Recession!
A History of Economic Contraction

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“Lord” Gordon Gordon

Source: Manitoba Historical Society

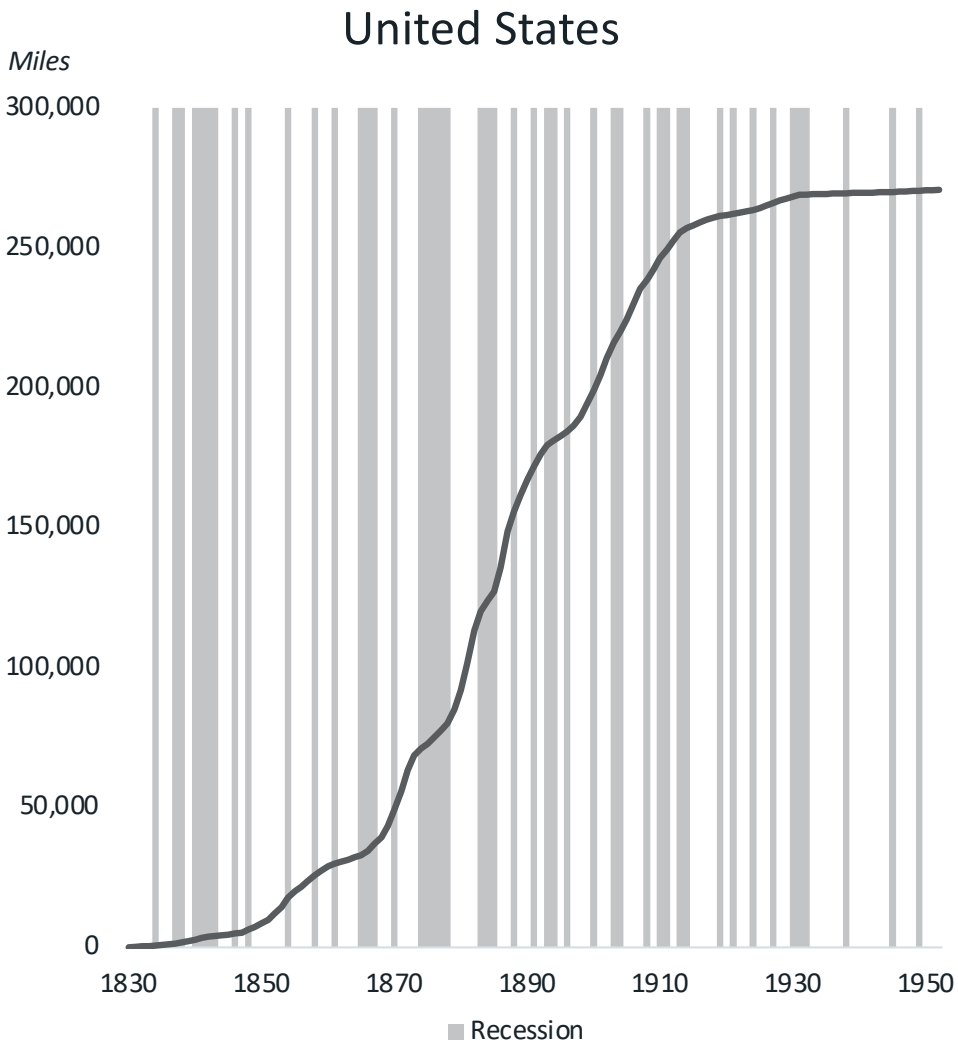
1873-76 locust plague

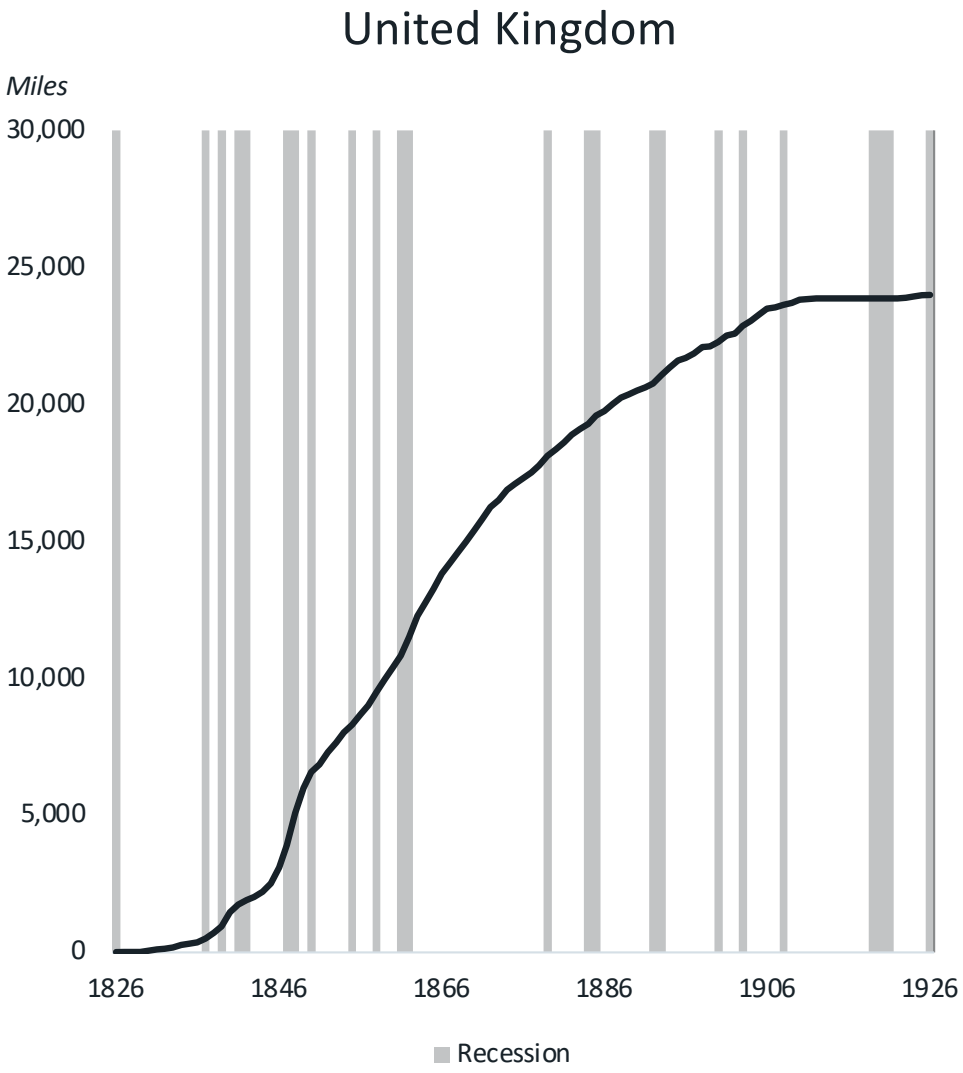
Source: Lyons (1915)

Northern Pacific “golden stake” ceremony

Source: Gillam (1883)

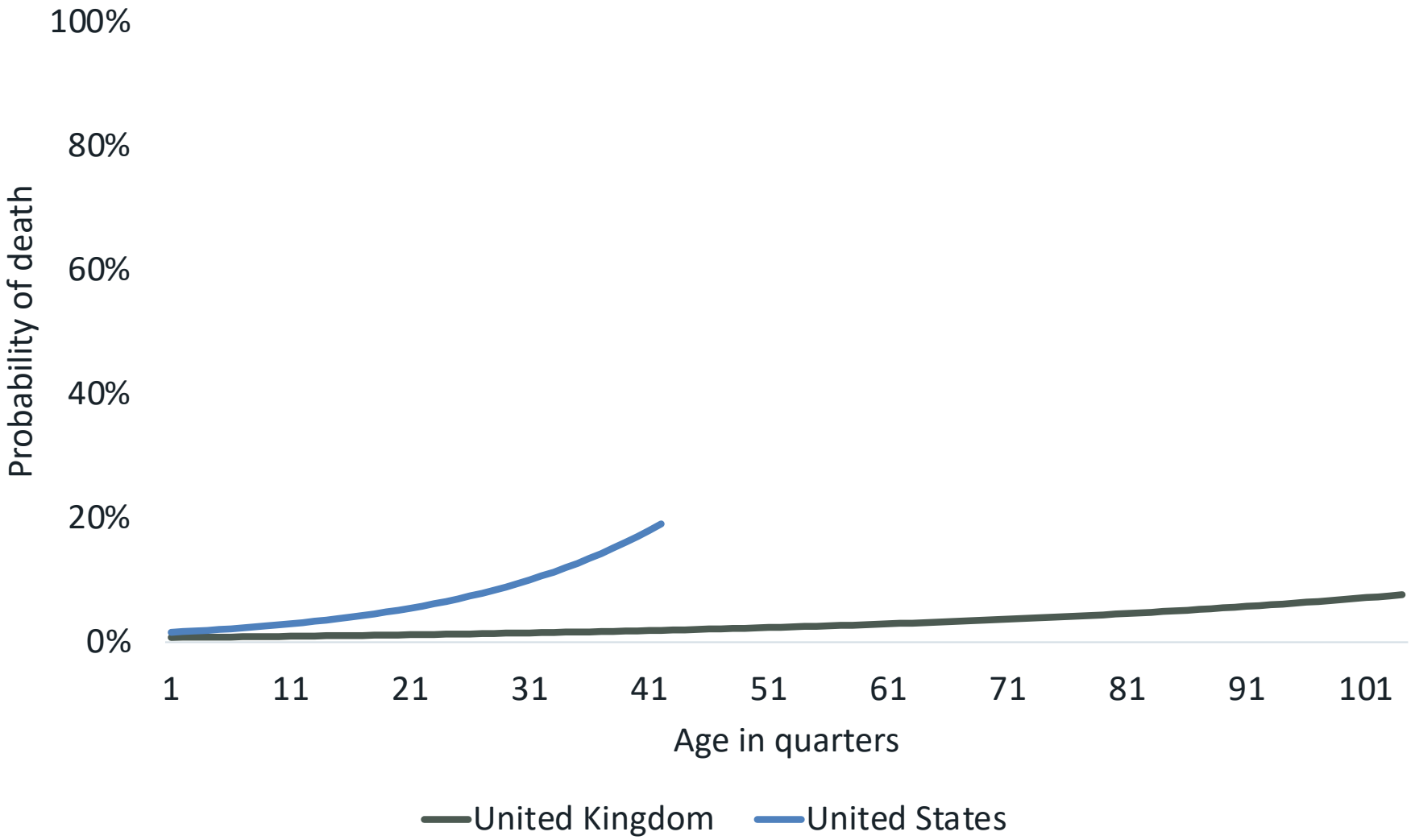
Cumulative miles of railroad built





Sources: NBER, Broadberry et al. (2023), author's calculations

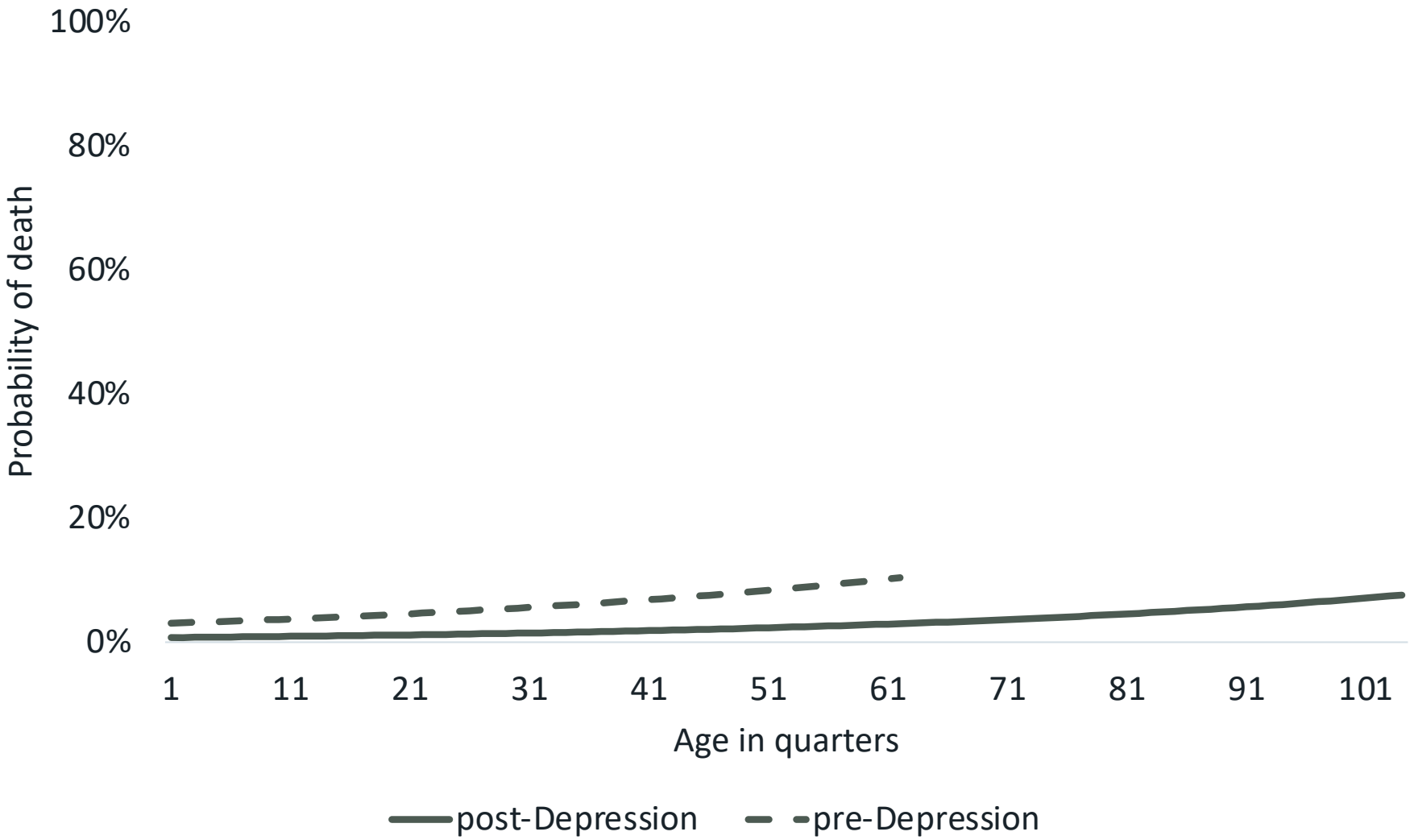
Probability an expansion ends in next quarter, 1933:Q2-2024:Q4



Back-up

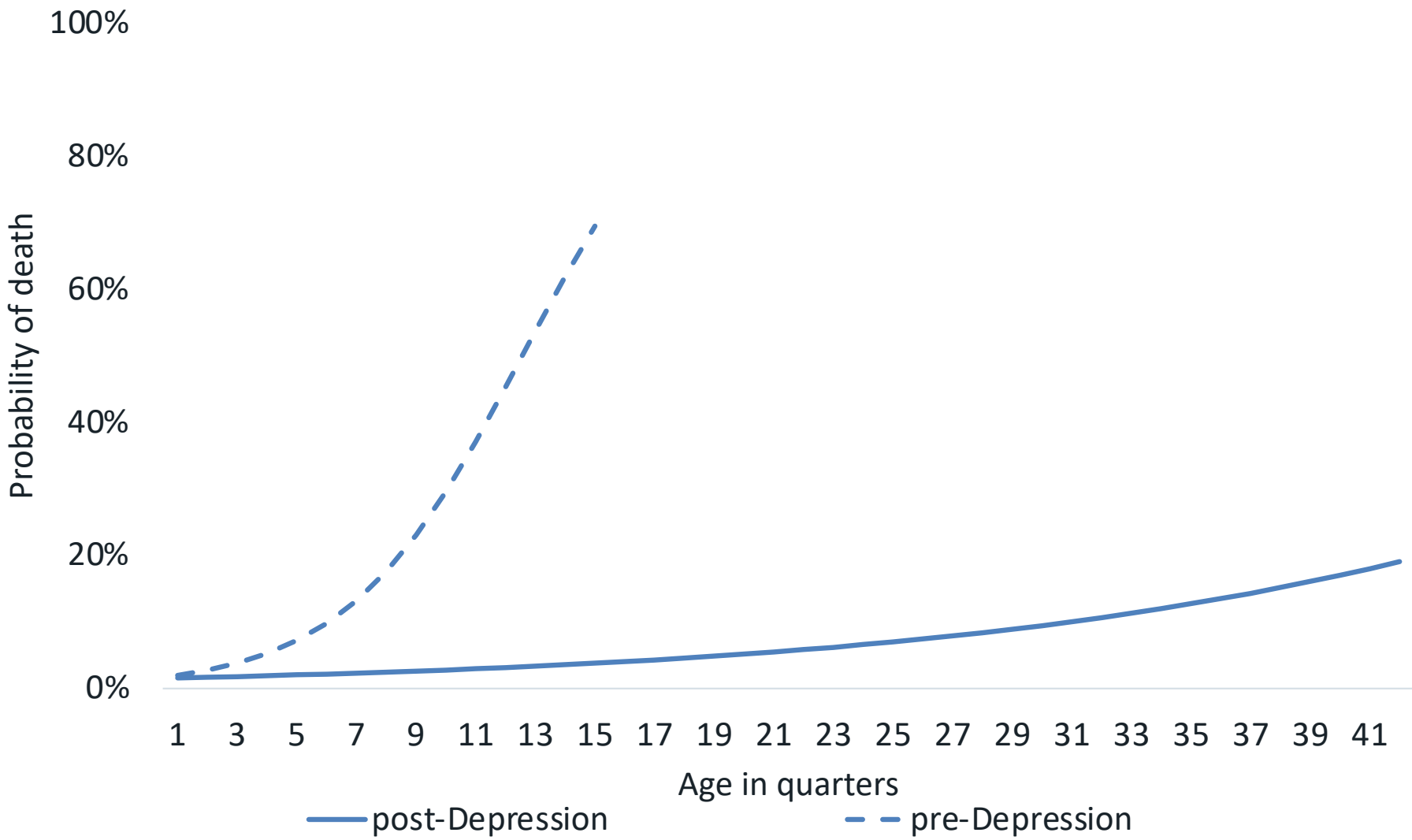
Sources: NBER, Broadberry et al. (2023), author's calculations

Probability a U.K. expansion ends in next quarter, 1854:Q4-2024:Q4



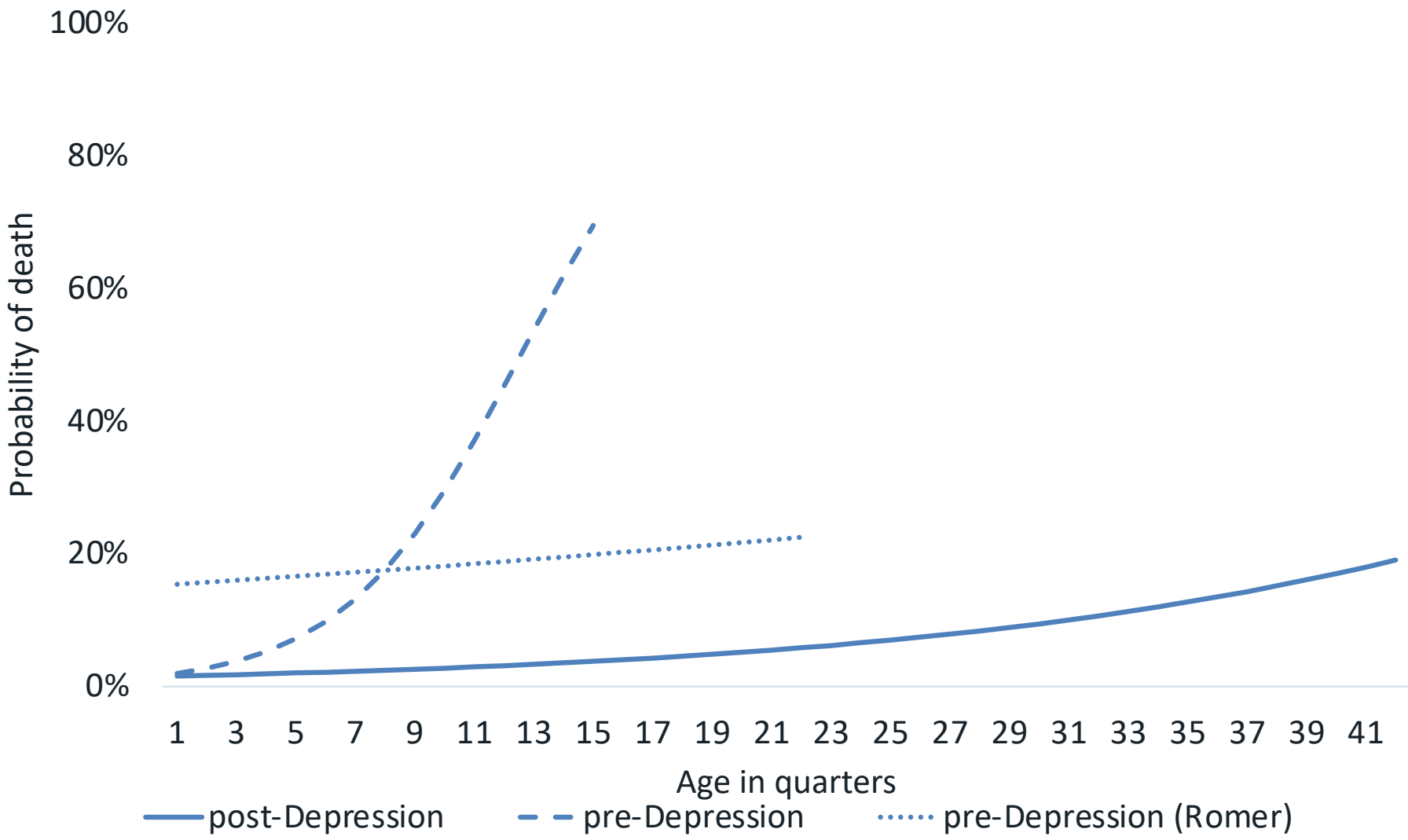
Sources: Broadberry et al. (2023), author's calculations

Probability a U.S. expansion ends in next quarter, 1854:Q4-2024:Q4



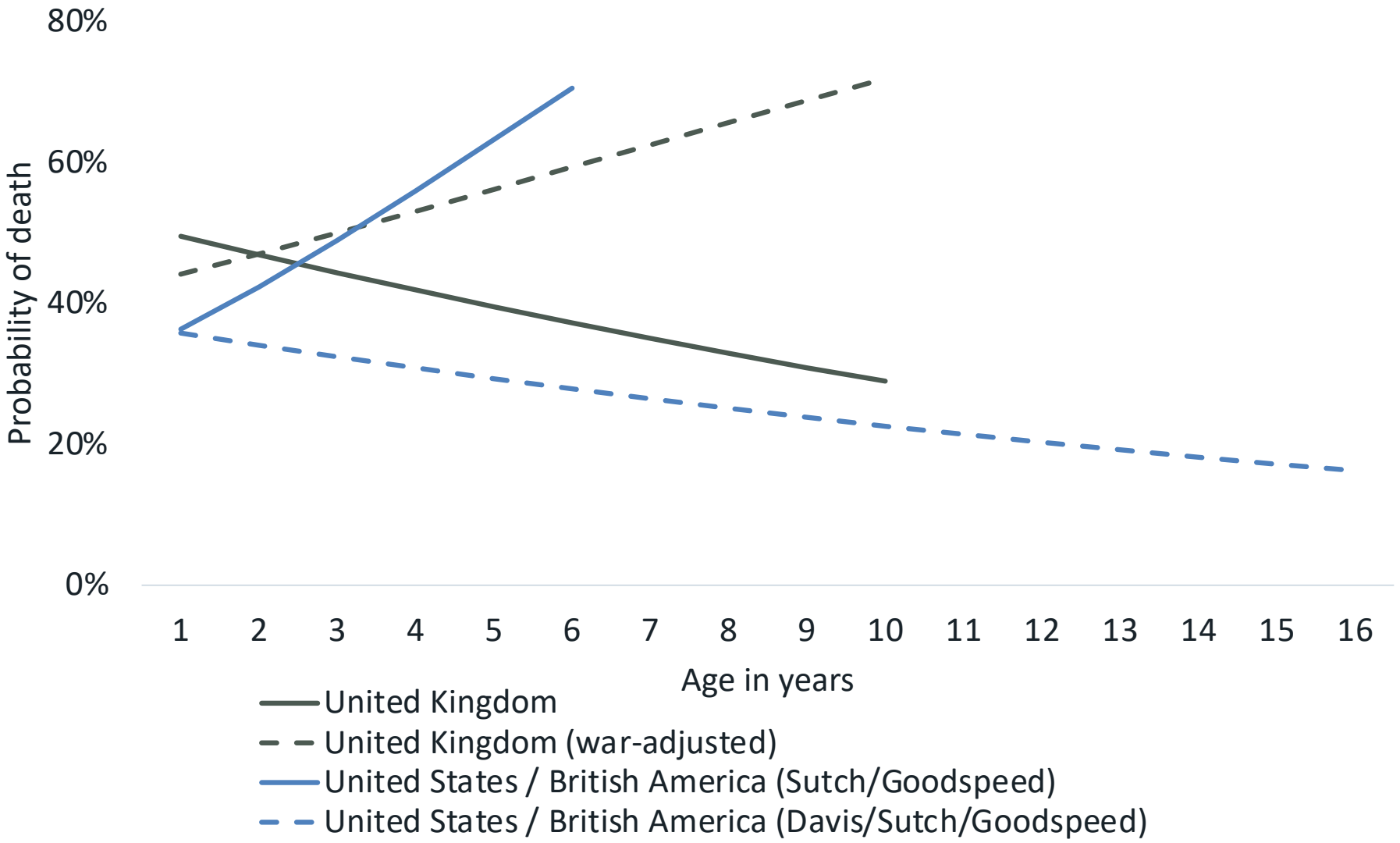
Sources: NBER, Romer (1994), author's calculations

Probability a U.S. expansion ends in next quarter, 1854:Q4-2024:Q4



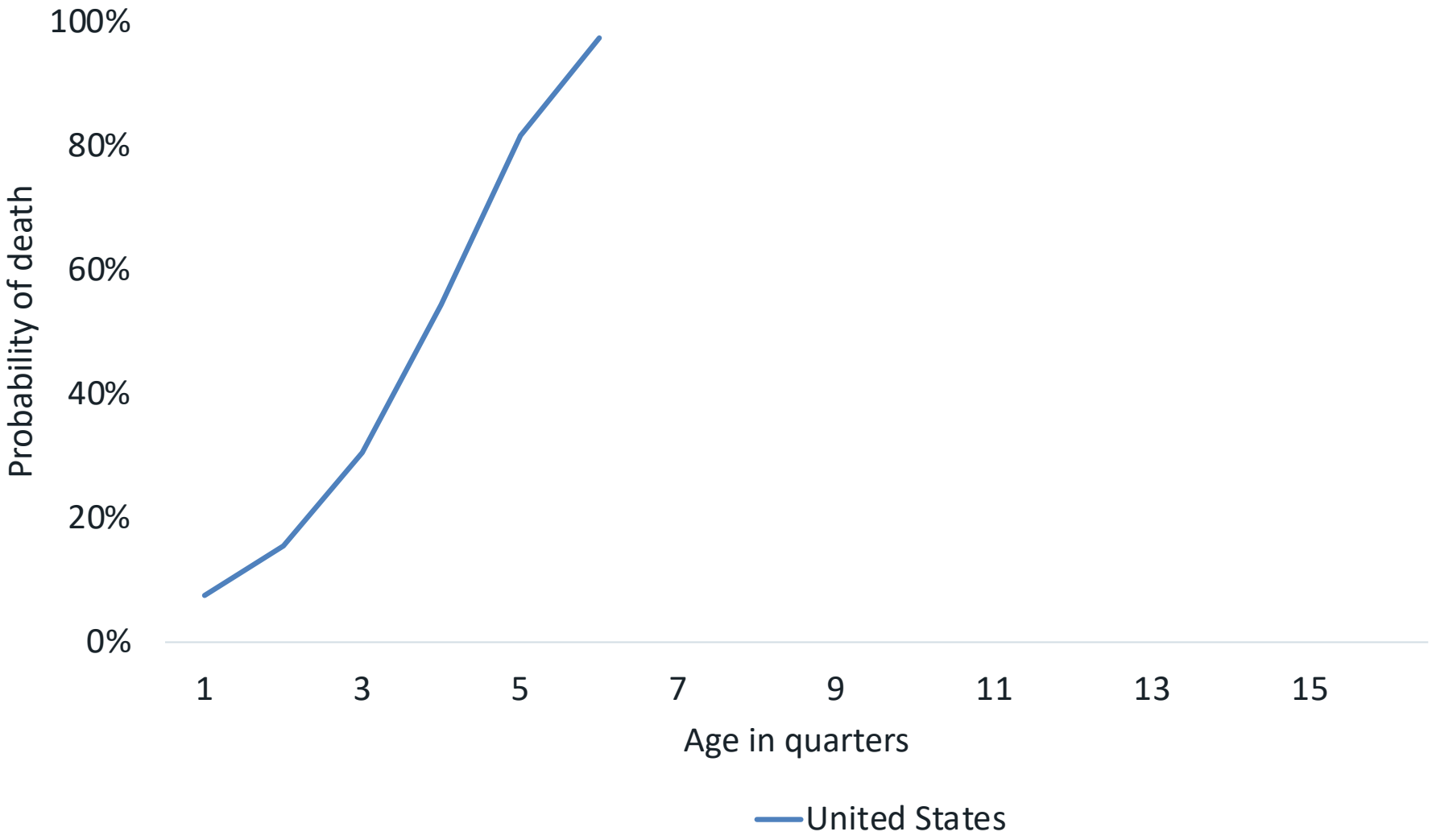
Sources: NBER, Romer (1994), author's calculations

Probability an expansion ends in next year, 1700-1854



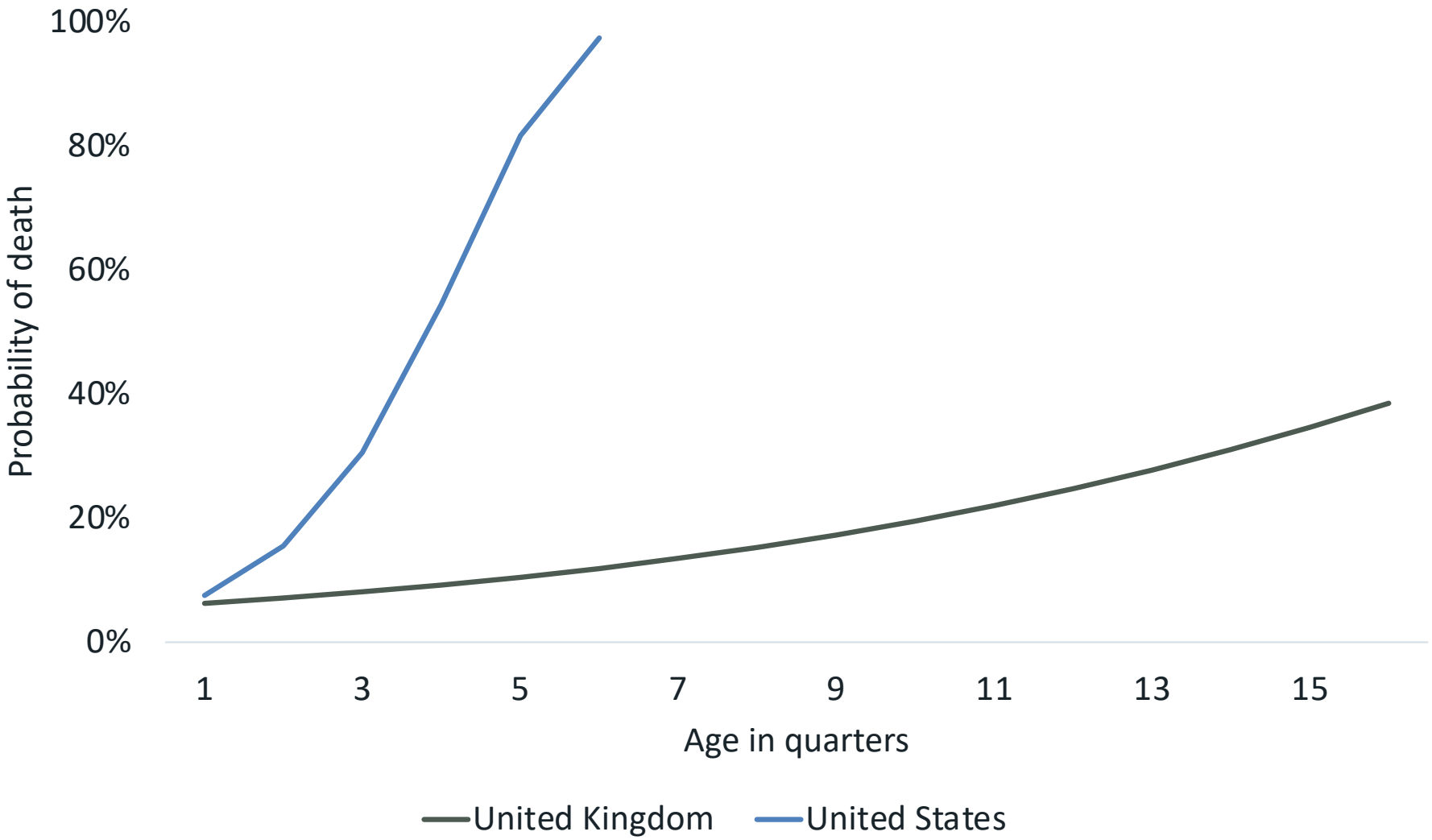
Sources: NBER, Sutch et al. (2006), Davis(2006), Broadberry et al. (2023), O'Brien and Palma (2023), author's calculations

Probability recession ends in next quarter, 1933:Q2-2024:Q4



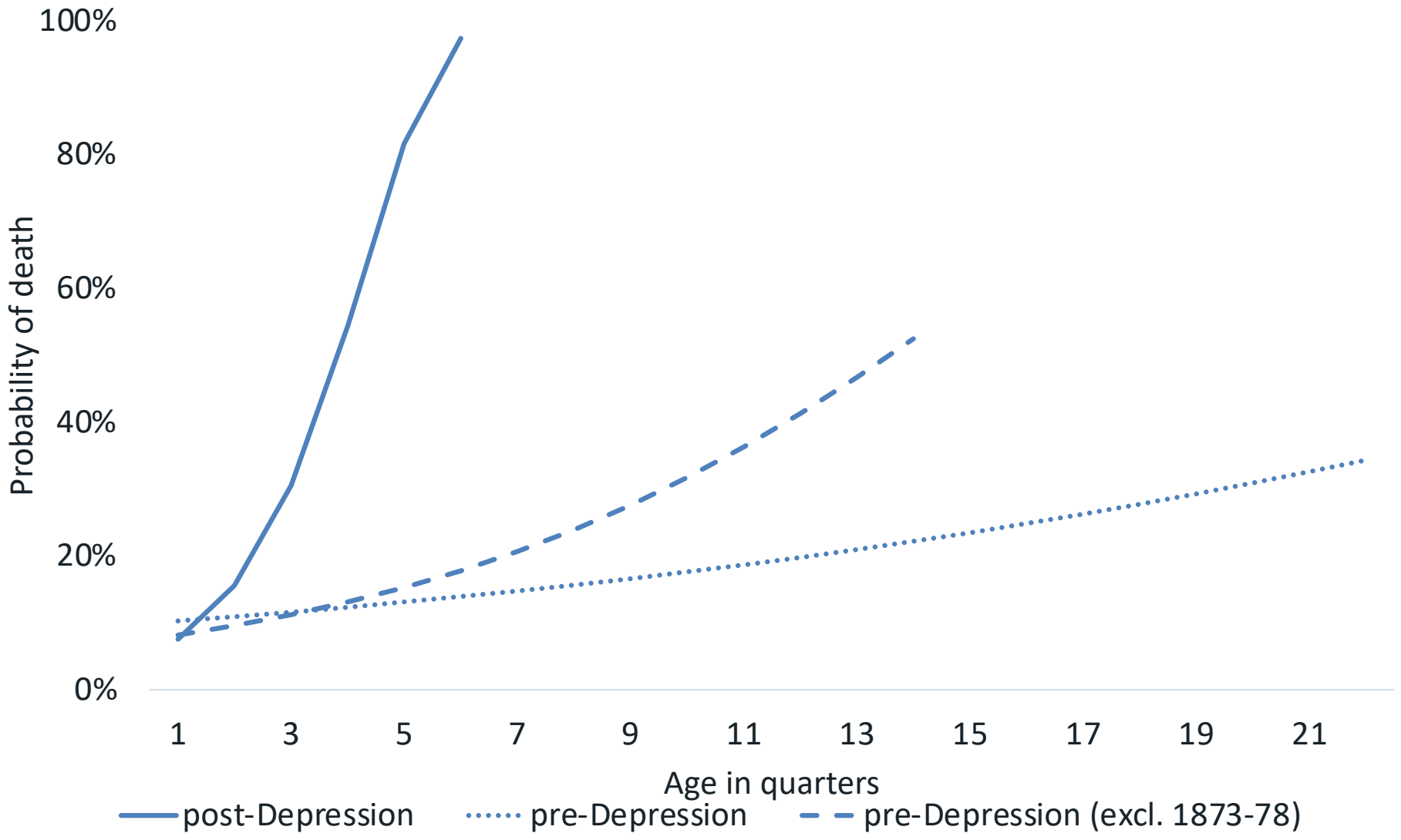
Sources: NBER, Broadberry et al. (2023), author's calculations

Probability recession ends in next quarter, 1933:Q2-2024:Q4



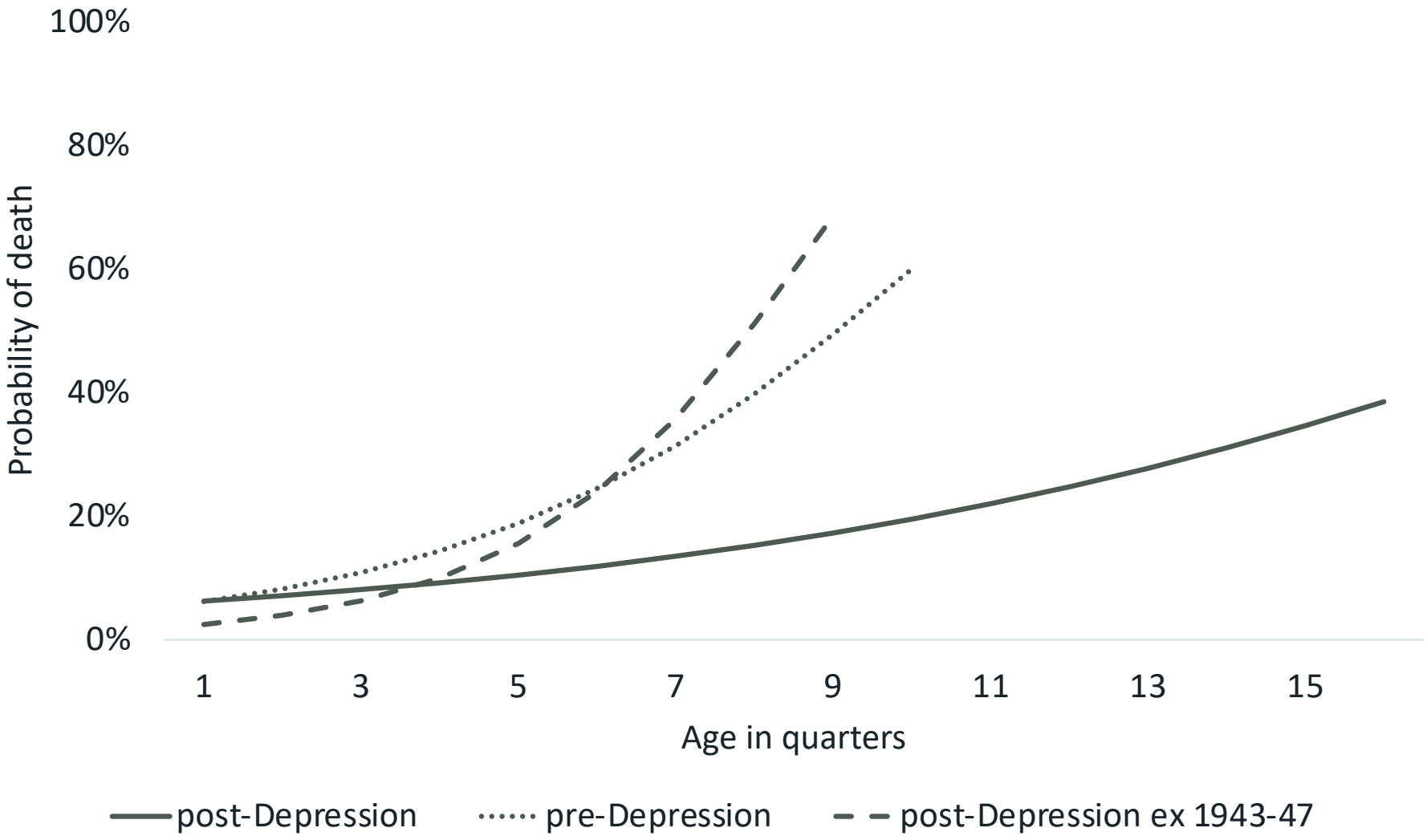
Sources: NBER, Broadberry et al. (2023), author's calculations

Probability a U.S. recession ends in next quarter, 1854:Q4-2024:Q4



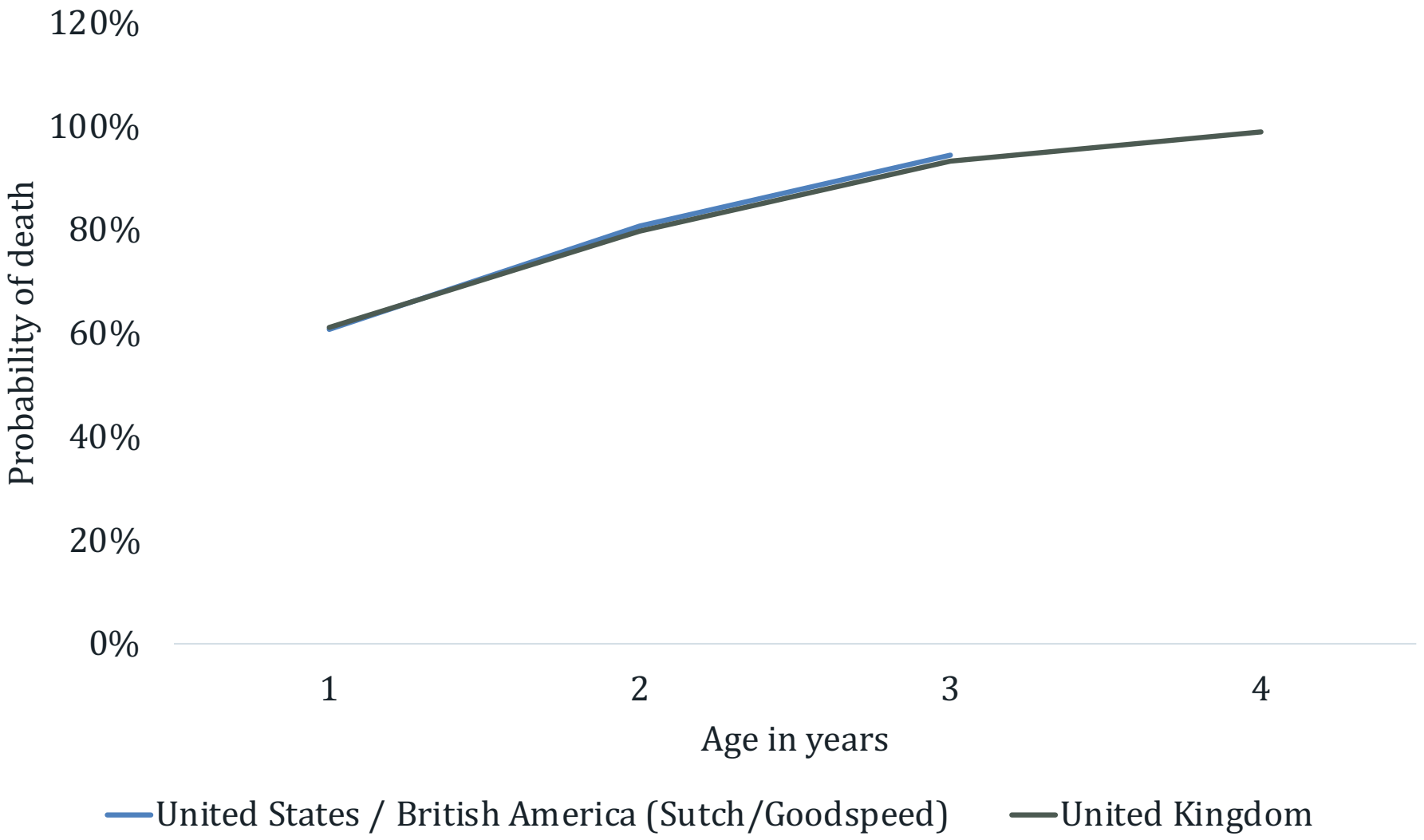
Sources: NBER, Broadberry et al. (2023), author's calculations

Probability a U.K. recession ends in next quarter, 1854:Q4-2024:Q4



Sources: NBER, Broadberry et al. (2023), author's calculations

Probability a recession ends in next year, 1700-1855



Sources: NBER, Sutch et al. (2006), Davis(2006), Broadberry et al. (2023), author's calculations

Effect of expansion duration on recession duration

	pre-Depression		post-Depression		Overall	
	U.S.	*U.K.*	*U.S.*	*U.K.*	*U.S.*	*U.K.*
Effect of an additional quarter of economic expansion on the length of a recession	0.31	0.01	-0.04**	0.01	-0.12***	0.03
(Standard error)	(0.41)	(0.04)	(0.02)	(0.03)	(0.03)	(0.02)
Number of observations	20	11	14	6	34	17
R -squared	0.04	0.00	0.18	0.00	0.09	0.04

Notes: This table reports the results of regressing the duration of a recession on the duration of the preceding expansion, with robust standard errors. *** p < 0.01, ** p < 0.05, * p < 0.10.

Sources: NBER, Broadberry et al. (2023), author's calculations

Plucking (real GDP)

	UNITED STATES				*UNITED KINGDOM*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Peak-to-trough (% change)	Trough-to-peak (% change)	Peak-to-Trough (annual % change)	Trough-to-Peak (annual % change)	Peak-to-trough (% change)	Trough-to-peak (% change)	Peak-to-Trough (annual % change)	Peak-to-Trough (annual % change, >1709)	Trough-to-Peak (annual % change)
Trough-to-peak (percent change)	-0.08				-0.09				
	(0.05)				(0.15)				
Peak-to-trough (% change)		-0.633**				-0.20			
		(0.31)				(0.46)			
Annual growth rate (trough-to-peak, %)			0.05				-0.428***	-0.18	
			(0.09)				(0.10)	(0.11)	
Annual growth rate (peak-to-trough, %)				-0.498***					-0.500**
				(0.16)					(0.25)
N	48	47	48	47	59	60	59	57	59
R2	0.05	0.09	0.00	0.25	0.05	0.22	0.24	0.03	0.18

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sources: BEA, OECD, BOE, NBER, Sutch et al. (2006), Broadberry et al. (2023), author's calculations

Plucking (real investment)

	UNITED STATES				*UNITED KINGDOM*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Peak-to-trough (% change)	Trough-to-peak (% change)	Peak-to-Trough (annual % change)	Trough-to-Peak (annual % change)	Peak-to-trough (% change)	Trough-to-peak (% change)	Peak-to-Trough (annual % change)	Trough-to-Peak (annual % change)
Trough-to-peak (percent change)	-0.10				0.00			
	(0.12)				(0.01)			
Peak-to-trough (% change)		-2.017***				-8.622*		
		(0.31)				(4.25)		
Annual growth rate (trough-to-peak, %)			-0.26				0.21	
			(0.39)				(0.48)	
Annual growth rate (peak-to-trough, %)				0.30				0.03
				(0.22)				(0.15)
N	23	22	22	22	23	22	22	22
R2	0.06	0.58	0.04	0.16	0.00	0.64	0.01	0.00

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sources: BEA, OECD, BOE, NBER, Sutch et al. (2006), Broadberry et al. (2023), author's calculations

Plucking (bank lending)

	UNITED STATES				*UNITED KINGDOM*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Peak-to-trough (% change)	Trough-to-peak (% change)	Peak-to-Trough (annual % change)	Trough-to-Peak (annual % change)	Peak-to-trough (% change)	Trough-to-peak (% change)	Peak-to-Trough (annual % change)	Trough-to-Peak (annual % change)
Trough-to-peak (percent change)	-0.20				0.01			
	(0.17)				(0.01)			
Peak-to-trough (% change)		-0.25				-17.807*		
		(0.34)				(8.81)		
Annual growth rate (trough-to-peak, %)			-0.02				0.47	
			(0.24)				(0.29)	
Annual growth rate (peak-to-trough, %)				0.213*				0.774***
				(0.12)				(0.23)
N	39	38	39	38	14	13	13	13
R2	0.10	0.07	0.00	0.11	0.06	0.66	0.23	0.57

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sources: FRB, Bodenhorn (2006), BOE, NBER, Sutch et al. (2006), Broadberry et al. (2023), author's calculations

Plucking (real consumption)

	UNITED STATES				*UNITED KINGDOM*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Peak-to-trough (% change)	Trough-to-peak (% change)	Peak-to-Trough (annual % change)	Trough-to-Peak (annual % change)	Peak-to-trough (% change)	Trough-to-peak (% change)	Peak-to-Trough (annual % change)	Trough-to-Peak (annual % change)
Trough-to-peak (percent change)	0.00				0.185**			
	(0.06)				(0.07)			
Peak-to-trough (% change)		-0.12				-0.73		
		(0.31)				(2.25)		
Annual growth rate (trough-to-peak, %)			0.04				-0.28	
			(0.19)				(0.40)	
Annual growth rate (peak-to-trough, %)				-0.07				-0.23
				(0.18)				(0.24)
N	37	36	36	35	23	22	22	22
R2	0.00	0.15	0.00	0.00	0.42	0.45	0.01	0.09

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sources: BEA, OECD, BOE, NBER, Sutch et al. (2006), Gallman and Rhode (2006, 2020), Broadberry et al. (2023), author's calculations

Plucking (effect of financial crises on recovery in real GDP)

	(1) Trough-to-peak (% change)	(2) Trough-to-peak (annual % change)	(3) Trough-to-peak (% change)	(4) Trough-to-peak (annual % change)
Peak-to-trough (percent change)	-0.13		-0.55	
	(0.46)		(1.55)	
Annual growth rate (peak-to-trough, %)		-0.499**		-0.238**
		(0.25)		(0.09)
Financial crisis	-0.06	0.00		
	(0.05)	(0.01)		
Peak-to-trough change in lending (percent)			-1.540**	-0.01
			(0.51)	(0.01)
N	60	59	13	13
R2	0.24	0.18	0.71	0.32

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sources: BOE, OECD, Broadberry et al. (2023), author's calculations

Plucking (effect of investment-to-consumption peak on investment-to-consumption trough)

	(1) Peak-to-trough (% change)	(2) Trough-to-peak (% change)
Trough-to-peak (percent change)	-0.06	
	(0.11)	
Expansion time (years)	0.00	
	(0.00)	
Peak-to-trough (% change)		-0.92**
		(0.34)
Recession time (years)		0.06**
		(0.02)
N	23	22
R2	0.17	0.71

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sources: NBER, BEA, Gallman and Rhode (2006, 2020), Sutch et al. (2006), author's calculations

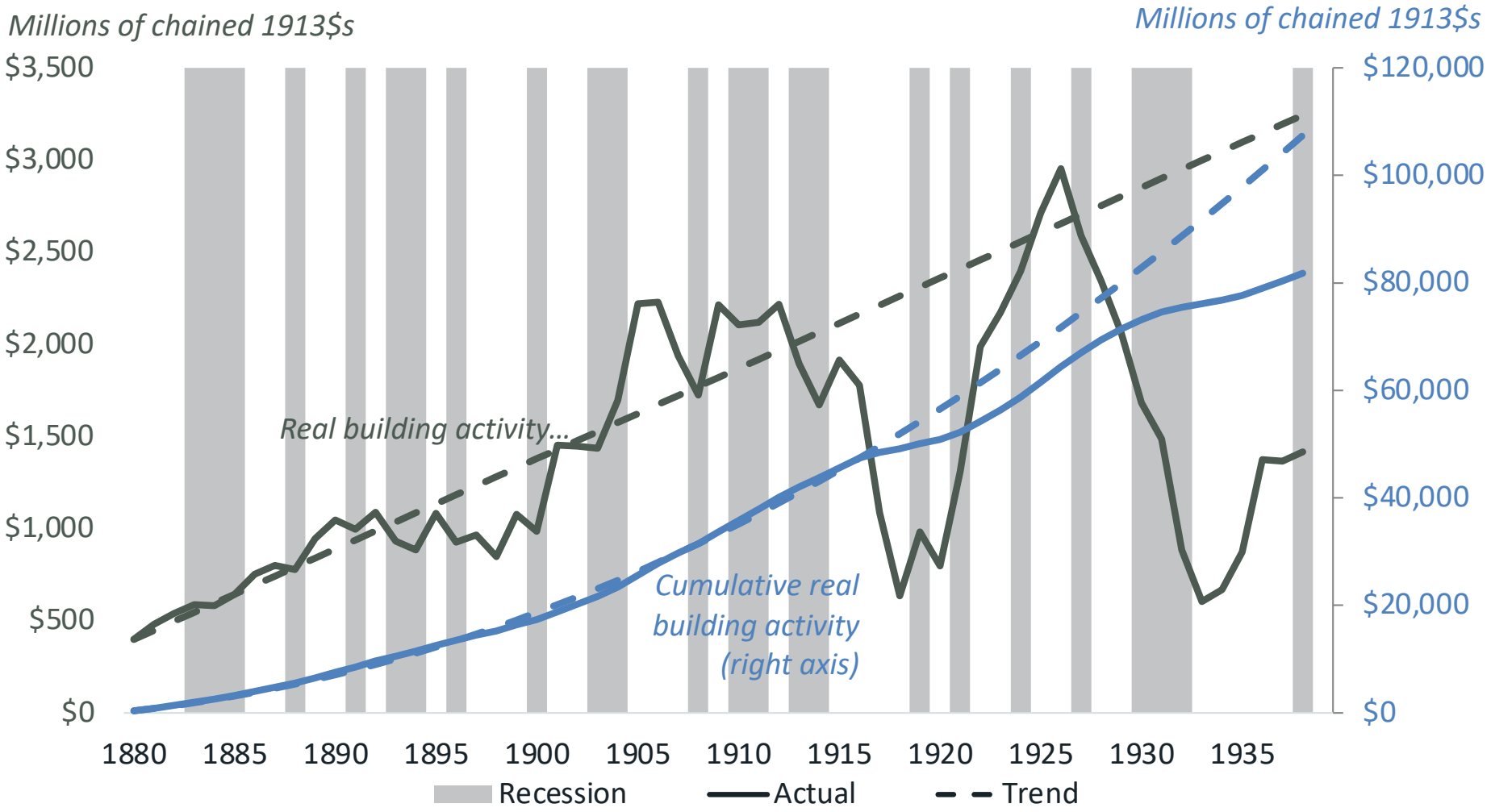
Plucking (real nonresidential structures)

	(1) Peak-to-trough (% change)	(2) Peak-to-trough (% change)
Trough-to-peak (percent change)	0.213**	
	(0.09)	
Expansion time (years)	-0.005*	
	(0.00)	
Annual growth rate (trough-to-peak, %)		0.755***
		(0.09)
N	16	15
R2	0.00	0.67

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sources: NBER, BEA, author's calculations

Plucking (structures)



Sources: NBER, author's calculations

Tests of Kitchin, Juglar, Kuznets, and Kondratiev cycles

	(1)	(2)	(3)	(4)
	Kitchin cycle (3-5 years)	Juglar cyle (5-10 years)	Kuznets swing (15-20 years)	Kondratiev wave (45-60 years)
Panel A: United States				
Sum of 3-5-year lags	0.54			
	(0.78)			
Sum of 5-10-year lags		-0.53		
		(1.09)		
Sum of 15-20-year lags			-0.83	
			(1.04)	
Sum of 45-60-year lags				-1.47*
				(0.85)
N	323	323	323	323
R2	0.00	0.01	0.00	0.02
Panel A: United Kingdom				
Sum of 3-5-year lags	0.88			
	(0.63)			
Sum of 5-10-year lags		1.42		
		(1.09)		
Sum of 15-20-year lags			1.34	
			(0.97)	
Sum of 45-60-year lags				-0.22
				(1.13)
N	323	320	320	320
R2	0.01	0.10	0.02	0.03

Robust standard errors are clustered at the cycle level and reported in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sources: NBER, Broadberry et al. (2023), author's calculations

Index of U.K. business cycles versus moving sum of lottery numbers

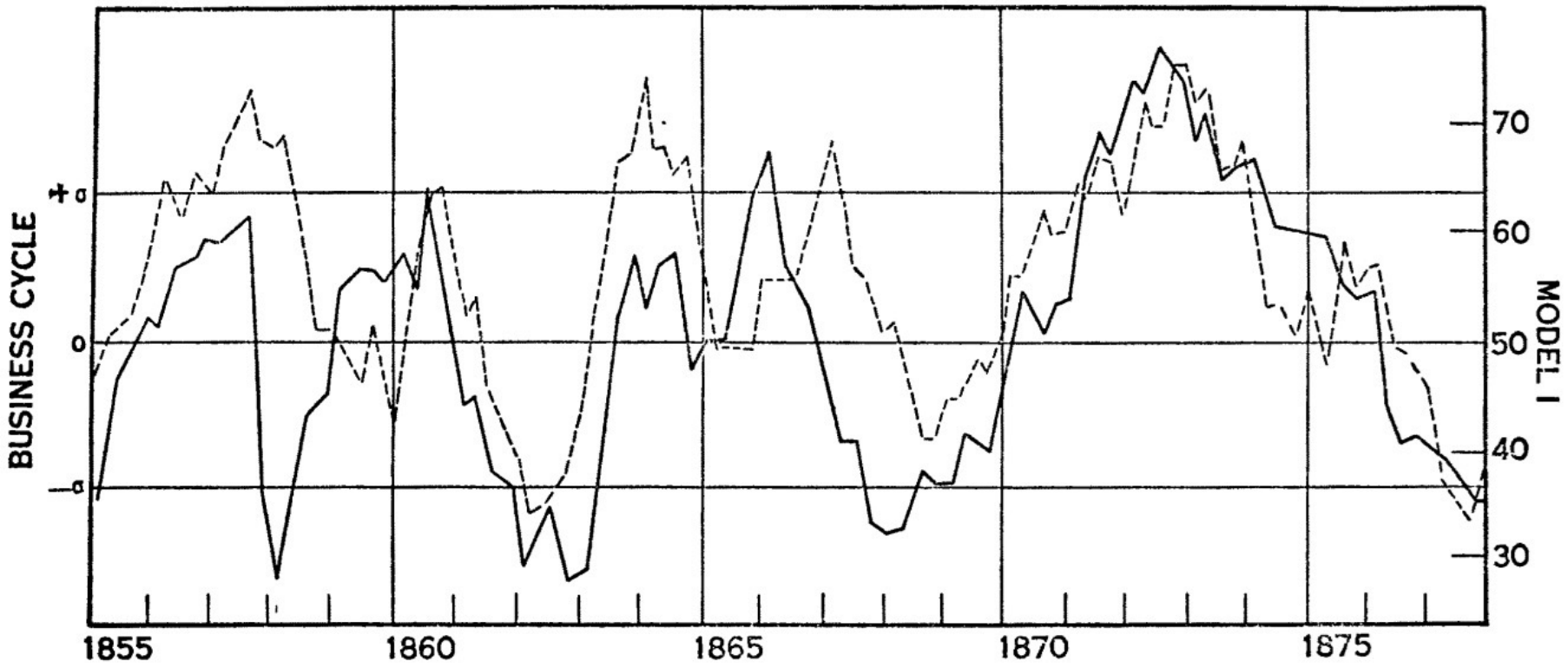
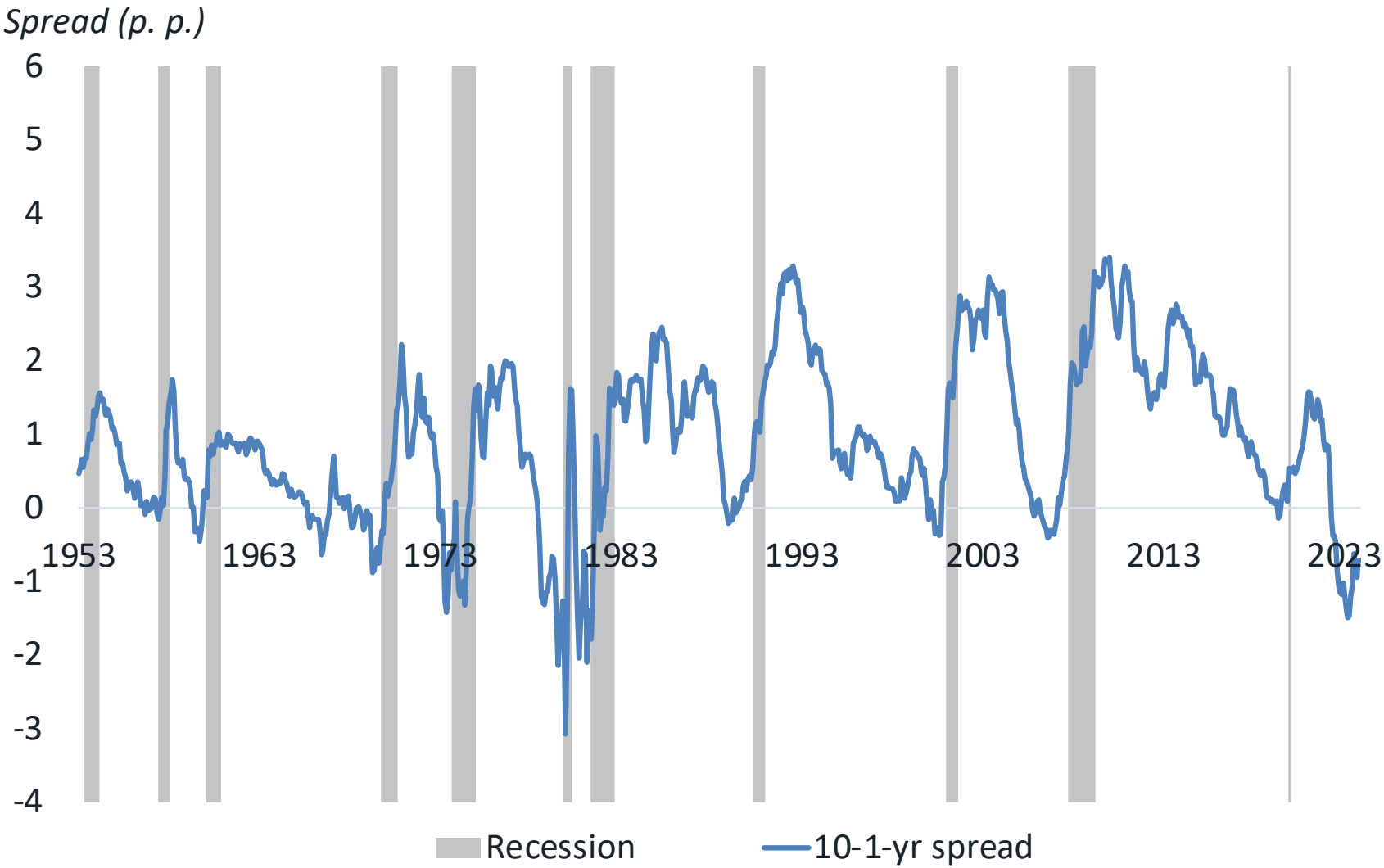


FIGURE 3.————An index of English business cycles from 1855 to 1877; scale on the left side. ---------Terms 20 to 145 of Model I; scale on the right side.

Sources: Slutzky (1927)

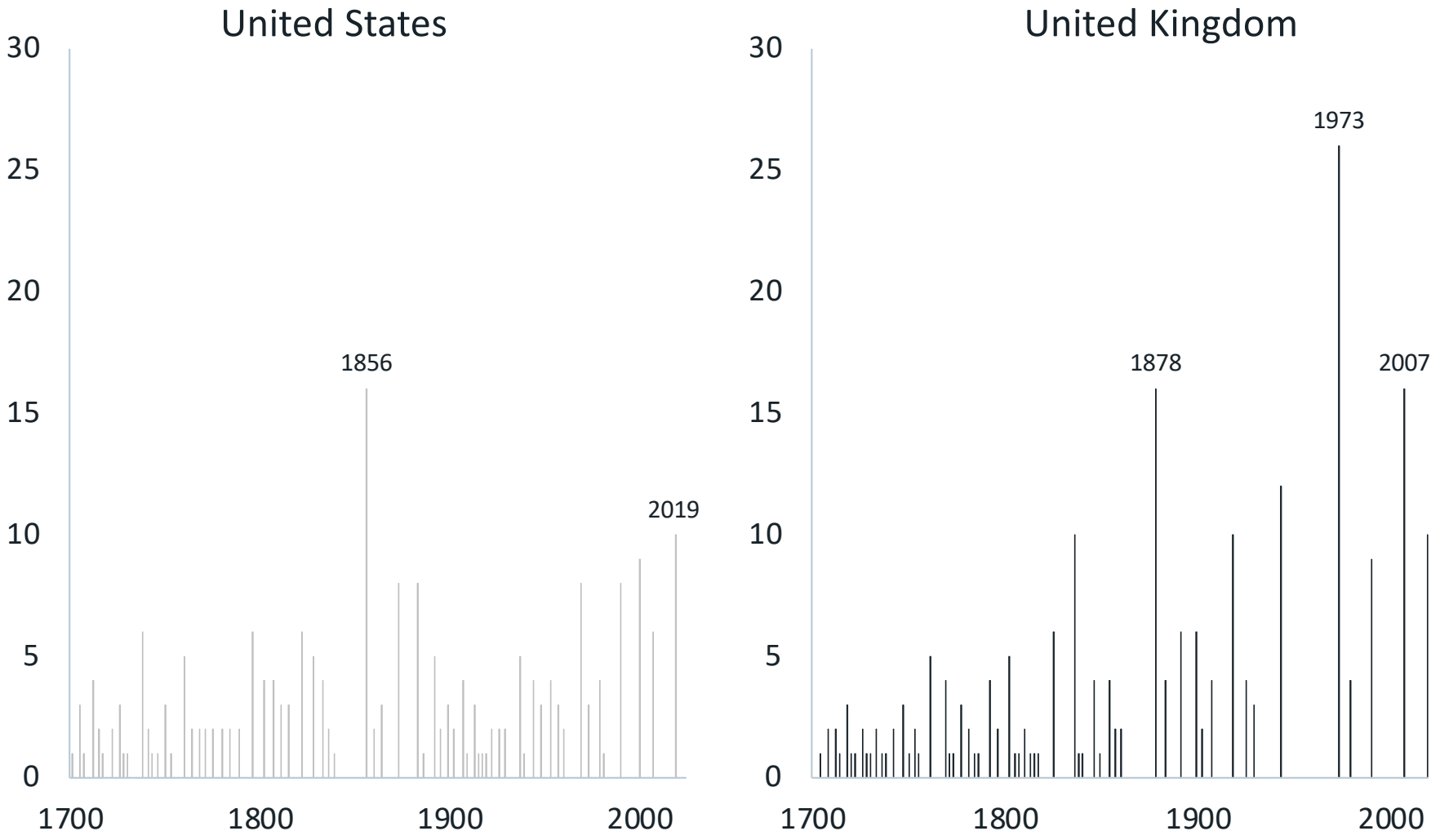
Yield curve spread in the United States, 1953-2024



Back-up

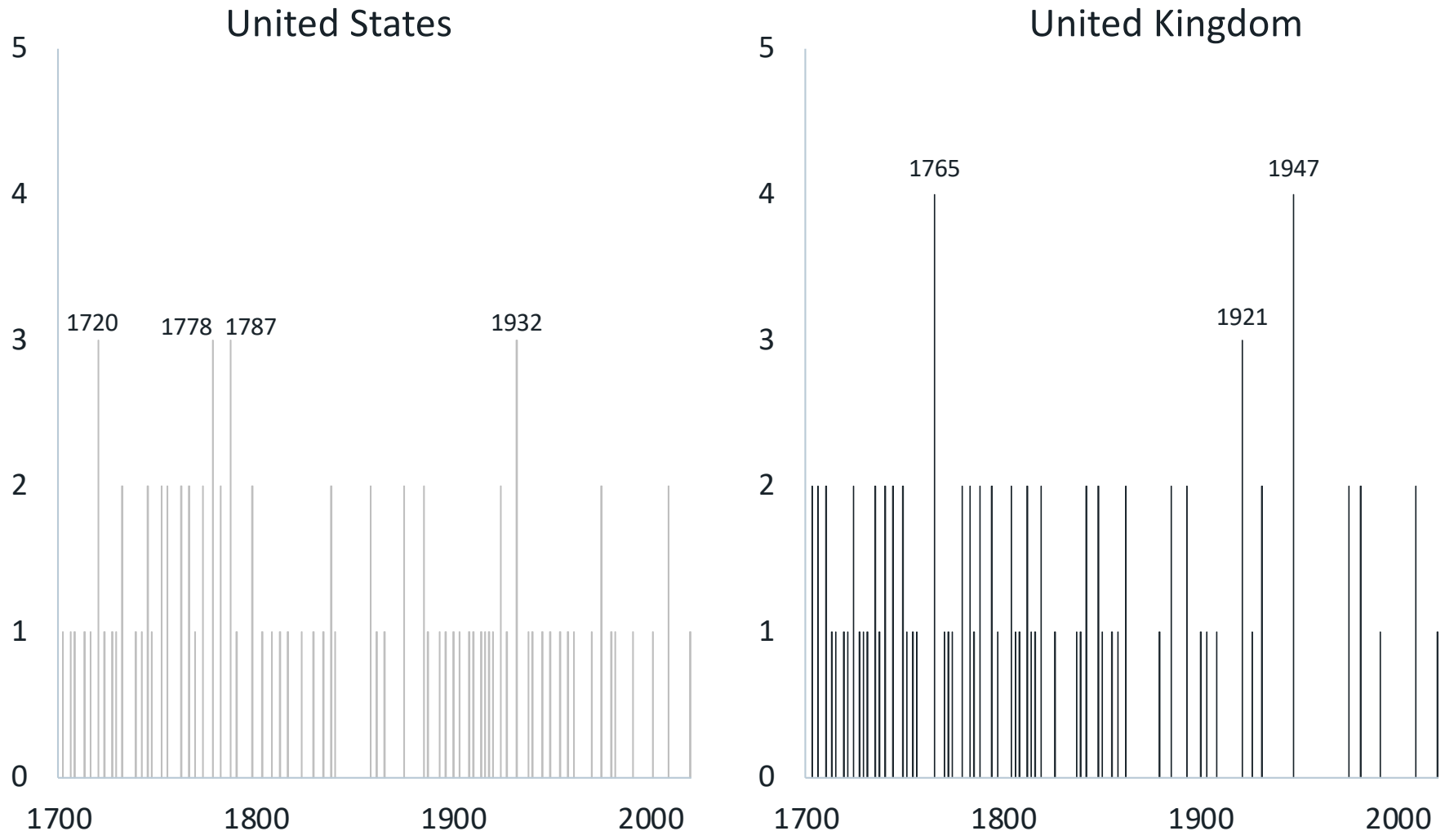
Sources: FRB, Haver Analytics, NBER, author's calculations

Expansion age at time of death, 1700-2020



Sources: NBER, Sutch et al. (2006), Davis(2006), Broadberry et al. (2023), author's calculations

Recession age at time of death, 1700-2020



Sources: NBER, Sutch et al. (2006), Davis(2006), Broadberry et al. (2023), author's calculations

Effect of time on recession and expansion duration, 1700-2020

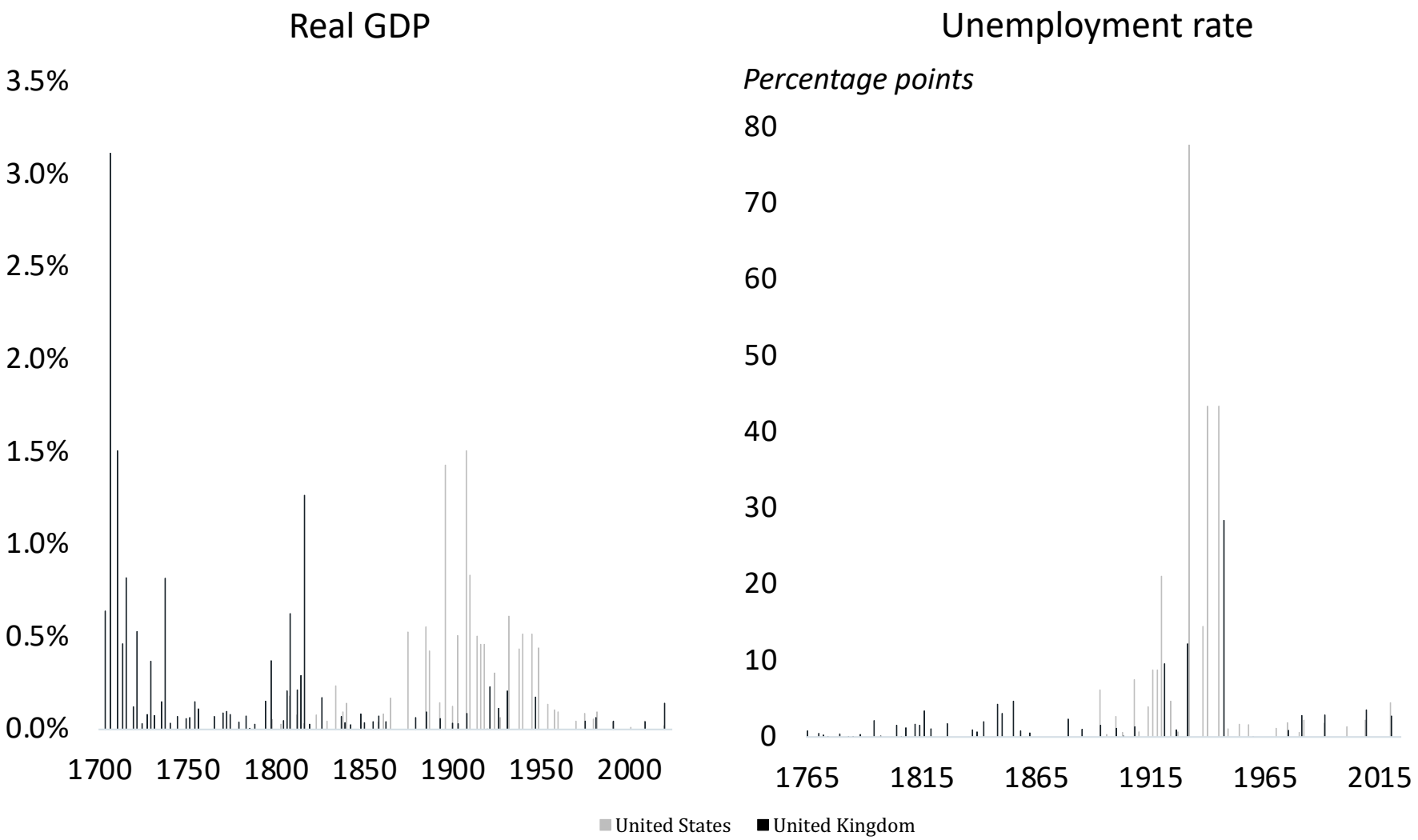
	UNITED STATES				UNITED KINGDOM	
	(1)	(2)	(3)	(4)	(5)	(6)
Duration	NBER	NBER	Davis-Romer	Davis-Romer	Broadberry	Broadberry
Panel A: Recessions						
Time	-0.00		-0.00		0.00	
	(0.00)		(0.00)		(0.00)	
Postwar		-0.53***		-0.23		0.52
		(0.18)		(0.14)		(0.42)
N	72	72	68	68	60	60
R2	0.01	0.04	0.04	0.02	0.02	0.05
Panel B: Expansions						
Time	0.01***		0.01***		0.04***	
	(0.00)		(0.00)		(0.01)	
Postwar		2.70***		2.10**		10.00***
		(0.86)		(0.91)		(3.45)
N	72	72	68	68	59	59
R2	0.19	0.26	0.10	0.09	0.41	0.37

Robust standard errors are reported in parentheses

*** p<0.01, ** p<0.05, * p<0.1

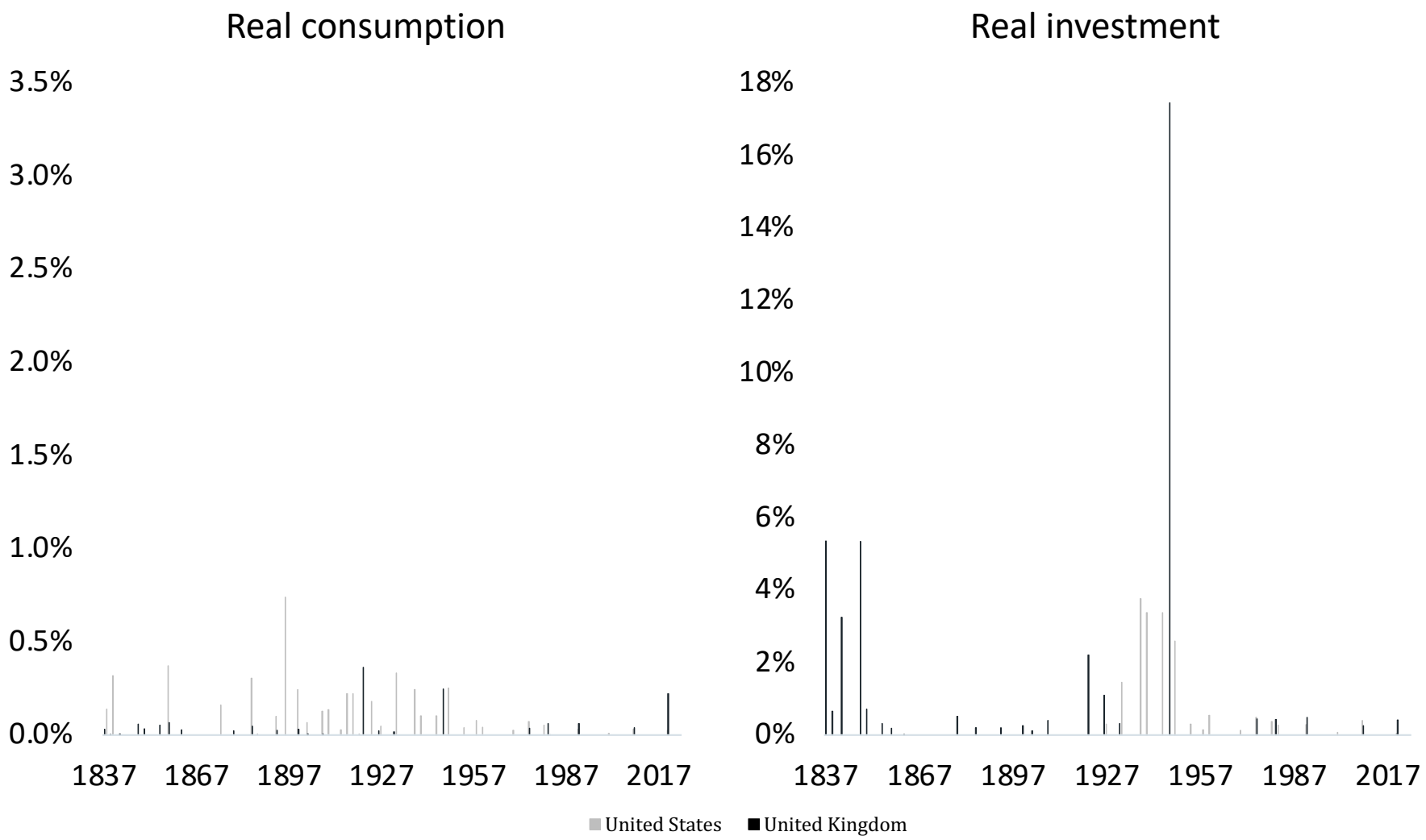
Sources: NBER, Sutch et al. (2006), Davis(2006), Romer (1994), Broadberry et al. (2023), author's calculations

Within-cycle variance, 1700-2020



Sources: NBER, Sutch et al. (2006), Davis(2006), Broadberry et al. (2023), author's calculations

Within-cycle variance, 1700-2020



Sources: NBER, Sutch et al. (2006), Davis(2006), Gallman and Rhode (2006, 2020), Broadberry et al. (2023), author's calculations

Effect of time on peak-to-trough declines, 1700-2020

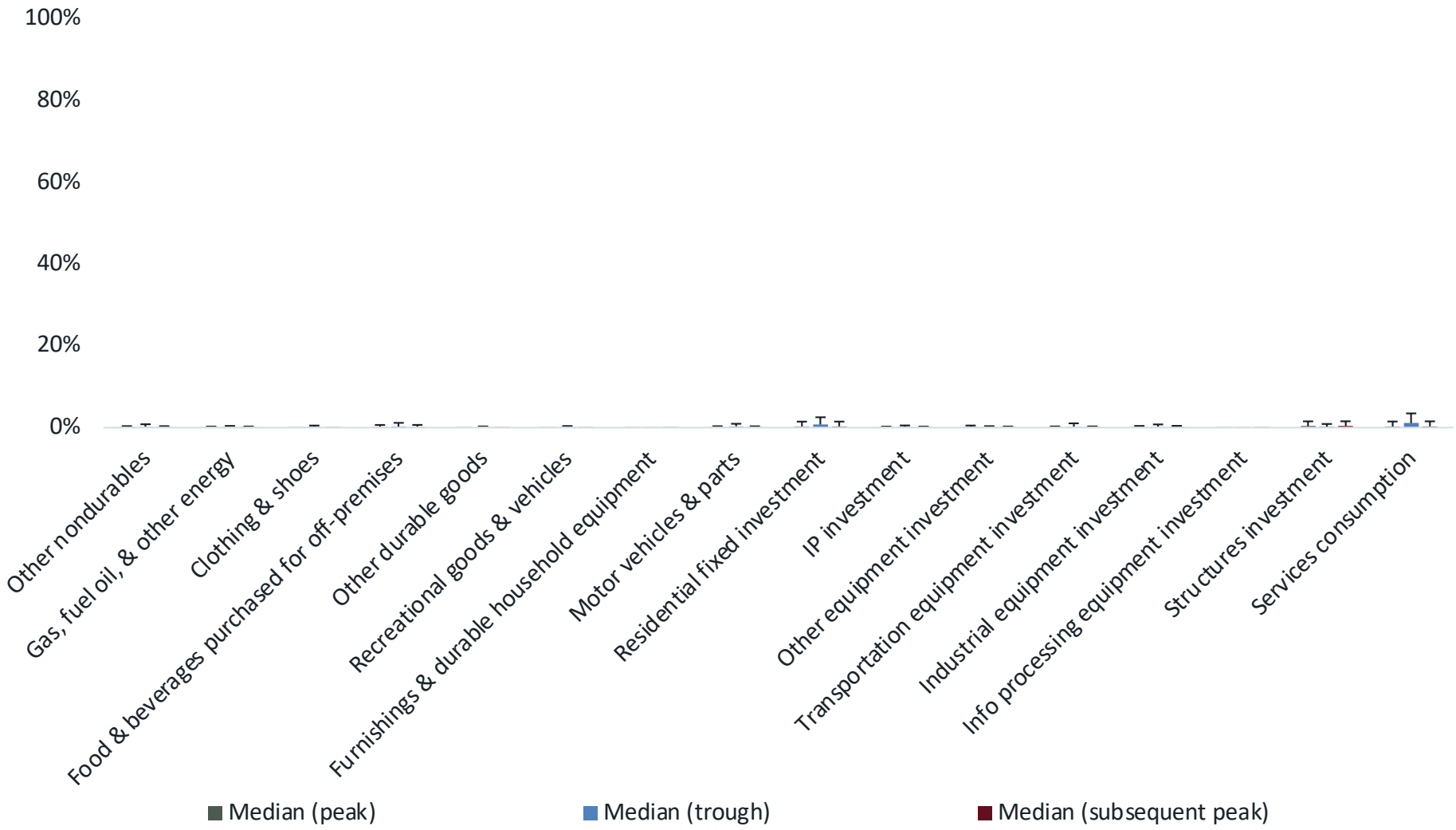
	Real GDP		Real consumption		Real investment		Unemployment rate	
Duration	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: United States								
Time	-0.00		-0.00		0.00		0.00	
	(0.00)		(0.00)		(0.00)		(0.01)	
Postwar		0.01		0.00		0.15		-0.25
		(0.01)		(0.01)		(0.11)		(0.69)
N	48	48	37	37	16	16	27	27
R2	0.02	0.00	0.02	0.00	0.09	0.28	0.00	0.00
Panel B: United Kingdom								
Time	0.00		-0.00		0.00		0.00	
	(0.00)		(0.00)		(0.00)		(0.00)	
Postwar		-0.01		-0.04*		-0.10**		-0.29
		(0.02)		(0.02)		(0.04)		(0.34)
N	60	60	23	23	23	23	41	41
R2	0.00	0.00	0.16	0.26	0.07	0.09	0.00	0.01

Robust standard errors are reported in parentheses

*** p<0.01, ** p<0.05, * p<0.1

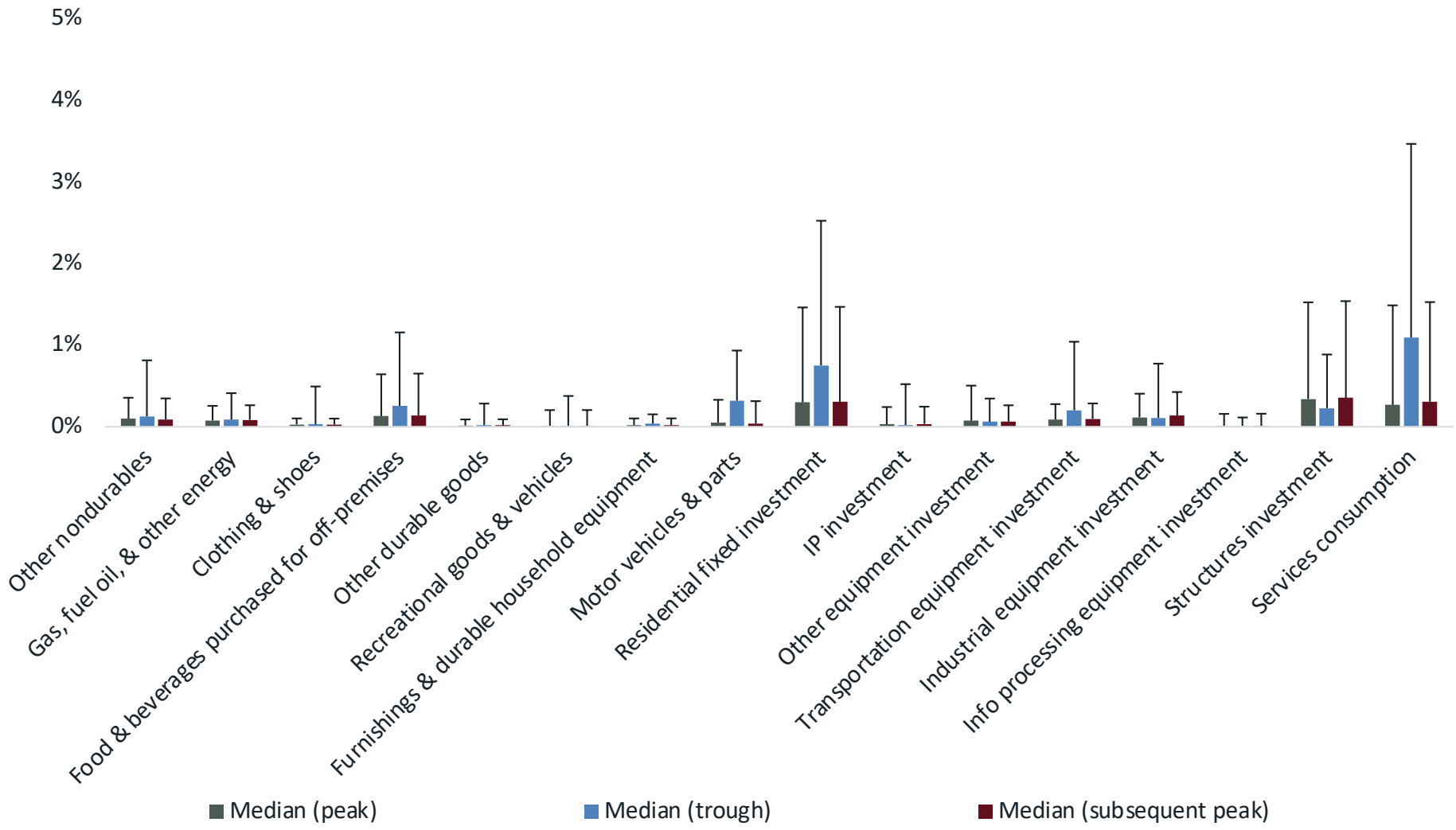
Sources: NBER, Sutch et al. (2006), Davis(2006), Romer (1994), Broadberry et al. (2023), author's calculations

Median and maximum deviation from long-run trend share of GDP by major GDP component, 1947-2023



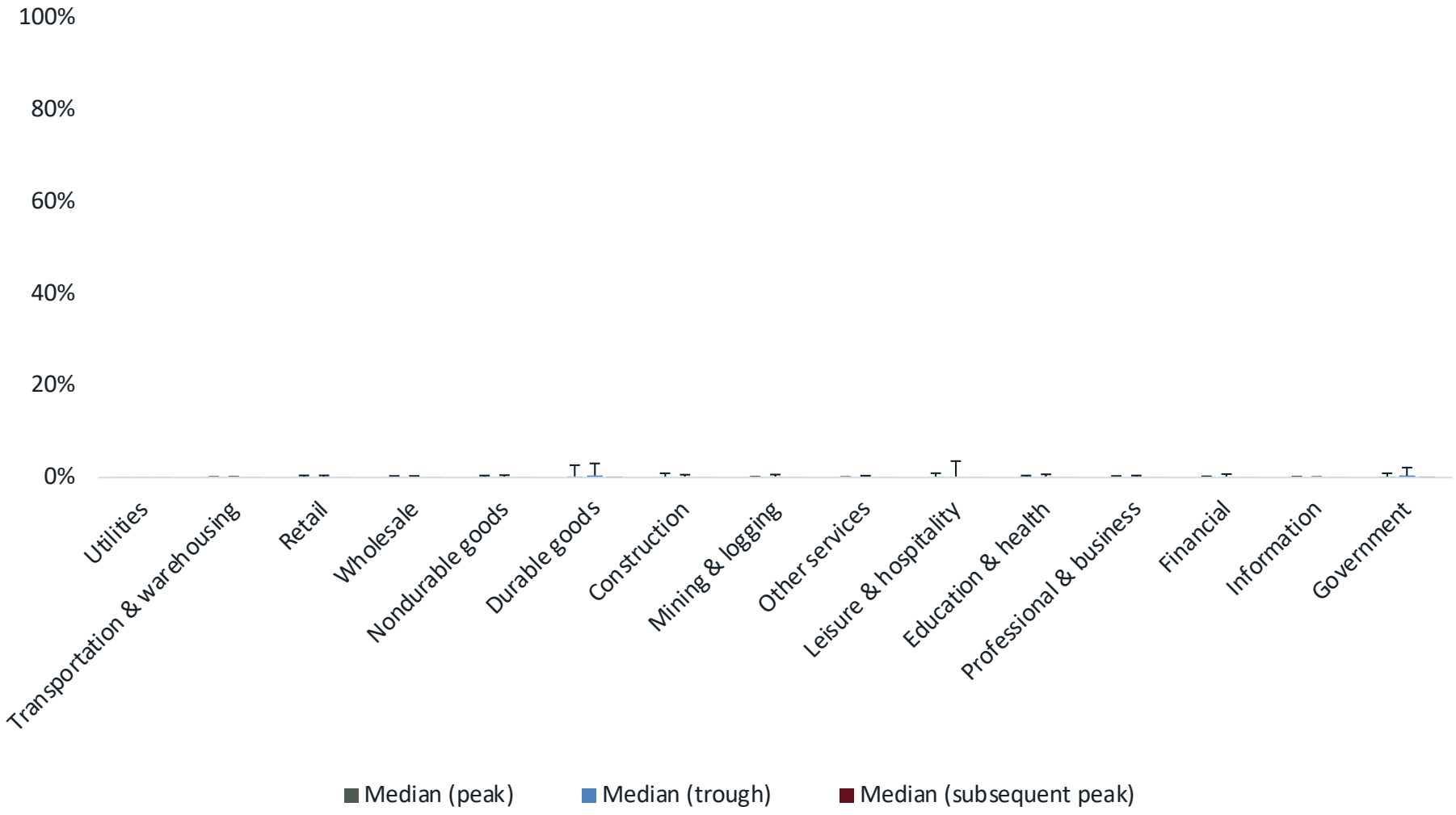
Sources: NBER, BEA, author's calculations

Median and maximum deviation from long-run trend share of GDP by major GDP component, 1947-2023



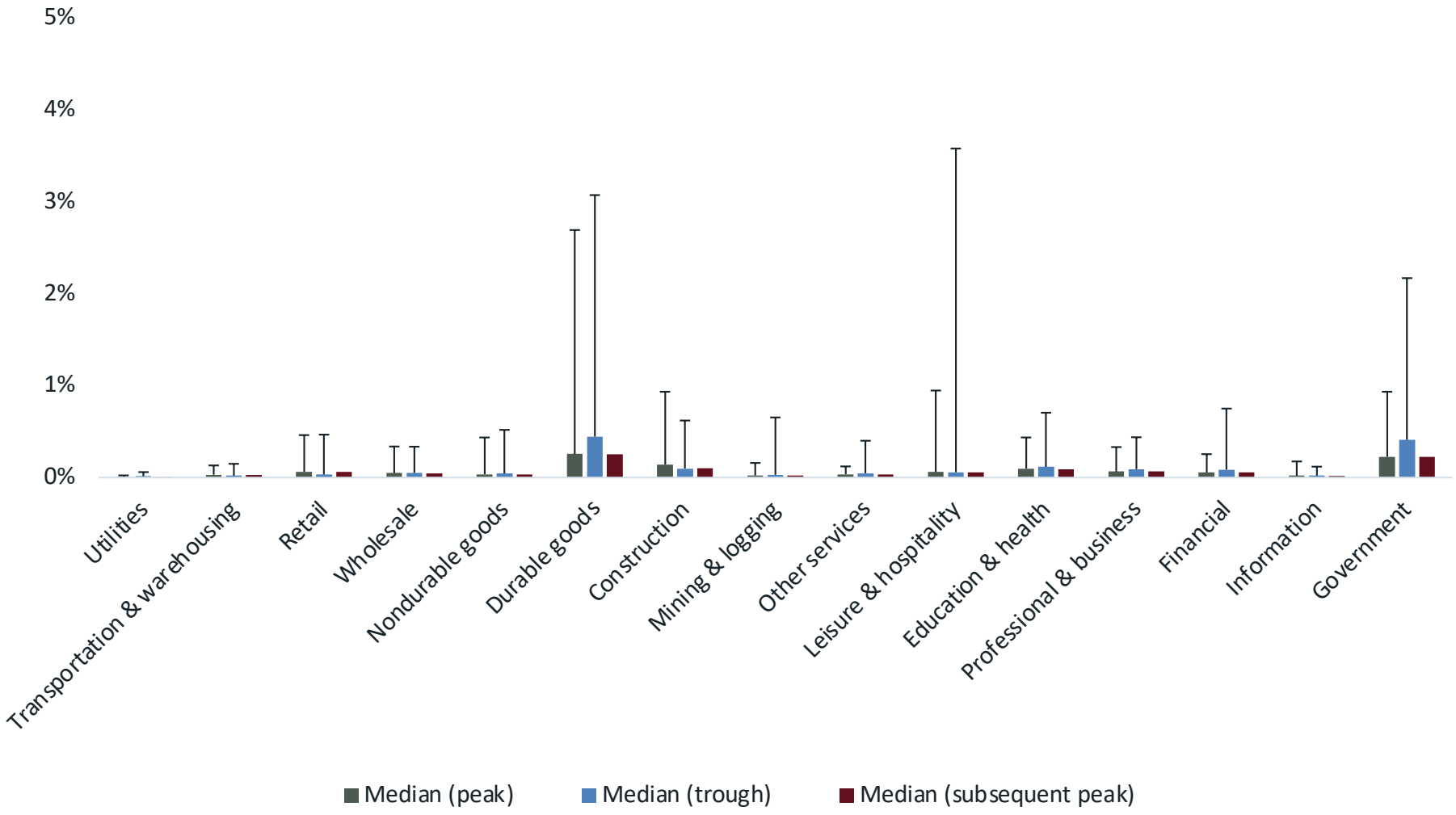
Sources: NBER, BEA, author's calculations

Median and maximum deviation from long-run trend share of employment by industry sector, 1947-2023



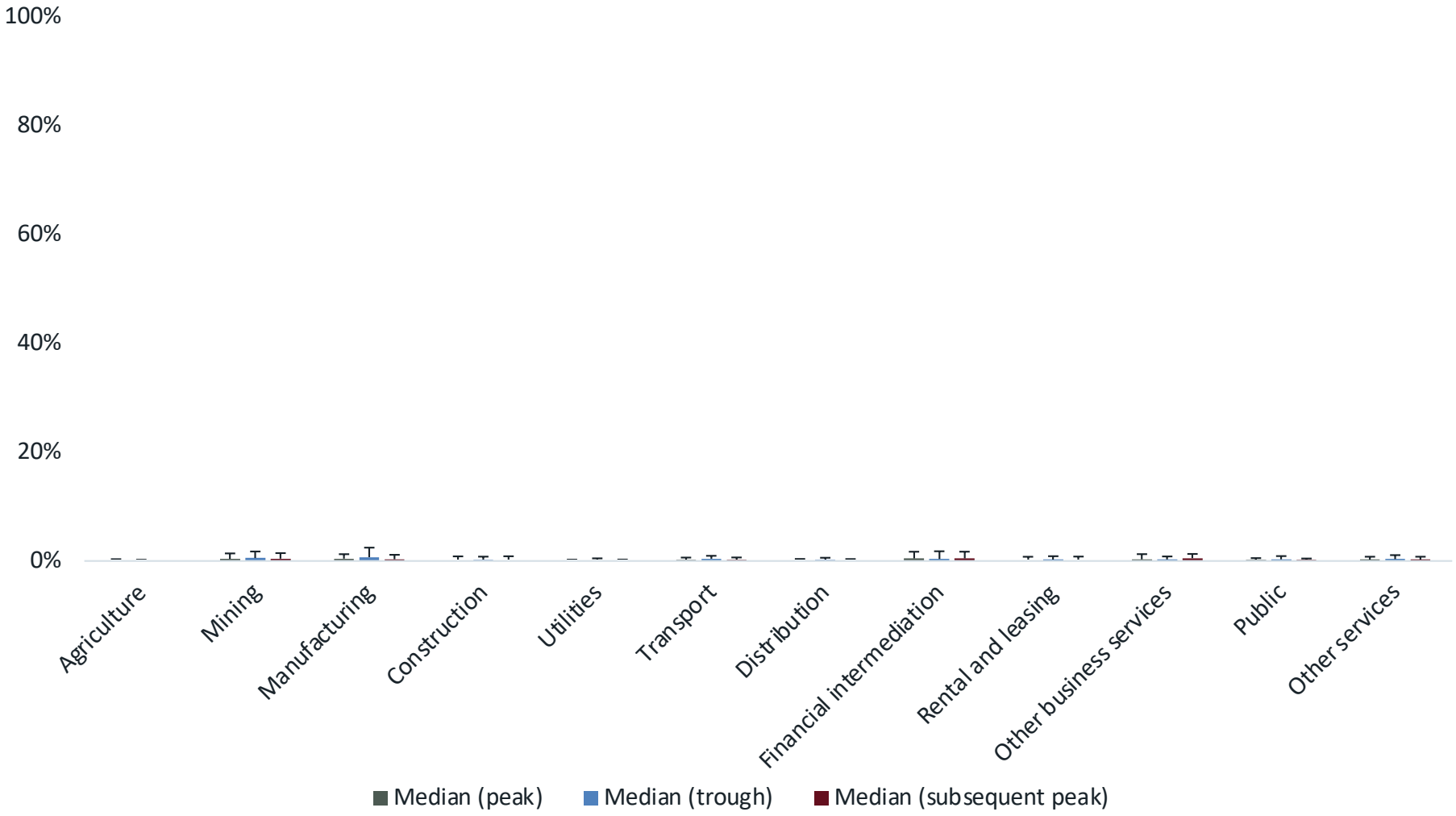
Sources: NBER, BLS, author's calculations

Median and maximum deviation from long-run trend share of employment by industry sector, 1947-2023



Sources: NBER, BLS, author's calculations

Median and maximum deviation from long-run trend share of gross value added by industry, 1920-2009



Back-up

Sources: BOE, Broadberry et al (2023), author's calculations

Effect of trend deviation at peak on trend deviation at trough by major sector, 1700-1870

	Agriculture	Industry	Services
Effect of trend deviation at expansion peak on trend deviation at recession trough	0.42***	-0.22	0.23
(Standard error)	(0.15)	(0.14)	(0.15)
Number of observations	45	45	45
R-squared	0.06	0.05	0.02

Notes: This table reports the results of regressing the deviation from trend at the trough of a recession on the deviation from trend at the peak of the preceding expansion, with robust standard errors. *** p < 0.01, ** p < 0.05, * p < 0.10.

Sources: BOE, Broadberry et al (2023), author's calculations

Effect of trend deviation at peak on trend deviation at trough by major industry, 1700-1870

	Metals and mining	Textiles and leather	Other industry	Trade and transport	Financial services	Domestic services
Effect of trend deviation at expansion peak on trend deviation at recession trough	0.12	-0.55***	0.16	-0.16	0.23	0.77***
(Standard error)	(0.23)	(0.10)	(0.13)	(0.12)	(0.17)	(0.23)
Number of observations	45	45	45	45	45	45
R-squared	0.01	0.37	0.03	0.04	0.06	0.50

Notes: This table reports the results of regressing the deviation from trend at the trough of a recession on the deviation from trend at the peak of the preceding expansion, with robust standard errors. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Back-up

Sources: BOE, Broadberry et al (2023), author's calculations

Are U.S. and U.K. recessions correlated?

	1700-1863	1864-1933	1934-present	Overall
*Quarterly (1854-2023)**				
Recession start	-0.06	0.03	0.08	0.05
In recession	0.31	0.23	0.32	0.29
Annual				
Recession start	0.32	0.28	0.48	0.20
In recession	0.14	0.35	0.48	0.27

* Note that quarterly recession indicators for the United States are only available in the NBER and Romer series; Davis indicators are only available at annual frequency.

Back-up

Sources: NBER, Romer (1994), Davis (2006), Broadberry et al (2023), author's calculations

Are U.S. and U.K. recessions correlated?

	1700-1863	1864-1933	1934-present	Overall
*Quarterly (1854-2023)**				
Coincident	0	1	1	2
U.S. leads	2	5	1	8
U.K. leads	0	2	4	6
U.S. only	0	10	9	19
U.K. only	0	1	0	1
Annual				
Coincident	17	5	5	27
U.S. leads	9	1	0	10
U.K. leads	4	2	1	7
U.S. only	6	9	9	24
U.K. only	15	1	0	16

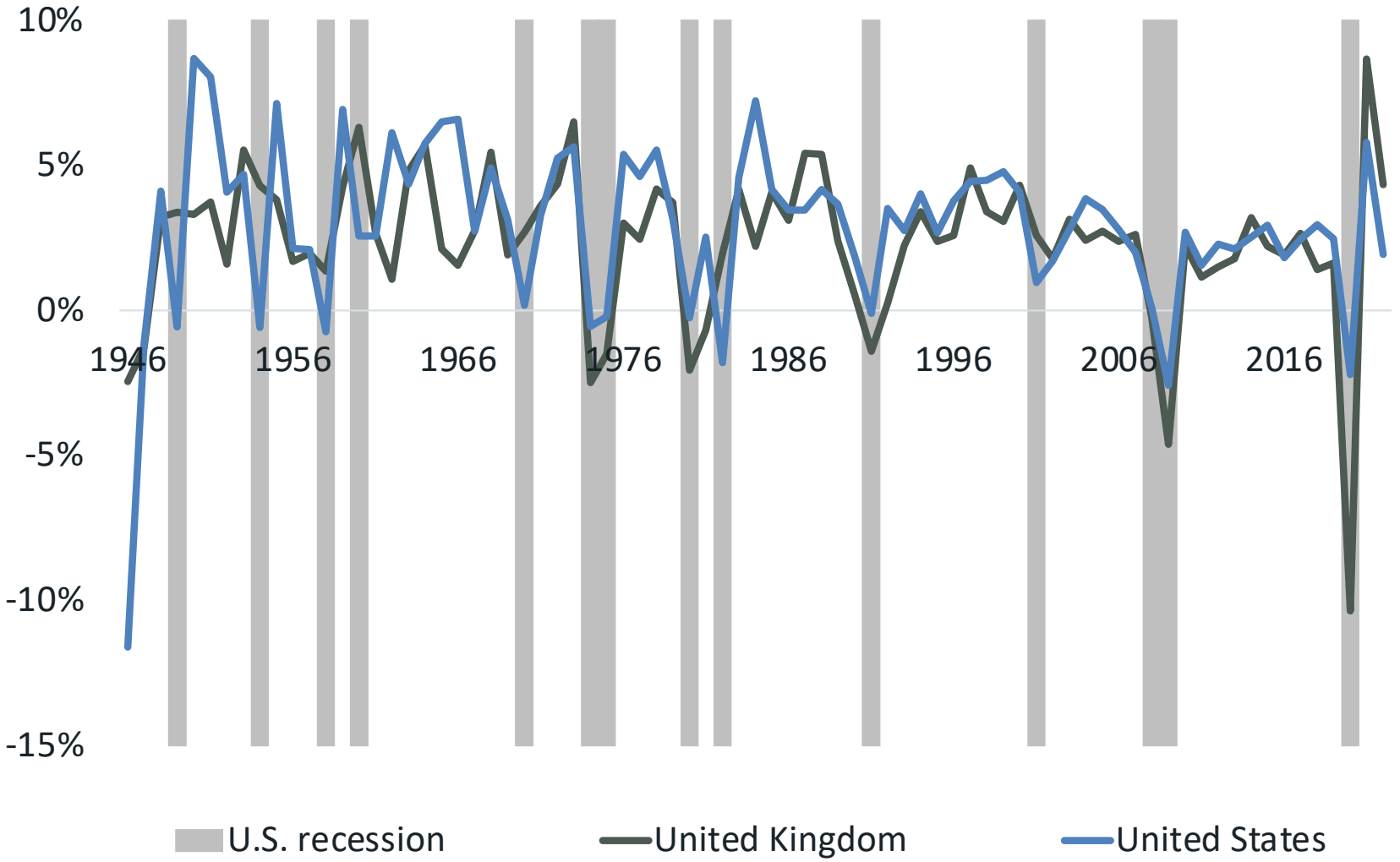
* Note that quarterly recession indicators for the United States are only available in the NBER and Romer series; Davis indicators are only available at annual frequency.

Back-up

Sources: NBER, Romer (1994), Davis (2006), Broadberry et al (2023), author's calculations

Back-up

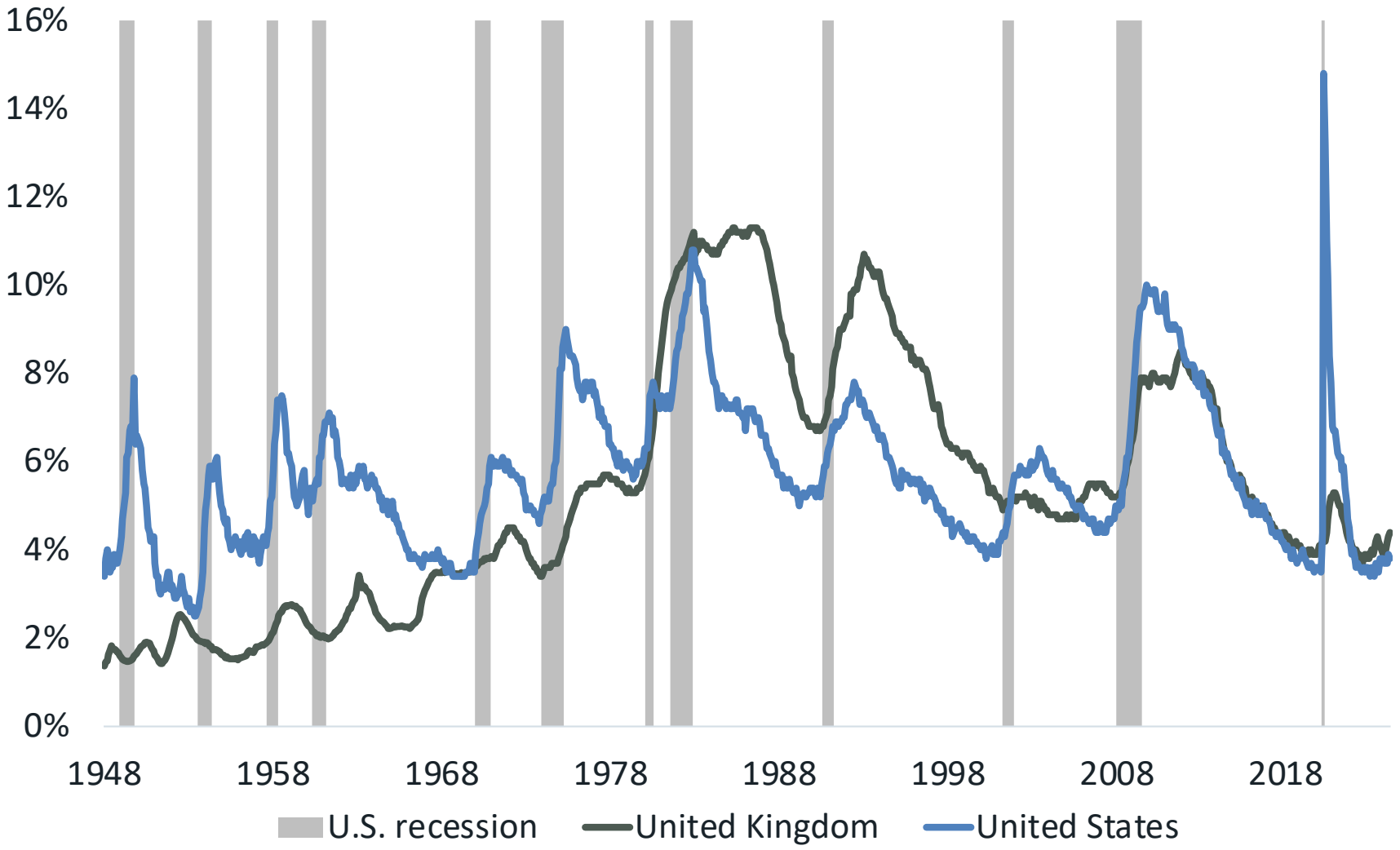
Year-over-year real GDP growth



Sources: NBER, BEA, ONS, Broadberry et al (2023), author's calculations

Return

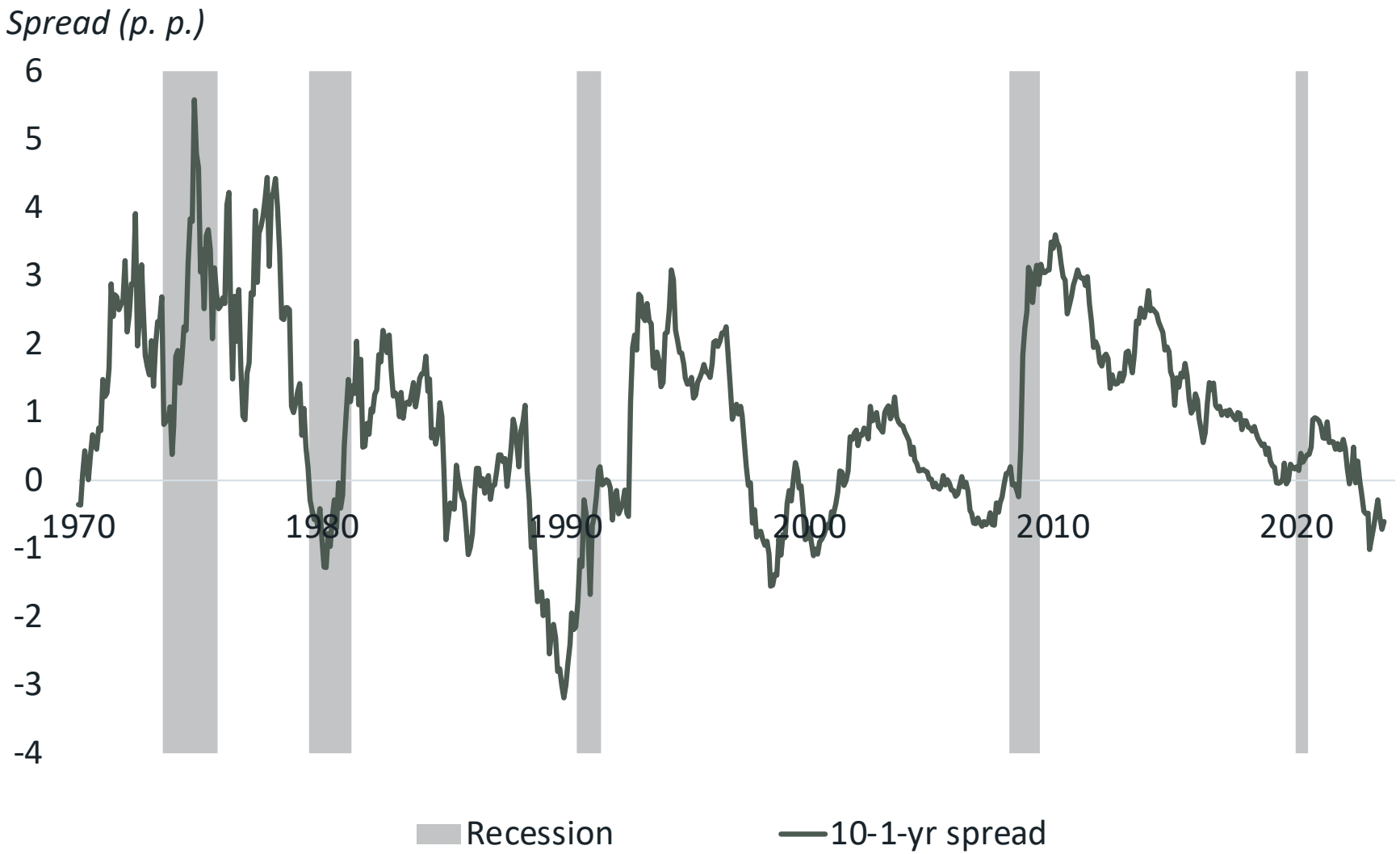
Civilian unemployment rate



Sources: NBER, BEA, ONS, Broadberry et al (2023), author's calculations

Return

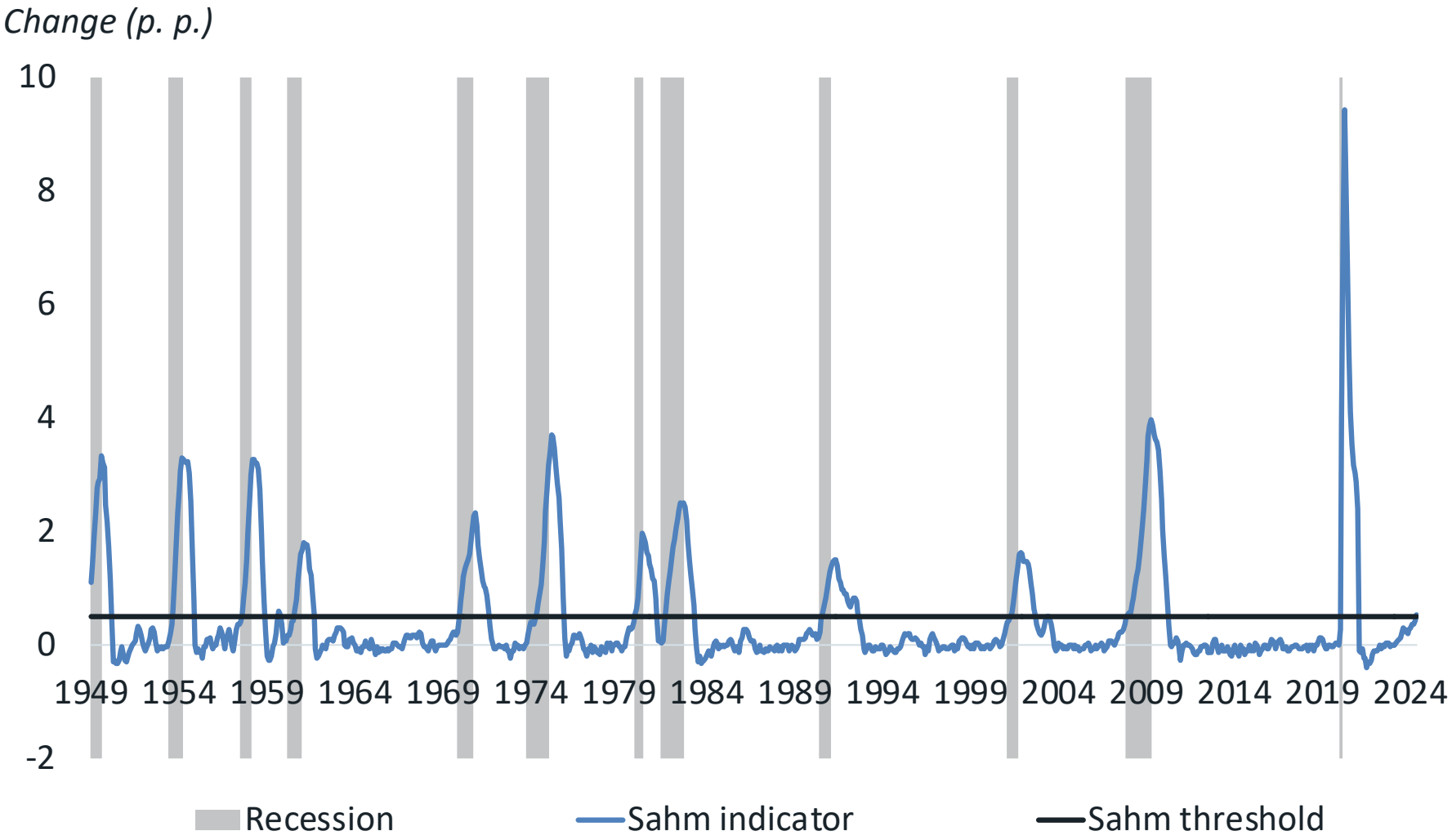
Yield curve spread in the United Kingdom, 1970-2023



Sources: BOE, Broadberry et al. (2023), author's calculations

Return

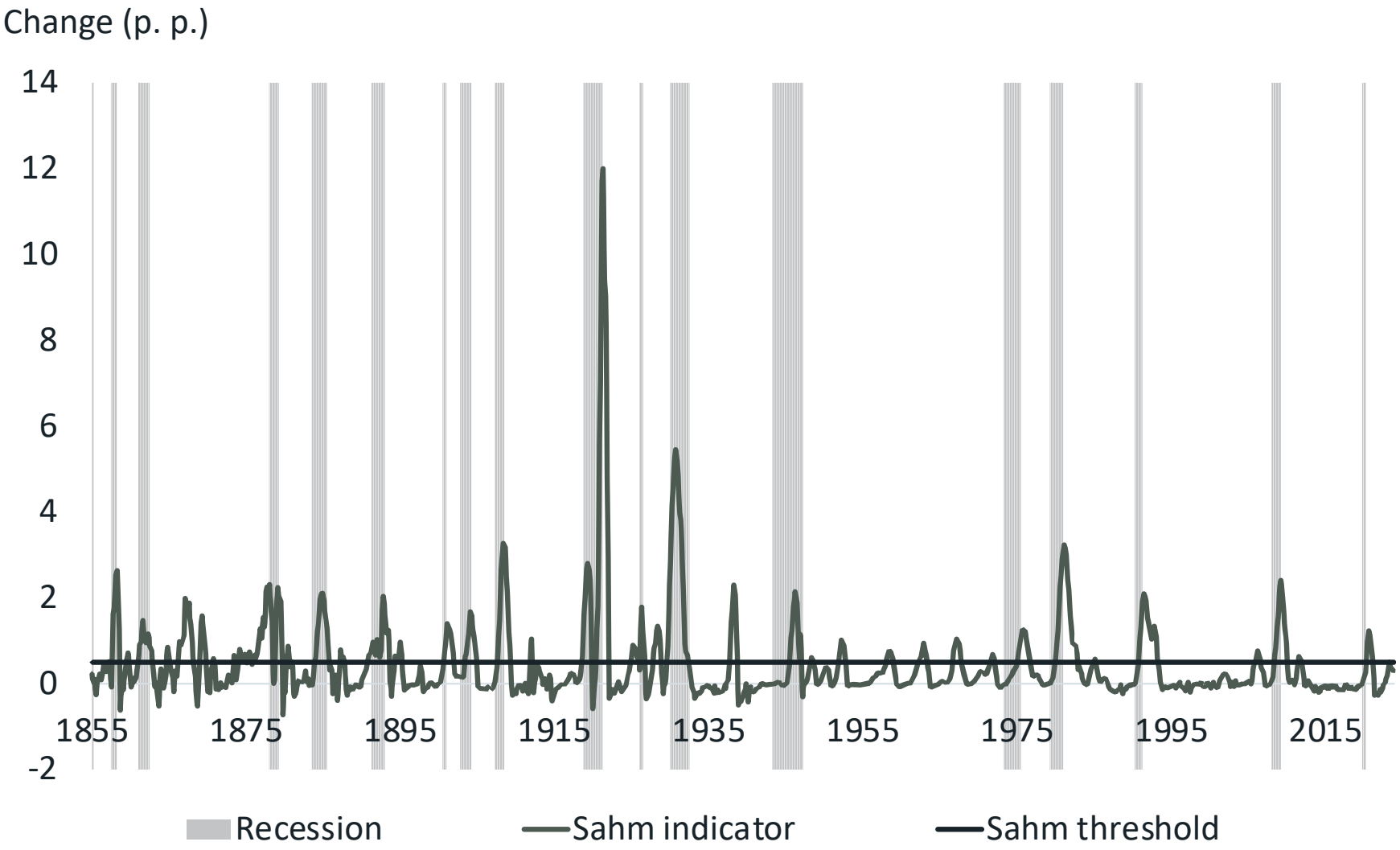
Sahm recession indicator for the United States, 1949-2024



Sources: FRB, Haver Analytics, NBER, author's calculations

Return

Sahm recession indicator for the United Kingdom, 1855-2024



Sources: OECD, FRED, BOE, Broadberry et al. (2023), author's calculations

Return

U.S.-U.K. macroeconomic correlations

Annual	1700-1863	1864-1933	1934-present	Overall
10-year government bond yield			0.85	0.85
GDP deflator	0.54	0.74	0.67	0.68
Nominal GDP	0.59	0.53	0.53	0.54
Employment		0.45	0.45	0.45
Bank lending		0.43	0.44	0.45
Long-term government bond yield	0.33	0.17	0.53	0.44
Industrial production	0.32	0.41	0.59	0.42
Stock market	0.40	0.05	0.56	0.35
Real estate lending		-0.02	0.50	0.33
Commercial paper rate	0.41	0.47	0.26	0.33
Consumer price inflation	0.18	0.65	0.64	0.33
Real GDP	0.38	0.21	0.51	0.33
Unemployment rate		0.19	0.54	0.31
Broad money supply	0.15	0.30	0.44	0.29
Wages	0.08	0.73	0.31	0.28
Monetary base	0.24	0.32	0.16	0.20
Corporate bond yield		0.15	0.13	0.12
Real consumption expenditure	-0.32	0.01	0.47	0.12
Banks	-0.01	0.02	0.03	0.03

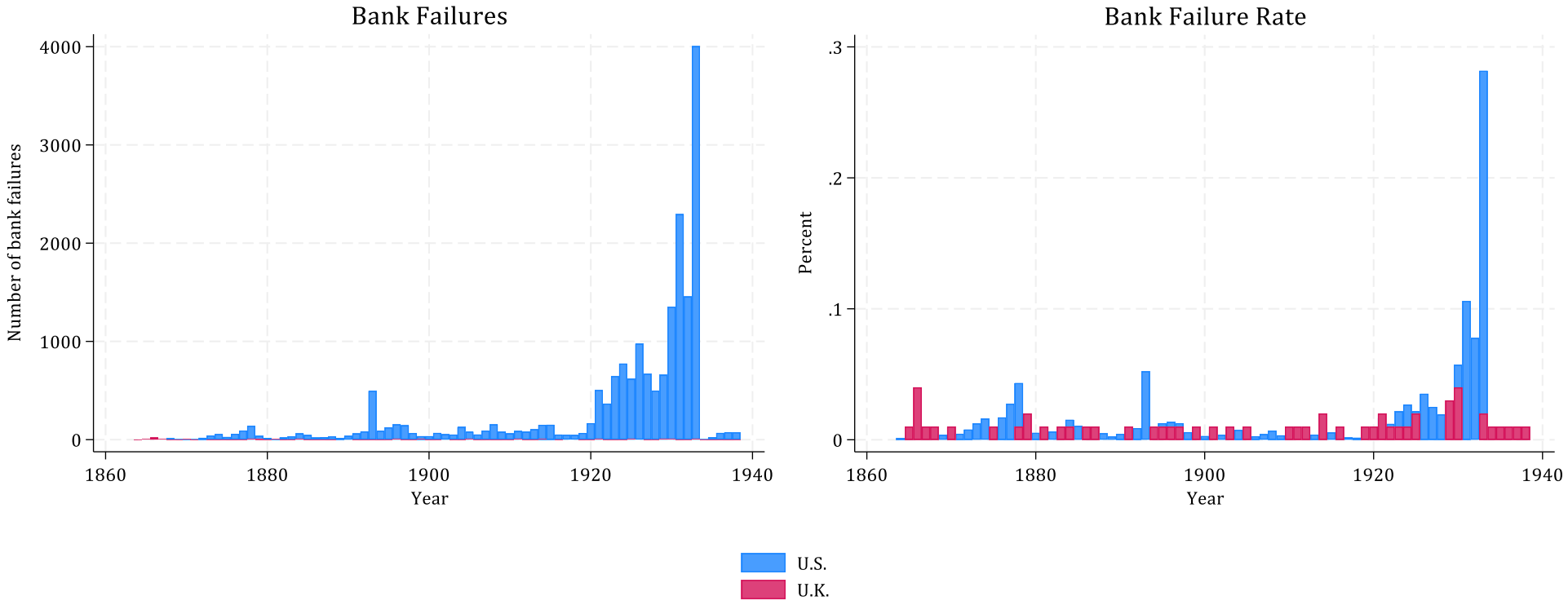
Return

U.S.-U.K. macroeconomic correlations (quarterly)

Quarterly	1875-1933	1934-present	Overall
10-year government bond yield		0.78	0.78
Nominal GDP		0.64	0.64
Consumer price inflation	0.47	0.48	0.60
GDP deflator		0.58	0.58
Long-term government bond yield	0.34	0.48	0.47
Stock market	0.35	0.59	0.45
Real GDP	0.16	0.42	0.33
Broad money supply	0.19	0.35	0.29
Commercial paper rate	0.37	0.19	0.27
M1 money supply	0.27	0.27	0.27
Unemployment rate	0.49	0.34	0.26
Industrial production	0.15	0.33	0.19
Monetary base	0.17	0.05	0.11
Corporate bond yield		-0.01	-0.01
Employment		-0.02	-0.02

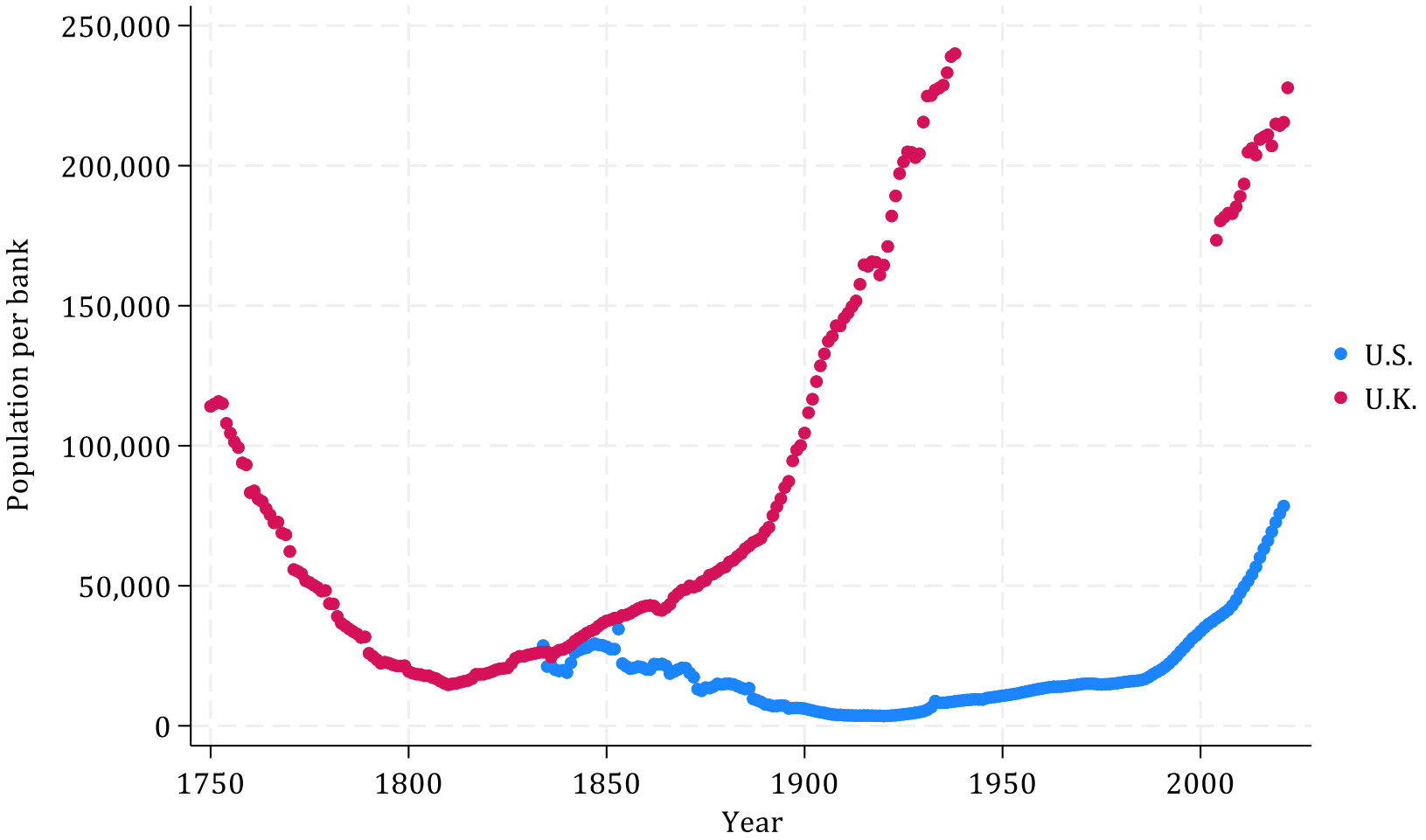
Return

U.S. and U.K. bank failures and failure rates



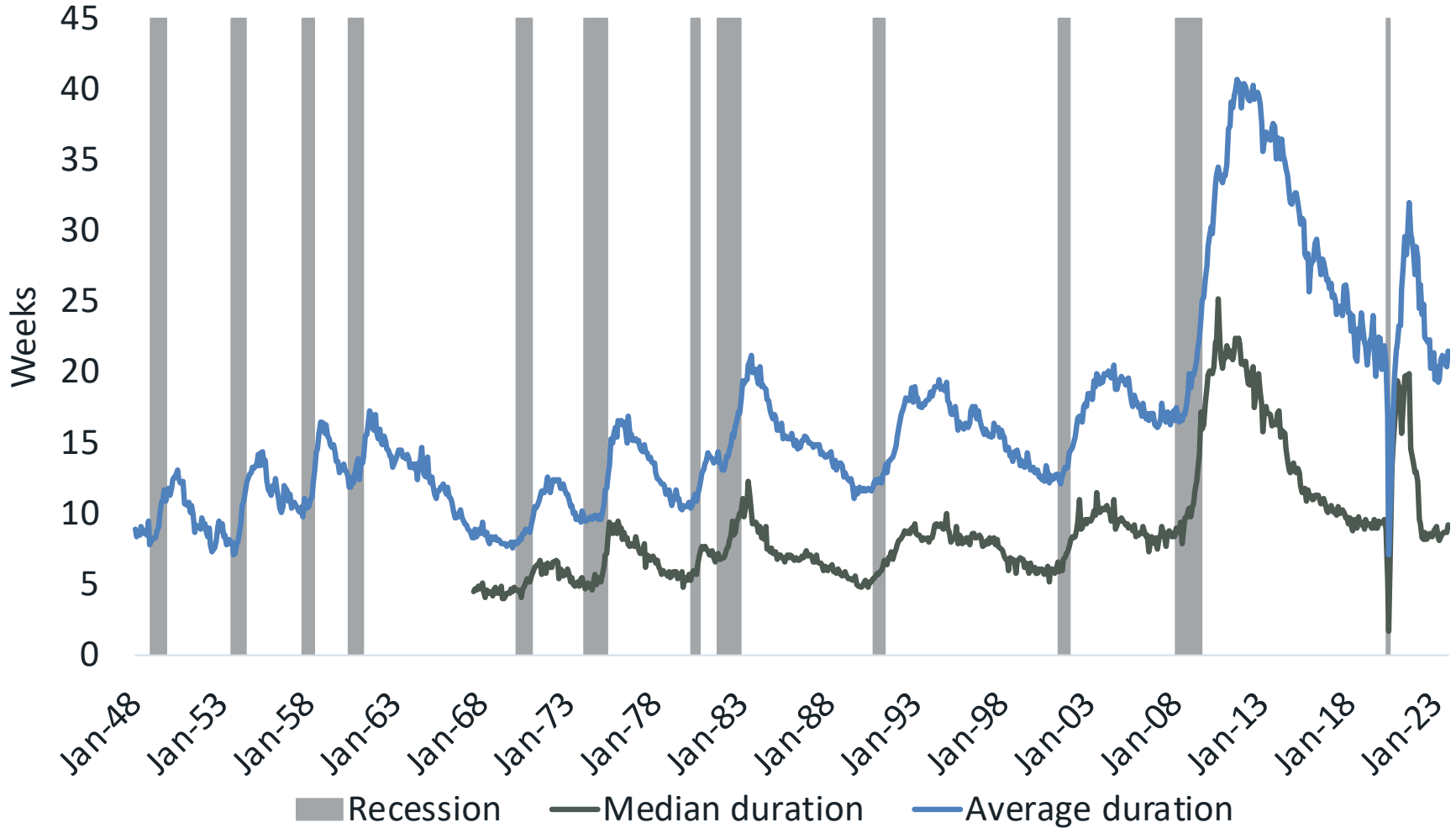
Return

Population per bank



Return

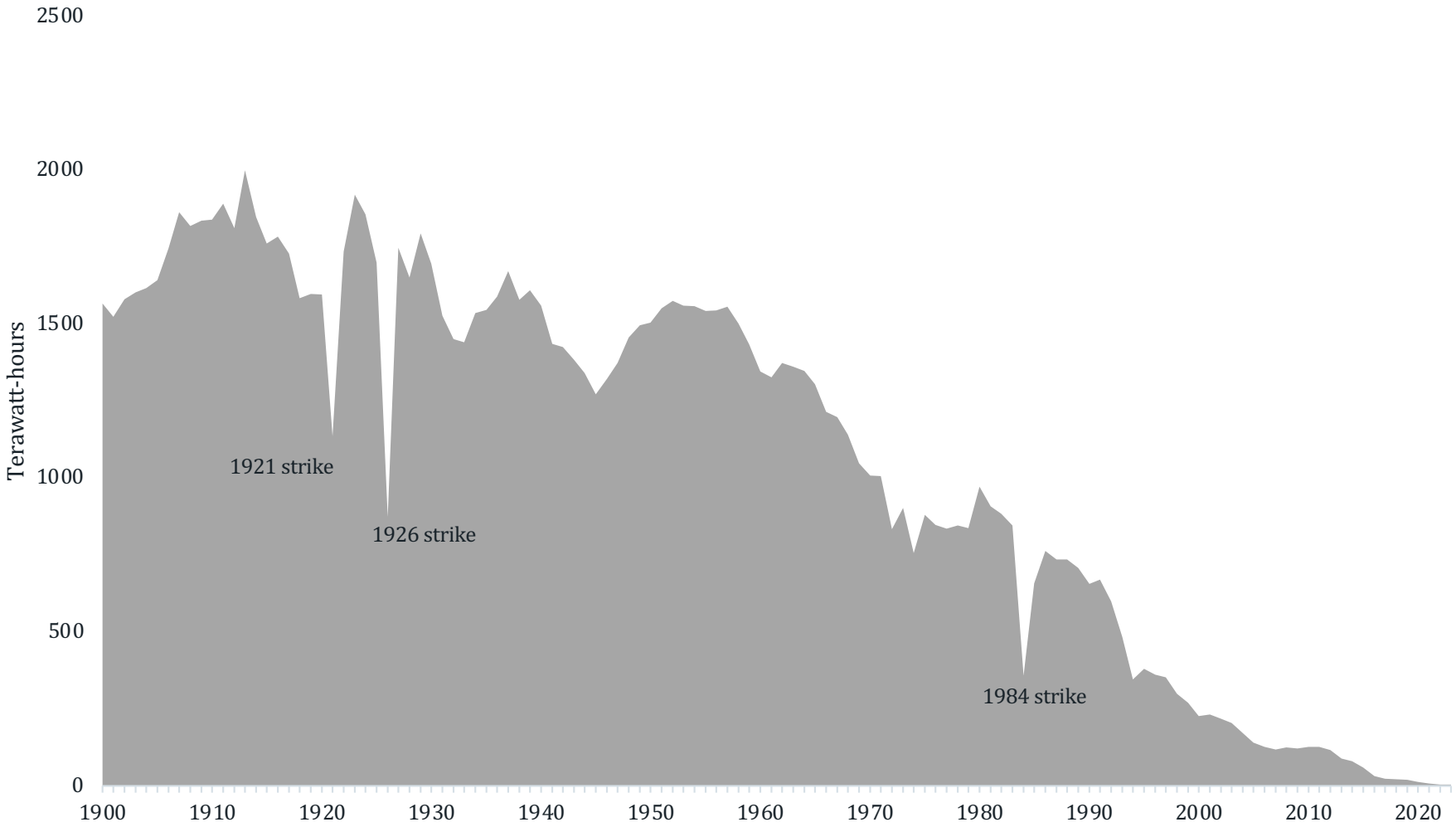
Duration of unemployment



Sources: NBER, BLS, author's calculations

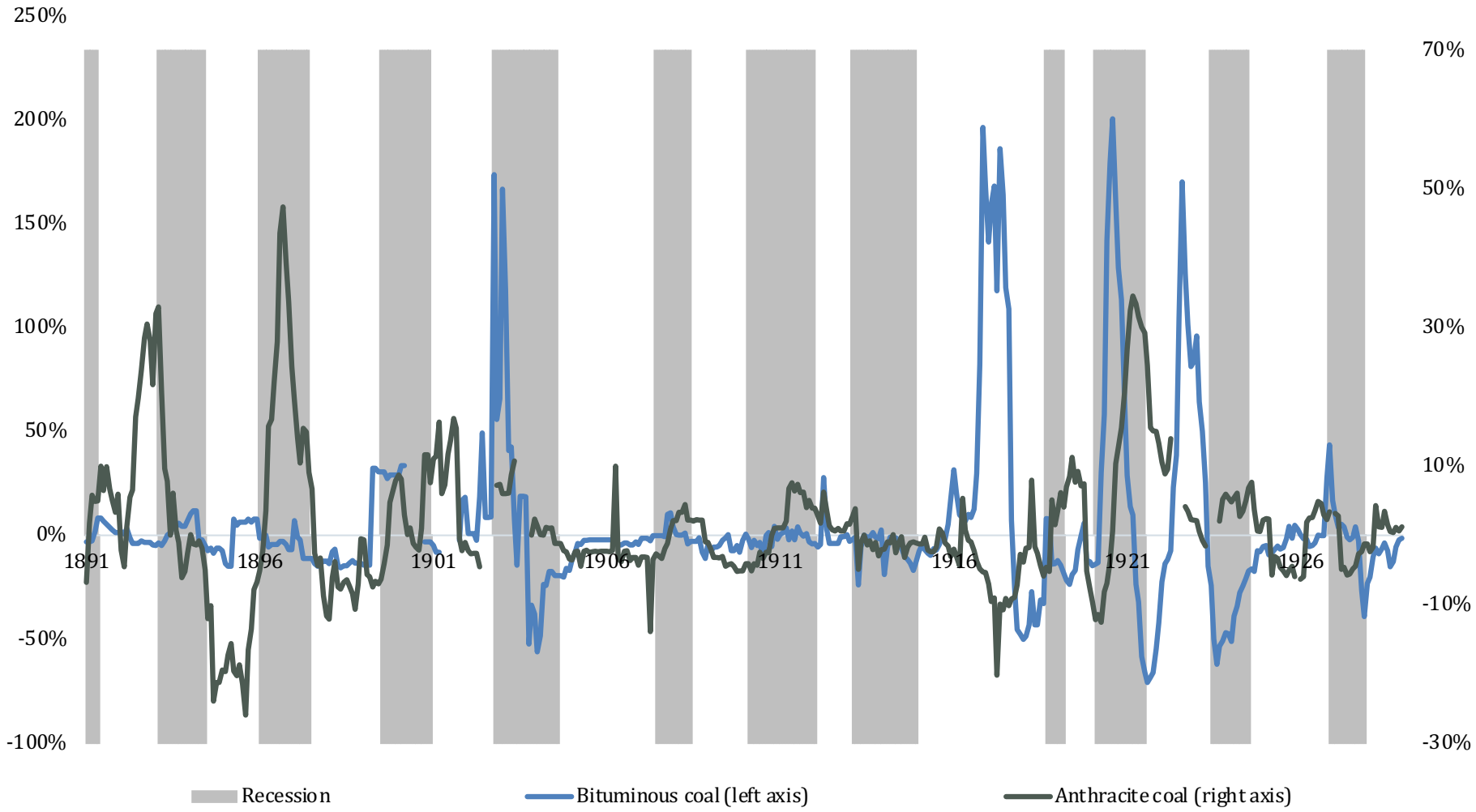
Return

U.K. coal production



Sources: OWID, author's calculations

Real coal price (percent change)

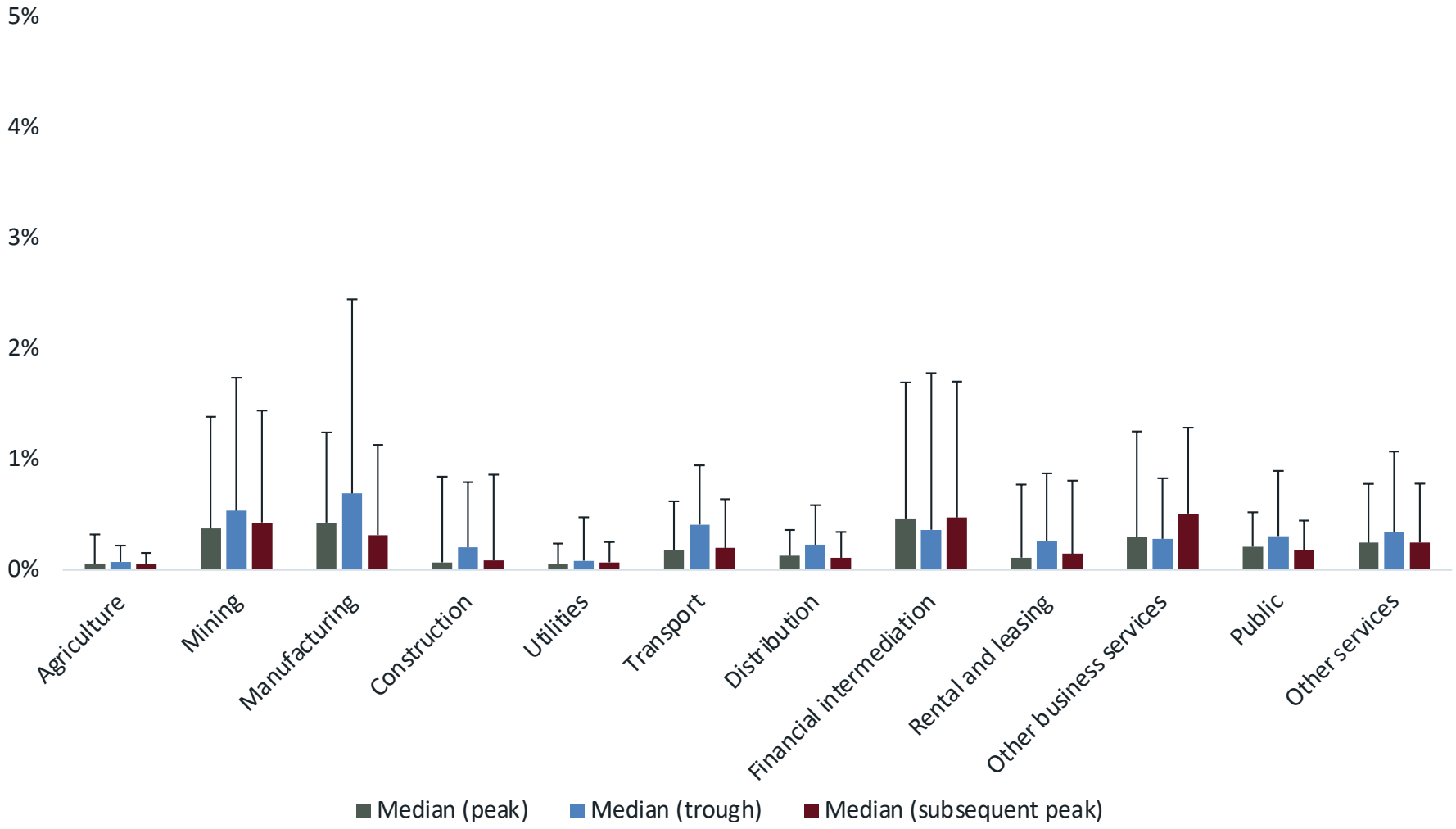


Sources: NBER, FRED, author's calculations

Real WTI crude oil price

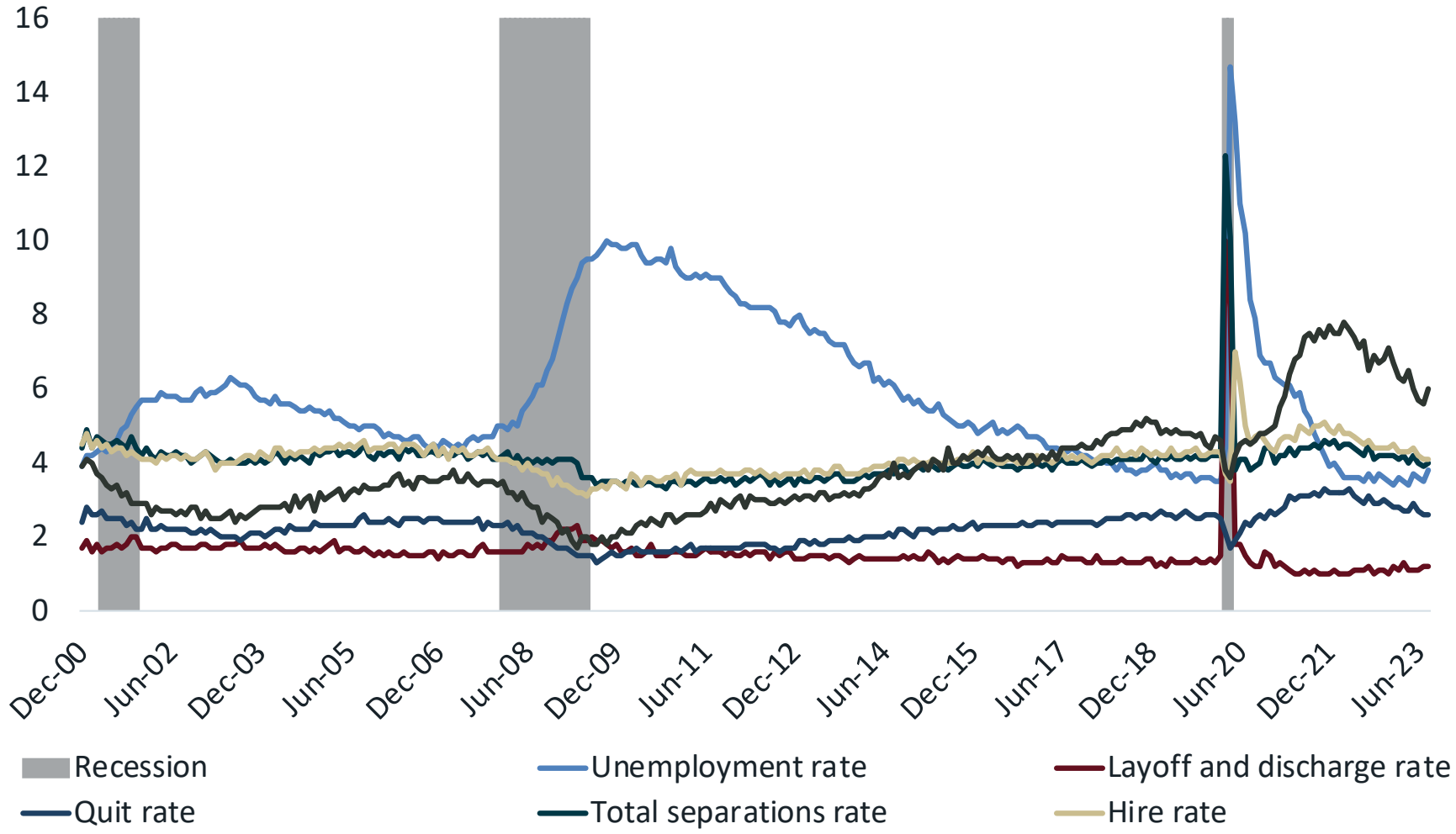
Sources: NBER, FRED, author's calculations

Median and maximum deviation from long-run trend share of gross value added by industry, 1920-2009



Sources: BOE, Broadberry et al (2023), author's calculations

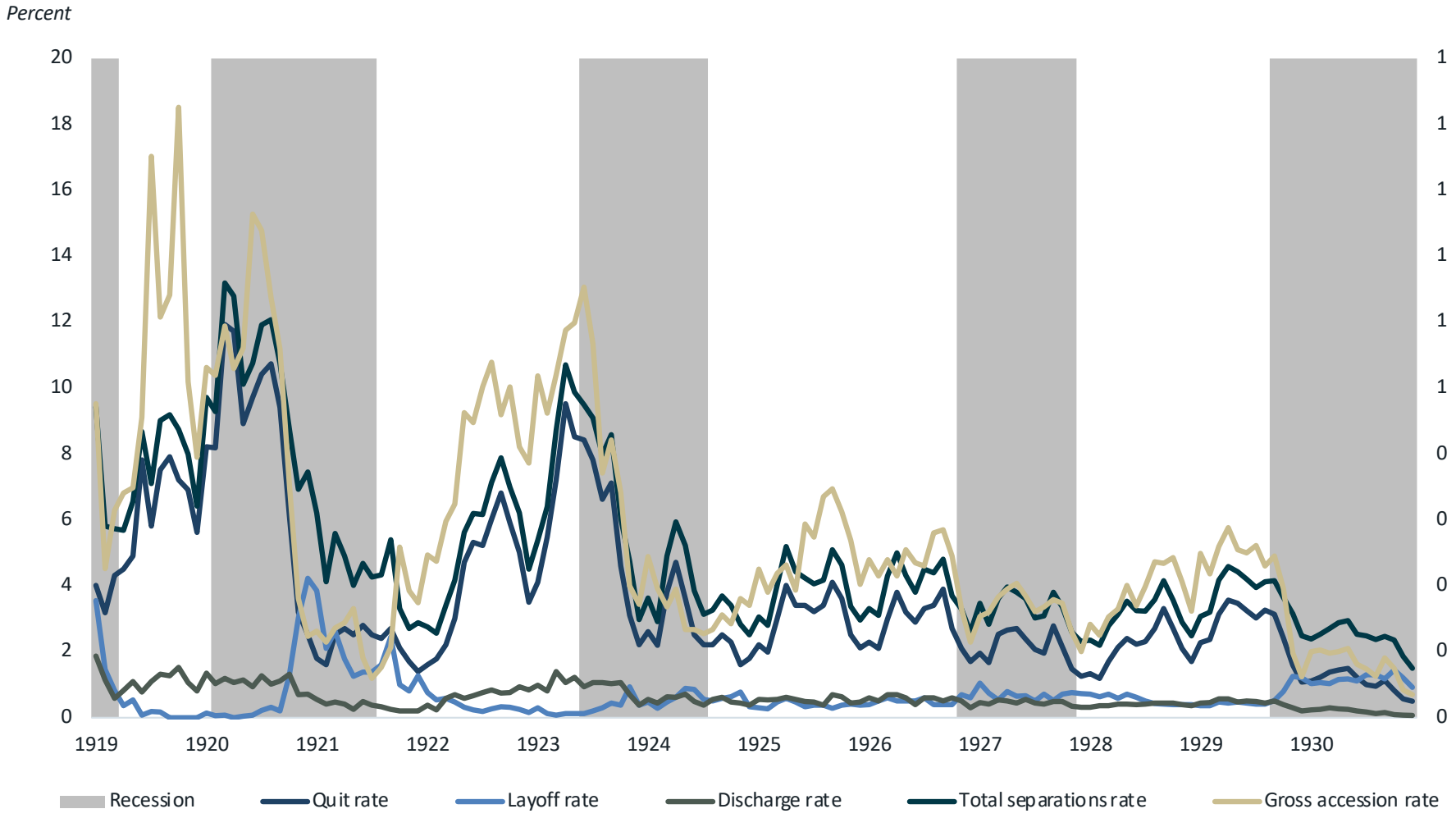
Unemployment, job separation, and job opening and hire rates, 2000-2023



Sources: NBER, BLS, author's calculations

Return

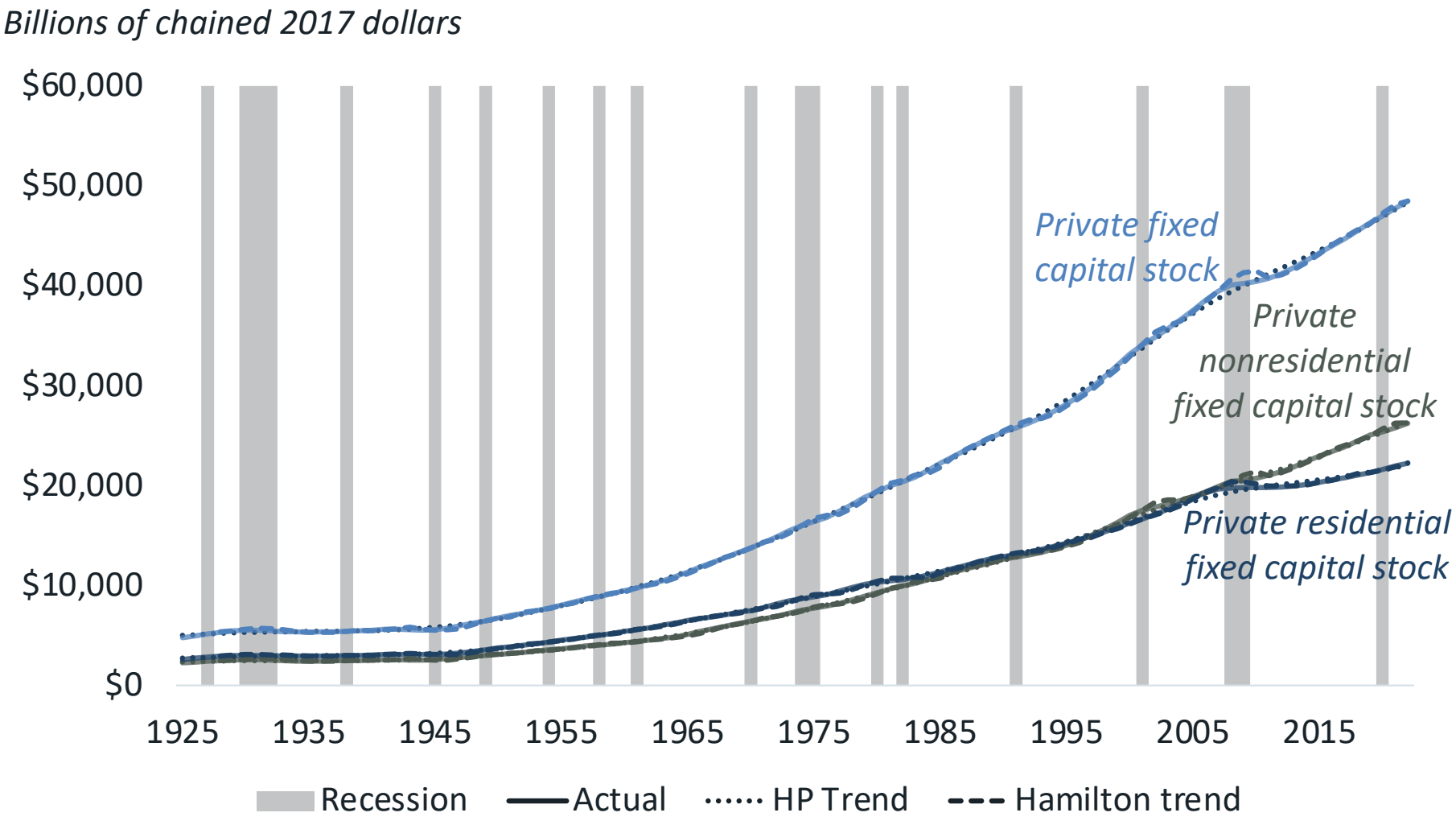
Job separation and accession rates for manufacturing workers, 1919-1930



Sources: NBER, author's calculations

Return

Plucking (structures)



Sources: NBER, BEA, author's calculations