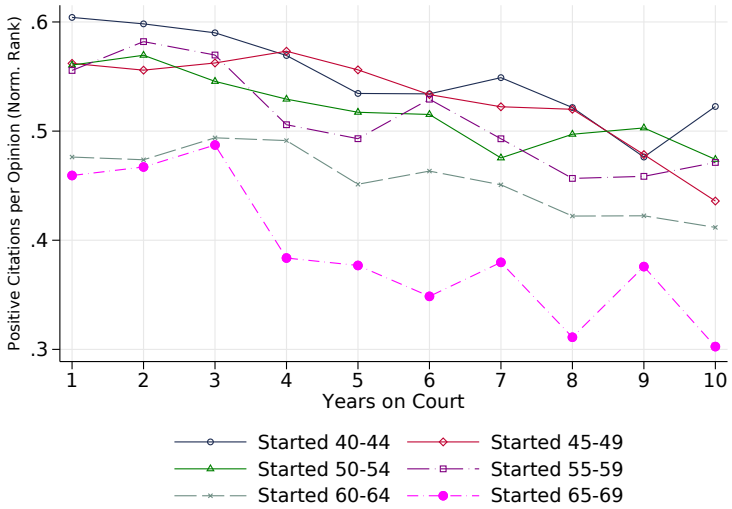
Dynamic coefficient plots for estimates of five-year age group differences, relative to the age < 45 group. Observation is a judge working in a year. All graphs contain court-year interacted fixed effects, first year baselines, and cohort fixed effects. Outcomes are in logs or rank percentiles, as indicated. 95% confidence intervals constructed using standard errors clustered by state.

Table C.3: Effect of Mandatory Retirement Reform; Relevance of Judge Experience

	(1)	(2)	(3)	(4)	(5)	(6)
	Experience		Age		Experience	
Retirement Reform	-1.206+	-1.353+	-1.905**	-1.927**	-0.218	-0.151
	(0.615)	(0.711)	(0.517)	(0.526)	(0.494)	(0.470)
Year FE, Court FE	X	X	X	X	X	X
Court Trends/Windows		X		X		X
Experience Decile FE			X	X		
Age Decile FE					X	X
N	2448	2448	2448	2448	2448	2448
R-sq	0.537	0.642	0.523	0.698	0.672	0.777

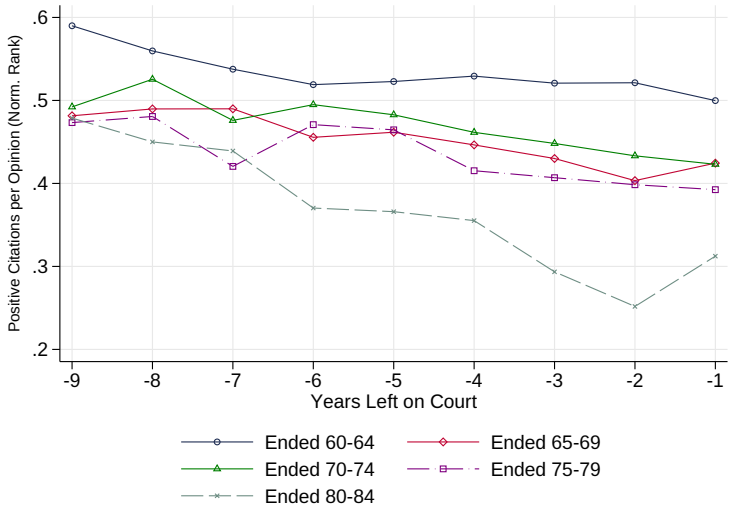
Notes. Observation is a court-year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. "Experience" is the years of experience of each judge. Court Treat Windows means court-specific treatment windows (eight years before and after reform). Experience decile FE and age decile FE are fixed effects for the associated deciles computed in the court-year dataset. Standard errors clustered by state in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

Figure C.2: Performance by Age in First Years of Judgeship



Notes. Time series for average rank percentile (within court year) in positive citations for the first years of a judge career, separately by starting age (indicated in legend).

Figure C.3: Performance by Age in Last Years of Judgeship



Notes. Time series for average rank percentile (within court year) in positive citations for the last years of a judge career, separately by starting age (indicated in legend).

Table C.4: Life Cycle Effects on Performance: Age vs. Experience

	(1)	(2)	(3)	(4)
	Log Positive Cites			
Judge Age (Years)	-0.00906**	-0.00904**		
	(0.00162)	(0.00125)		
Judge Experience (Years)			0.00137	0.00166
			(0.00234)	(0.00213)
Court-Year FE	X	X	X	X
First-Year Baseline		X		X
Experience FE	X	X		
Age FE			X	X
N	14977	14977	14969	14969
R-sq	0.683	0.706	0.674	0.698

Notes. Observation is a judge-year. Judge Age and Judge Experience are years since birth, and years since starting judgeship, respectively. Court-Year FE is interacted court-year fixed effects. First-Year Baseline means a judge's value for the outcome in their first year on the court is included as a control. Experience FE means fixed effects for years of experience, and similarly for Age FE. Standard errors clustered by state in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

C.3 Selection on Entry and Exit

Table C.5: Comparing Judges Selected Before/After the Reform

	(1)	(2)	(3)	(4)
	Effect on Log Positive Cites			
Selected Post Reform	0.0509	0.0630	0.0643	0.0923
	(0.0576)	(0.0636)	(0.0767)	(0.0780)
Court × Year FE	X	X	X	X
Age FE	X	X	X	X
Starting Year FE		X	X	X
Inverse Career Weights			X	
Ten Years Before/After				X
N	14969	14968	14955	2030
R-sq	0.674	0.681	0.709	0.588

Observation is a judge working in a year. Inverse career weights means judges are weighted by inverse number of years in the sample. "Ten Years Before/After" means sample is limited to those years before and after the reform. "Selected Post Reform" is an indicator for judges selected after the introduction of mandatory retirement. Standard errors clustered by state in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

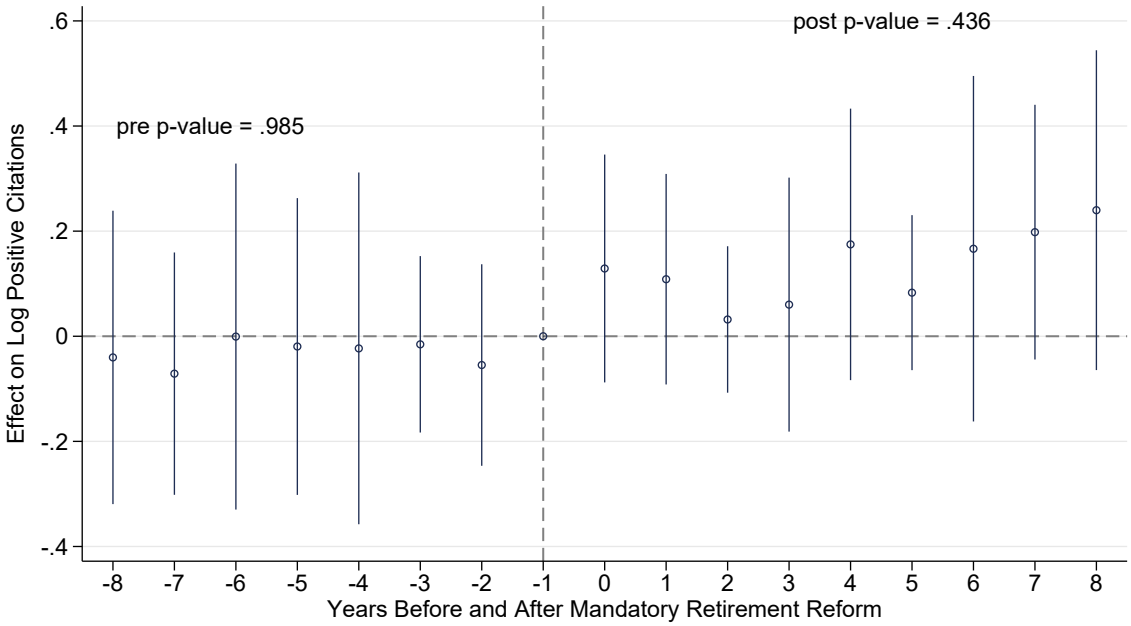
Table C.6: Effect on Number of Working Judges and Cites Per Judge

	(1)	(2)	(3)	(4)	(5)	(6)
	Log Number of Judges			Log Cites per Judge		
Retirement Reform	0.0406	0.0493	0.0662+	0.197*	0.198*	0.251**
	(0.0259)	(0.0344)	(0.0330)	(0.0810)	(0.0856)	(0.0938)
Court FE, Year FE	X	X	X	X	X	X
Court Trends/Windows	X	X	X	X	X	X
Init Court Rules × Year FE		X	X		X	X
Init Case Types × Year FE			X			X
N	2448	2448	2448	2448	2448	2448
R-sq	0.814	0.835	0.851	0.802	0.823	0.844

Observation is a court-year. Term are as above. Standard errors clustered by state in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

C.4 Team Effects of Aging

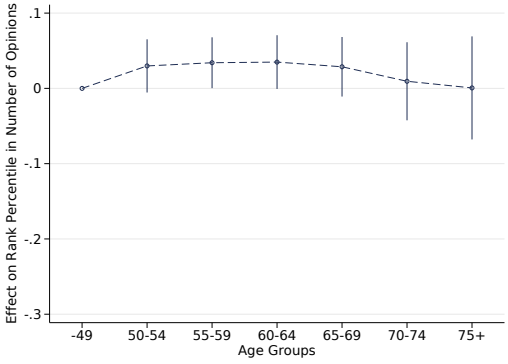
Figure C.4: Event-Study Effect of Reform on Performance, with Judge Fixed Effects



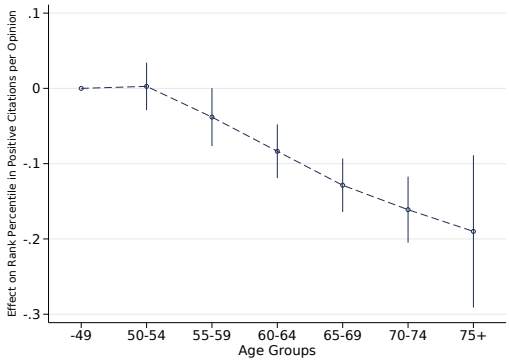
Judge performance before and after reforms implementing retirement ages of 70, 72 or 75. Outcome is log positive citations for a judge in a year. Time series is a coefficient plot from the event study regression (2), with coefficients estimated relative to the year before the reform. Regression includes court and year fixed effects, plus judge fixed effects. 95% confidence intervals constructed with standard errors clustered by court.

Figure C.5: Effect of Judge Age on Number of Authored Opinions, and Cites Per Opinion

(A) Log # of Opinions



(B) Log Cites per Opinion



Dynamic coefficient plots for estimates of five-year age group differences, relative to the age < 45 group. Observation is a judge working in a year. All graphs contain court-year interacted fixed effects, first year baselines, and cohort fixed effects. Outcomes are in logs or rank percentiles, as indicated. 95% confidence intervals constructed using standard errors clustered by state.

Table C.7: Effect of Reform, Other Measures, Judge Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Cites in Levels		Within 10 years		All Cites		Discuss Cites		Out-of-State Cites	
Ret. Reform	22.72	21.10	0.217**	0.185	0.156+	0.138	0.105+	0.111	0.154*	0.180+
	(14.61)	(21.61)	(0.104)	(0.124)	(0.088)	(0.095)	(0.061)	(0.088)	(0.093)	(0.101)
Year / Judge FE	X	X	X	X	X	X	X	X	X	X
Trends/Windows		X		X		X		X		X
N	14905	14905	14905	14905	14905	14905	14905	14905	14905	14905
R-sq	0.585	0.665	0.739	0.809	0.678	0.753	0.667	0.749	0.641	0.718

Notes. Observation is a judge working in a year. "Retirement Reform" is an indicator for the eight years after the introduction of mandatory retirement. "Cites in Levels" means the outcome is not logged. "Within 10 years" is the log positive cites within eight years of an opinion. "All Cites" is the log number of all citations (positive, negative, and distinguishing) to a judge in a year. "Discuss Cites" is only the positive cites where the latter judge discussed the cited opinion. "Out-of-State Cites" is the count of number of positive citations from courts in other states. "Positive Cites" is the number of positive cites (in levels). Court Treat Windows means court-specific treatment windows (eight years before and after reform). Standard errors clustered by state in parentheses. + p<.0.1, * p<0.05, ** p<0.01.

D The Age Discrimination in Employment Act of 1967 Sec. 621

The Congress hereby finds and declares that

1. in the face of rising productivity and affluence, older workers find themselves disadvantaged in their efforts to retain employment, and especially to regain employment when displaced from jobs;

   (a) the setting of arbitrary age limits regardless of potential for job performance has become a common practice, and certain otherwise desirable practices may work to the disadvantage of older persons;

   (b) the incidence of unemployment, especially long-term unemployment with resultant deterioration of skill, morale, and employer acceptability is, relative to the younger ages, high among older workers; their numbers are great and growing; and their employment problems grave;

   (c) the existence in industries affecting commerce, of arbitrary discrimination in employment because of age, burdens commerce and the free flow of goods in commerce.

   (d) It is therefore the purpose of this chapter to promote employment of older persons based on their ability rather than age; to prohibit arbitrary age discrimination in employment; to help employers and workers find ways of meeting problems arising from the impact of age on employment.