Why Has the Unemployment Rate Fared Better than GDP Growth?

Answer: Between 2007 and 2014, GDP growth was held back by shortfalls of

- 4.4 percent in productivity
- 4.0 percent in capital input
- 3.6 percent in labor-force participation
- 2.2 percent in growth of the working-age population

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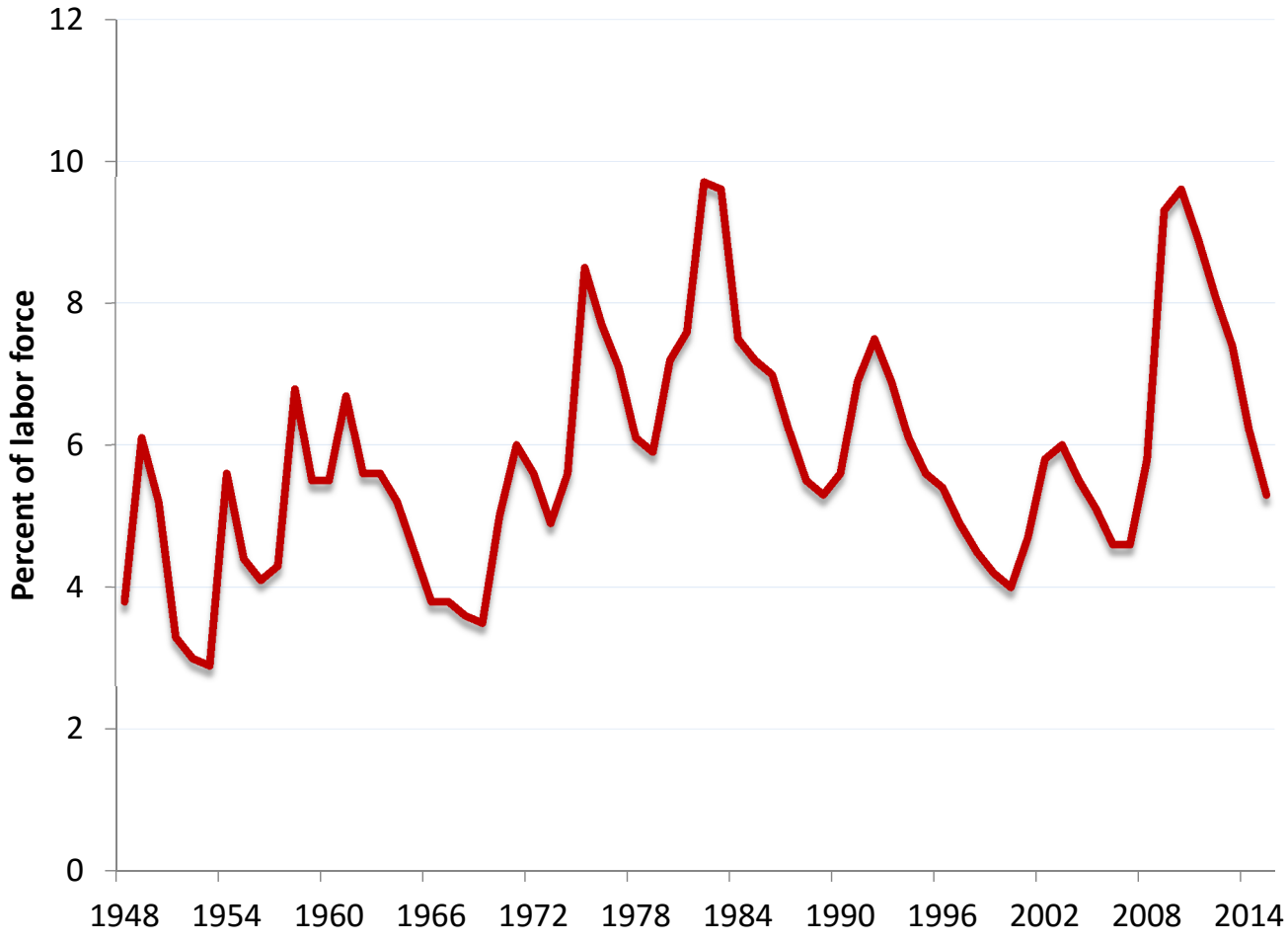
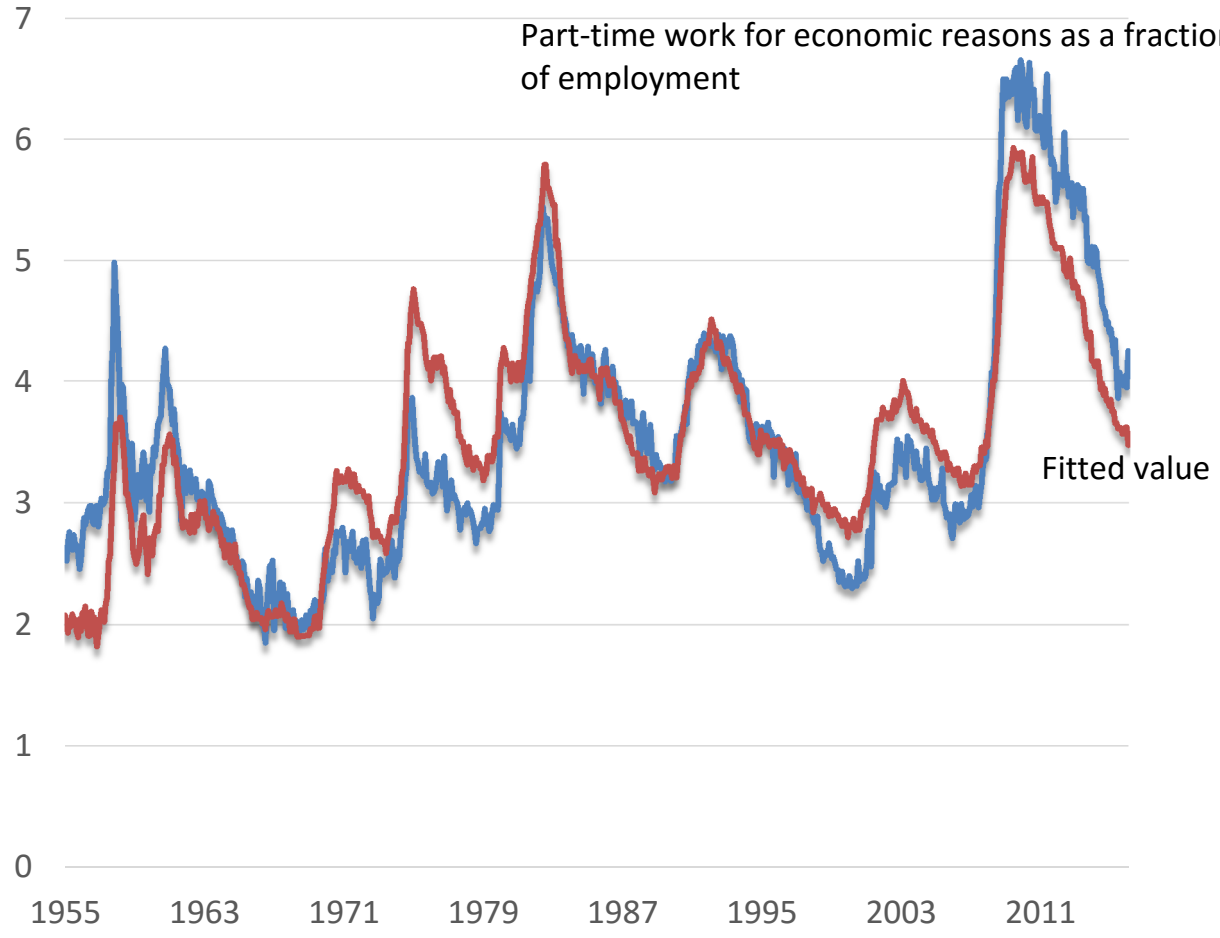
Unemployment Rate



Fraction of Employed People on Part Time for Economic Reasons, with Fitted Value from a Regression on Unemployment



Okun's law econometrics

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But actually: $\mathbb{E}\left[\Delta \log y | \Delta u\right] = -\frac{R^2}{0.30}\ \Delta u = -2.1\ \Delta u$

.

Sources of growth

$$\Delta \text{ log private output} = \Delta \text{ log total factor productivity} + \text{capital share} \times \Delta \text{ log capital input} + \text{labor share} \times \Delta \text{ log labor input}$$

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Hours of work

$$\textbf{log labor input} = \textbf{log private hours} + \textbf{log labor quality}$$

I use data for the total economy to break down private hours, so I make use of the identity

$$\textbf{log private hours} = \textbf{log} \frac{\textbf{private hours}}{\textbf{total hours}} + \textbf{log total hours}$$

Then to focus on the role of hours per worker, I use the identity,

$$\textbf{log total hours} = \textbf{log} \frac{\textbf{total hours}}{\textbf{employment}} + \textbf{log employment}$$

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Unemployment and participation

The direct effect of unemployment operates through the employment rate, which is 1 – the unemployment rate:

$$\textbf{log employment} = \textbf{log } \frac{\textbf{employment}}{\textbf{labor force}} + \textbf{log labor force}$$

Labor-force participation enters via the identity

$$\textbf{log labor force} = \textbf{log } \frac{\textbf{labor force}}{\textbf{population} \geq \textbf{16}} + \textbf{log } \textbf{population} \geq \textbf{16}$$

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Decomposition of output growth

Rate of growth of output = the sum of

- **the rate of growth of total factor productivity**
- **the capital share $\times$ the rate of growth of the capital stock**

plus the labor share $\times$ the sum of the rates of growth of

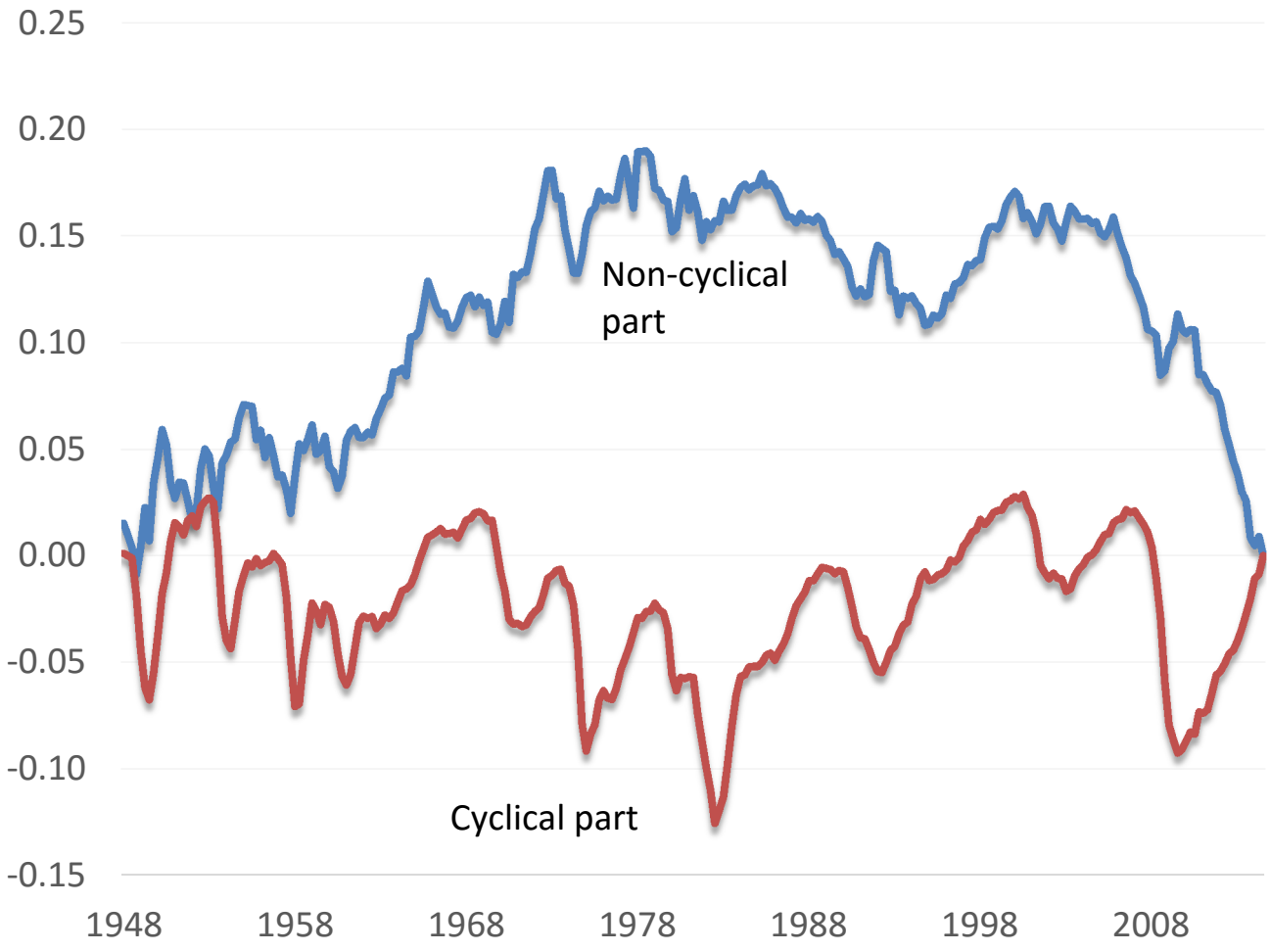
- **the number of people 16 and over**
- **the fraction of people 16 and over participating in the labor force**
- **the fraction of those in the labor force who are employed**
- **the average number of hours per worker in the total economy**
- **the fraction of hours in the total economy that are in the private economy**
- **the quality index of workers**

Regression Results for Real GDP and Its Components

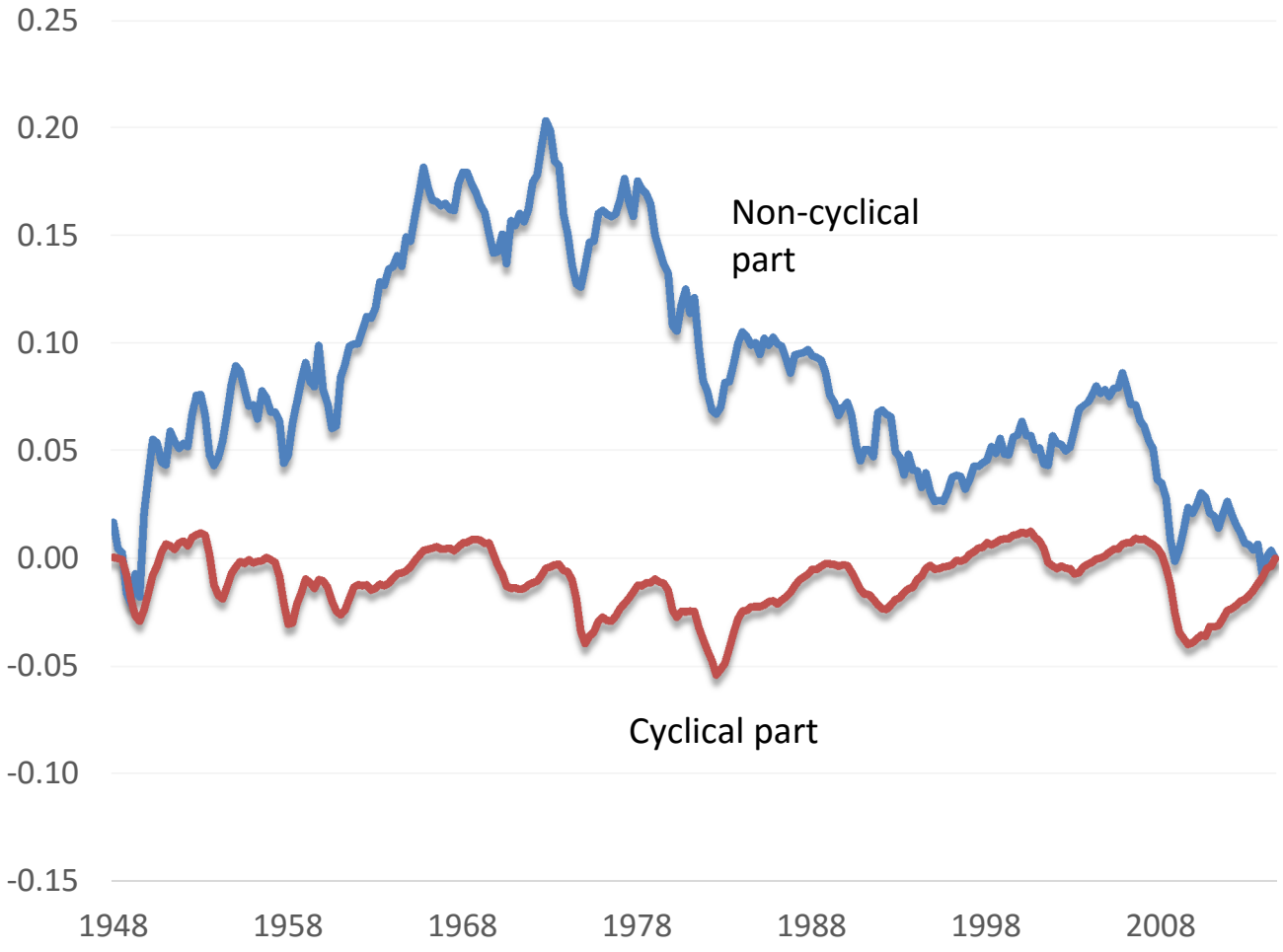
Line	*Component*	*Regression coefficient on unemployment rate*	*Standard error*	*Cyclical standard deviation*	*Non-cyclical standard deviation*
1	Private real GDP	-2.125	(0.128)	3.33	3.26
2	Total factor productivity	-0.911	(0.124)	1.43	3.15
3	Capital input	-0.032	(0.015)	0.05	0.38
4	Population 16 and over	0.018	(0.017)	0.03	0.44
5	Labor-force participation rate	0.025	(0.033)	0.04	0.85
6	Employment rate	-0.722	(0.001)	1.13	0.03
7	Hours per worker	-0.516	(0.074)	0.81	1.89
8	Ratio of private to total hours of work	-0.051	(0.056)	0.08	1.43
9	Labor quality	0.063	(0.021)	0.10	0.52

Notes: Components are first-differences of logs. The unemployment rate

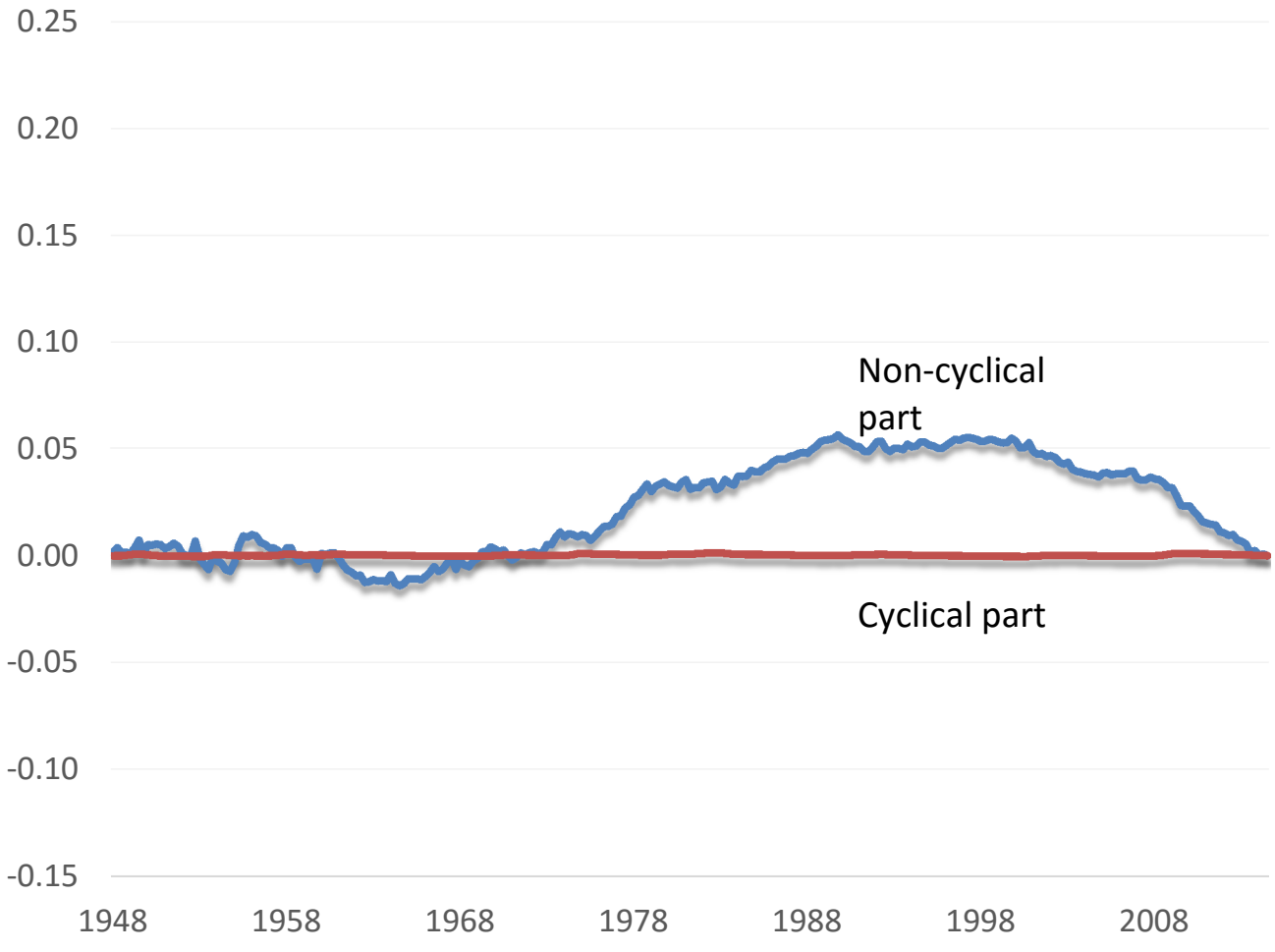
Real Private GDP, 2000 to 2014



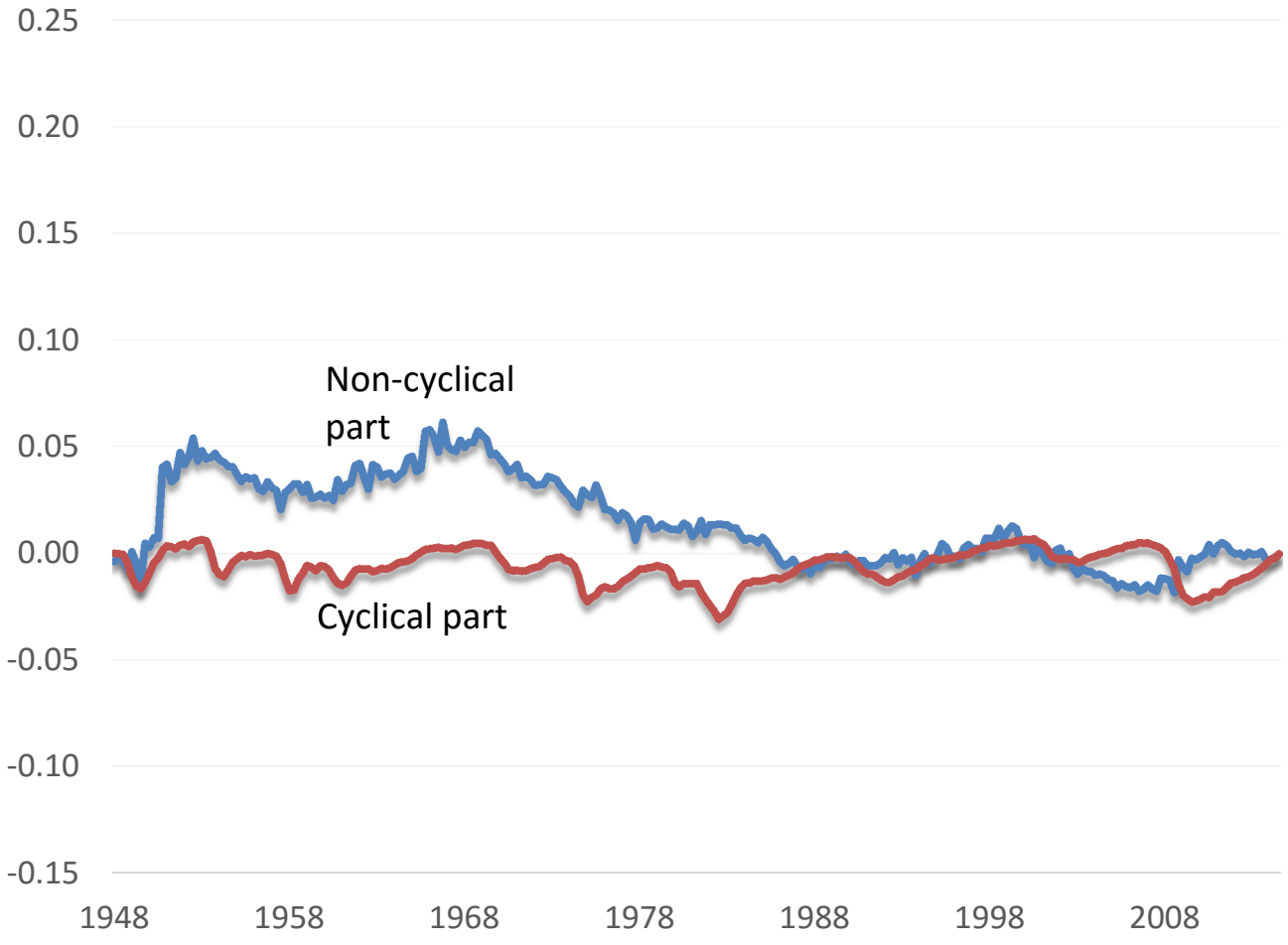
Total Factor Productivity, 2000 to 2014



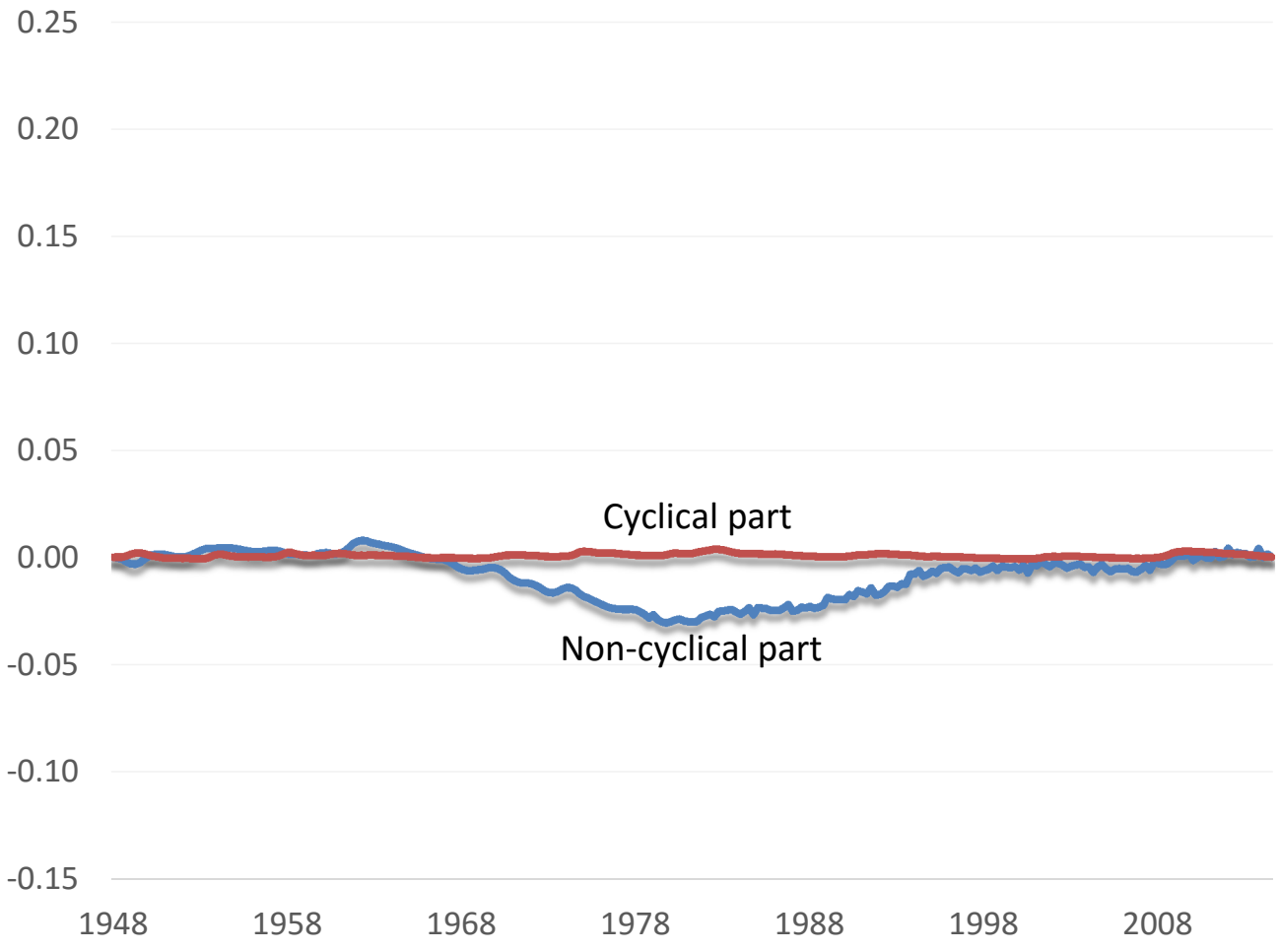
Labor-Force Participation Rate, 2000 to 2014



Hours per Worker, 2000 to 2014



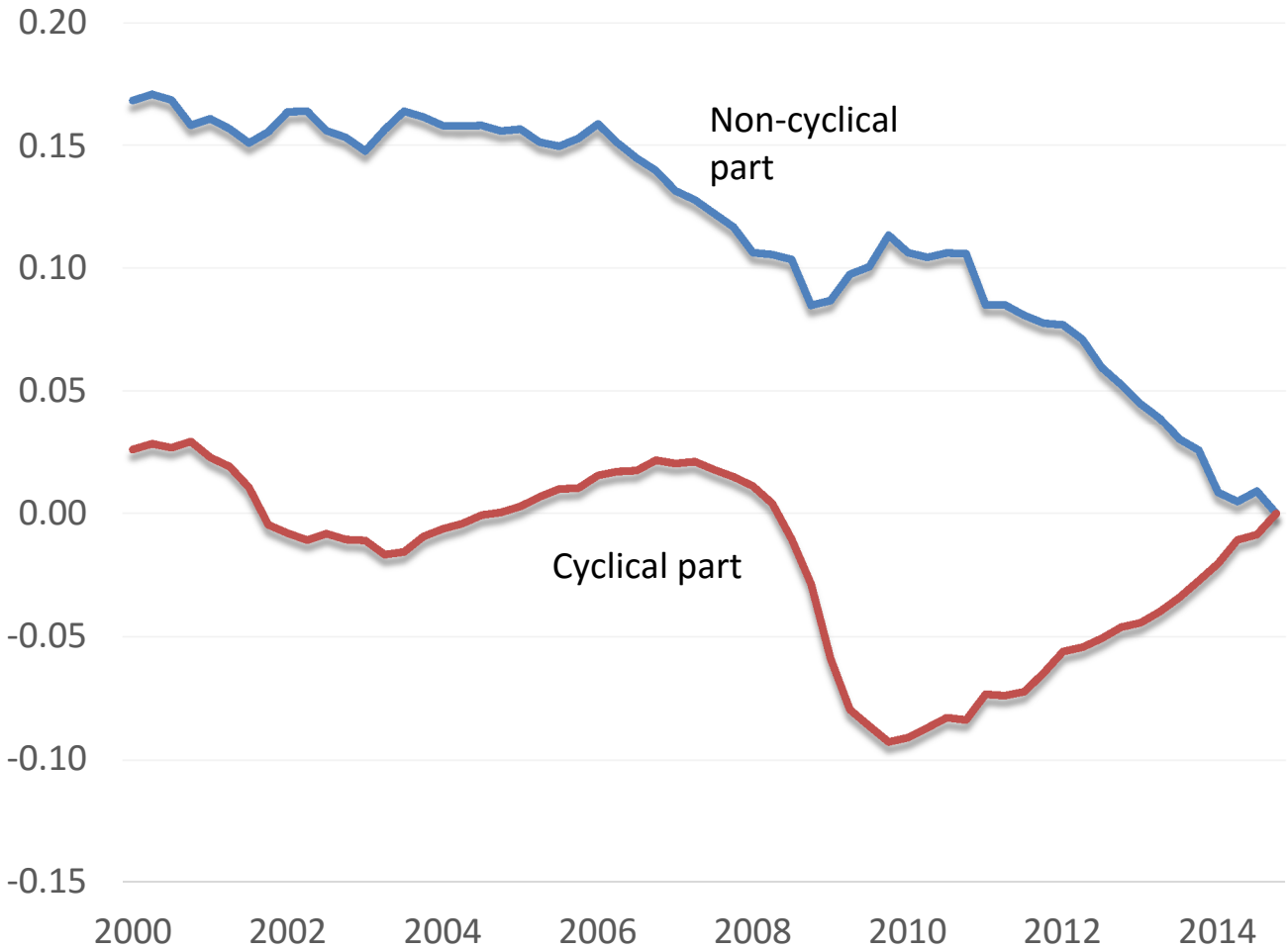
Cyclical and Non-Cyclical Parts of Labor Quality



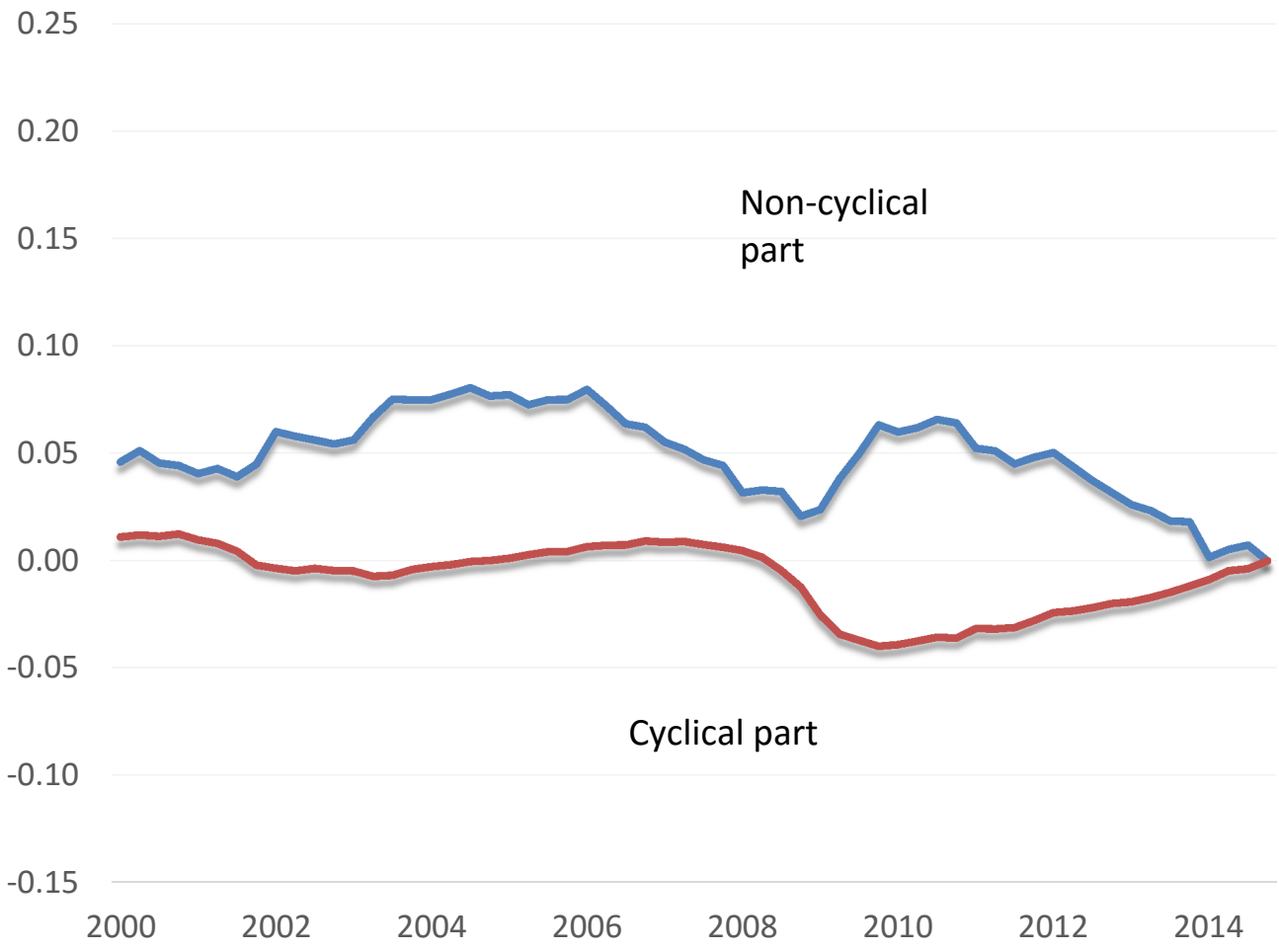
Results for Sub-Periods

		Full sample, 1948:2 to 2014:4		*Okun's sample, 1948:2 to 1960:4*		*Recent sample, 1984:1 to 2014:4*	
Line	*Component*	*Coeffi-cient*	*Standard error*	*Coeffi-cient*	*Standard error*	*Coeffi-cient*	*Standard error*
1	Private real GDP	-2.125	(0.128)	-2.175	(0.279)	-1.773	(0.191)
2	Total factor productivity	-0.911	(0.124)	-1.064	(0.252)	-0.474	(0.193)
3	Capital input	-0.032	(0.015)	-0.019	(0.017)	-0.105	(0.034)
4	Population 16 and over	0.018	(0.017)	0.025	(0.030)	-0.031	(0.031)
5	Labor-force participation rate	0.025	(0.033)	0.093	(0.078)	-0.056	(0.048)
6	Employment rate	-0.722	(0.001)	-0.718	(0.002)	-0.704	(0.002)
7	Hours per worker	-0.516	(0.074)	-0.741	(0.174)	-0.251	(0.103)
8	Ratio of private to total hours of work	-0.051	(0.056)	0.230	(0.147)	-0.343	(0.068)
9	Labor quality	0.063	(0.021)	0.019	(0.012)	0.192	(0.053)

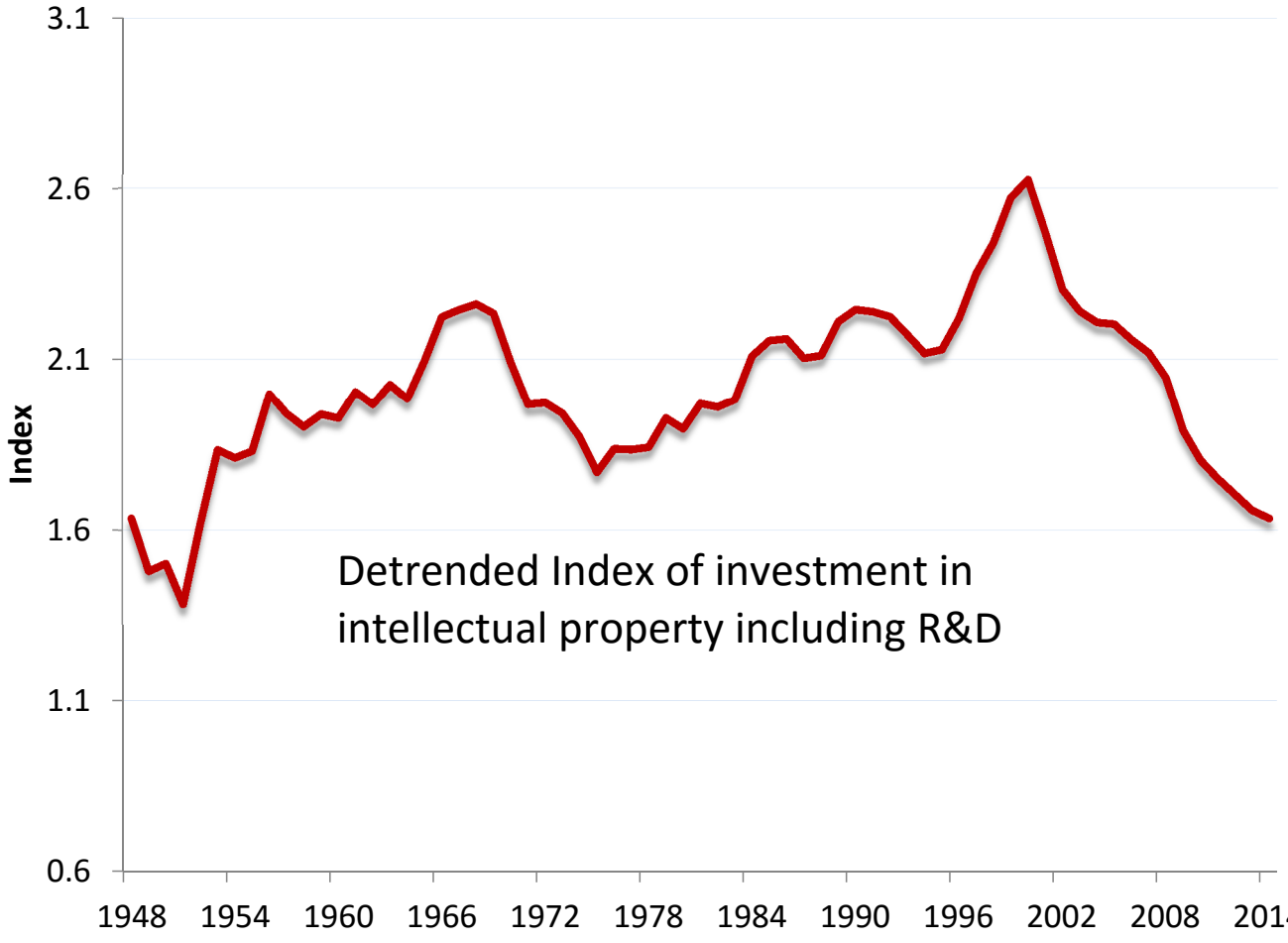
Real Private GDP, 2000 to 2014



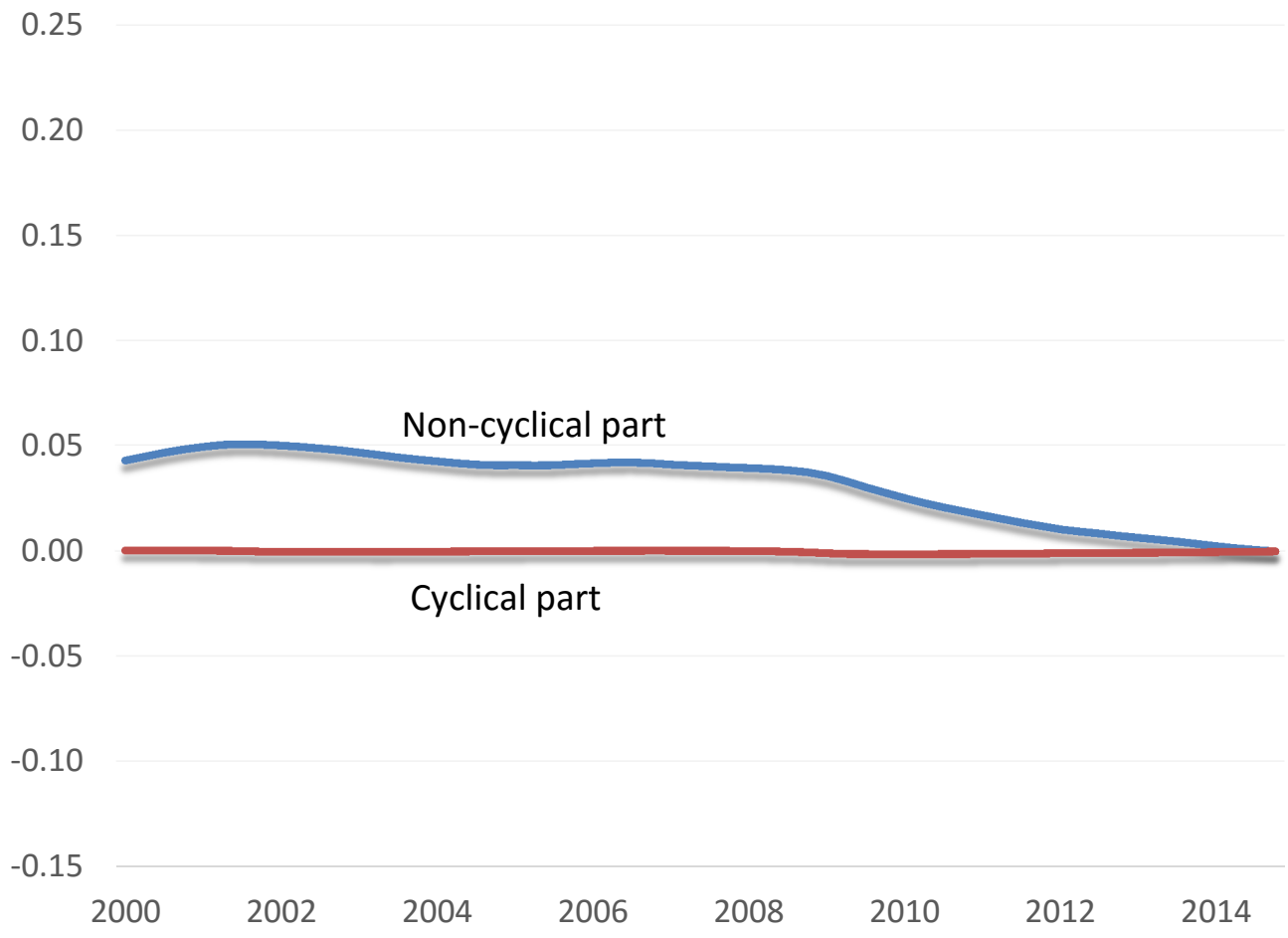
Total Factor Productivity, 2000 to 2014



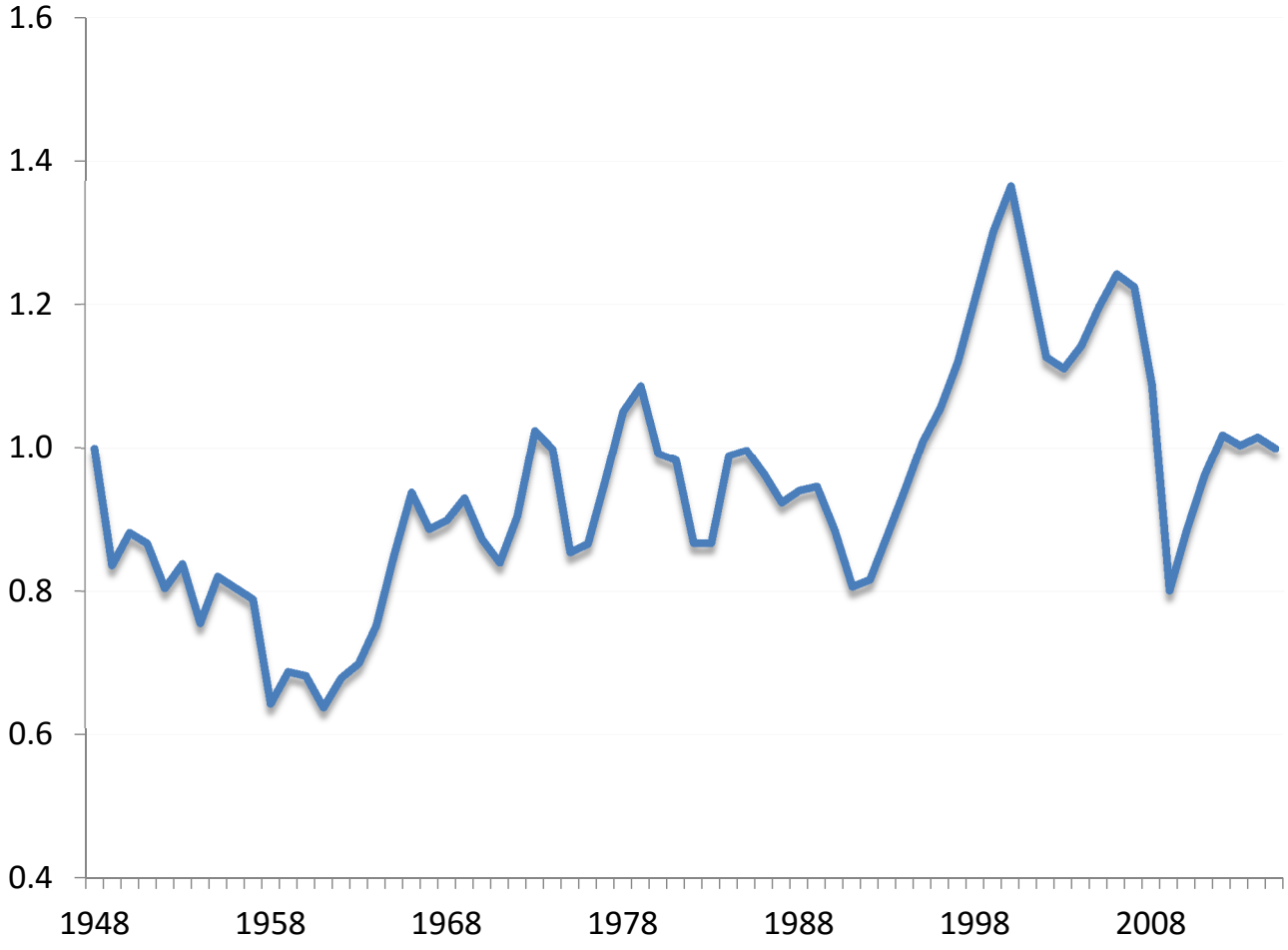
Investment in Productivity Improvements



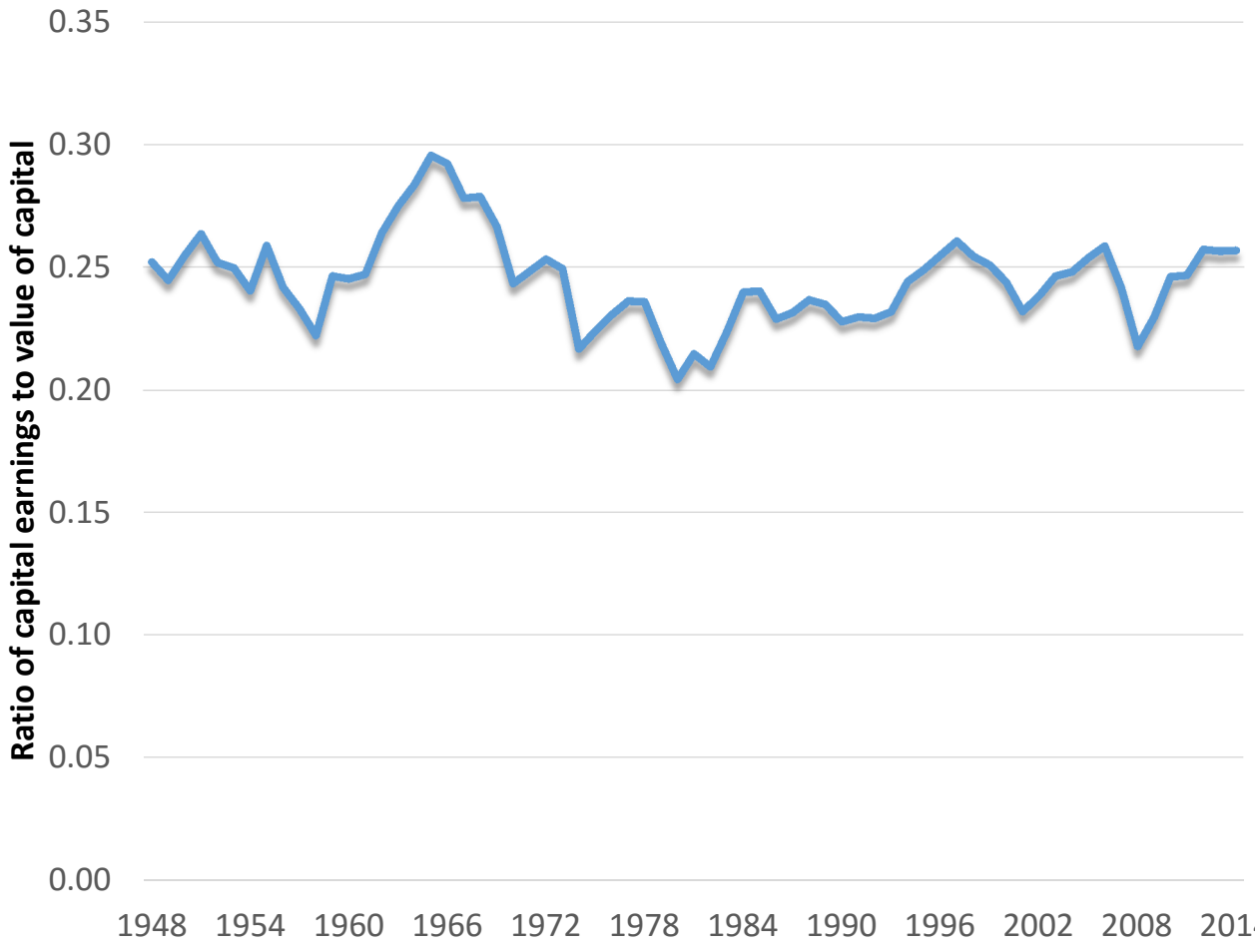
Capital Input, 2000 to 2014



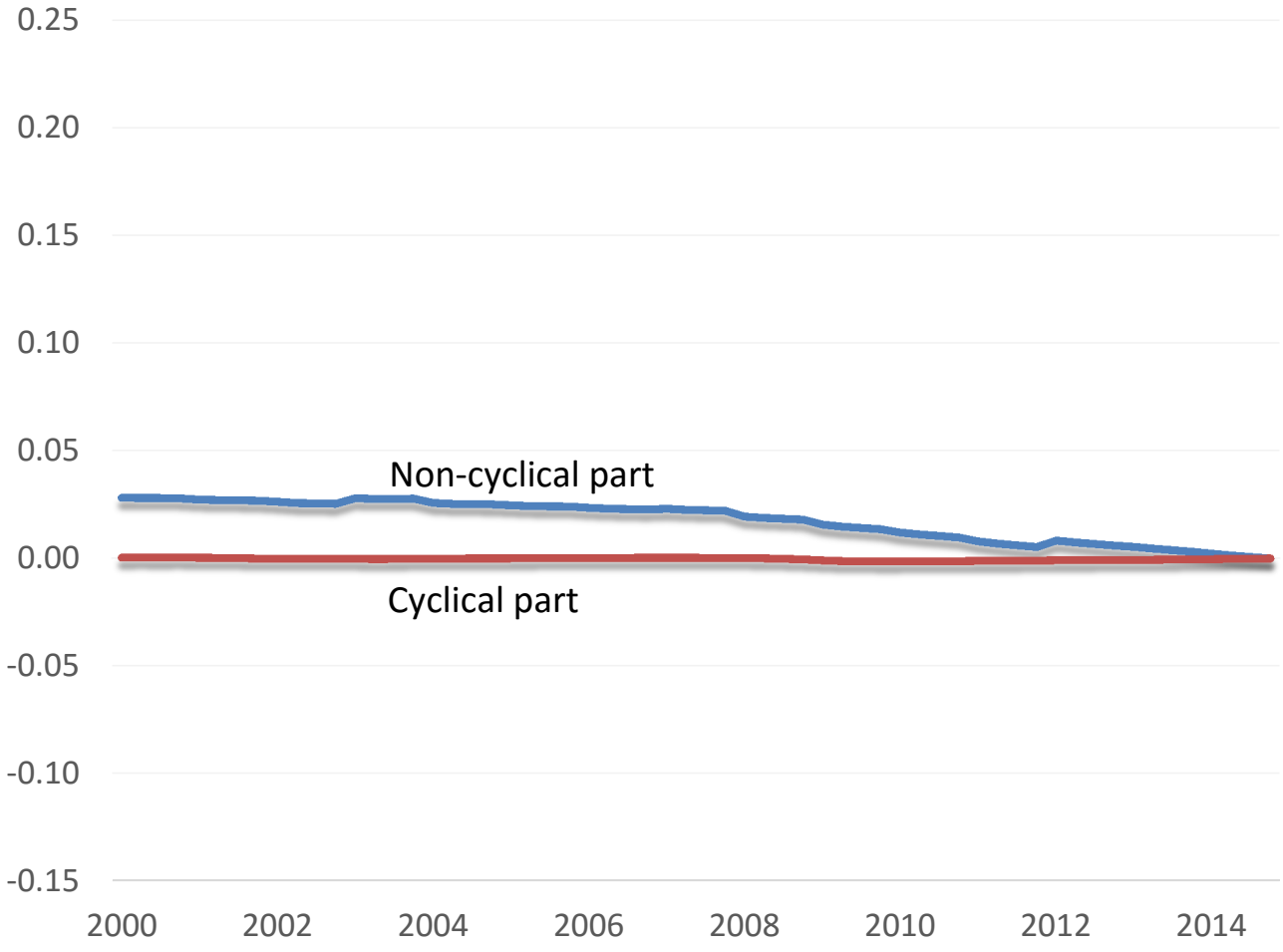
Equipment Investment



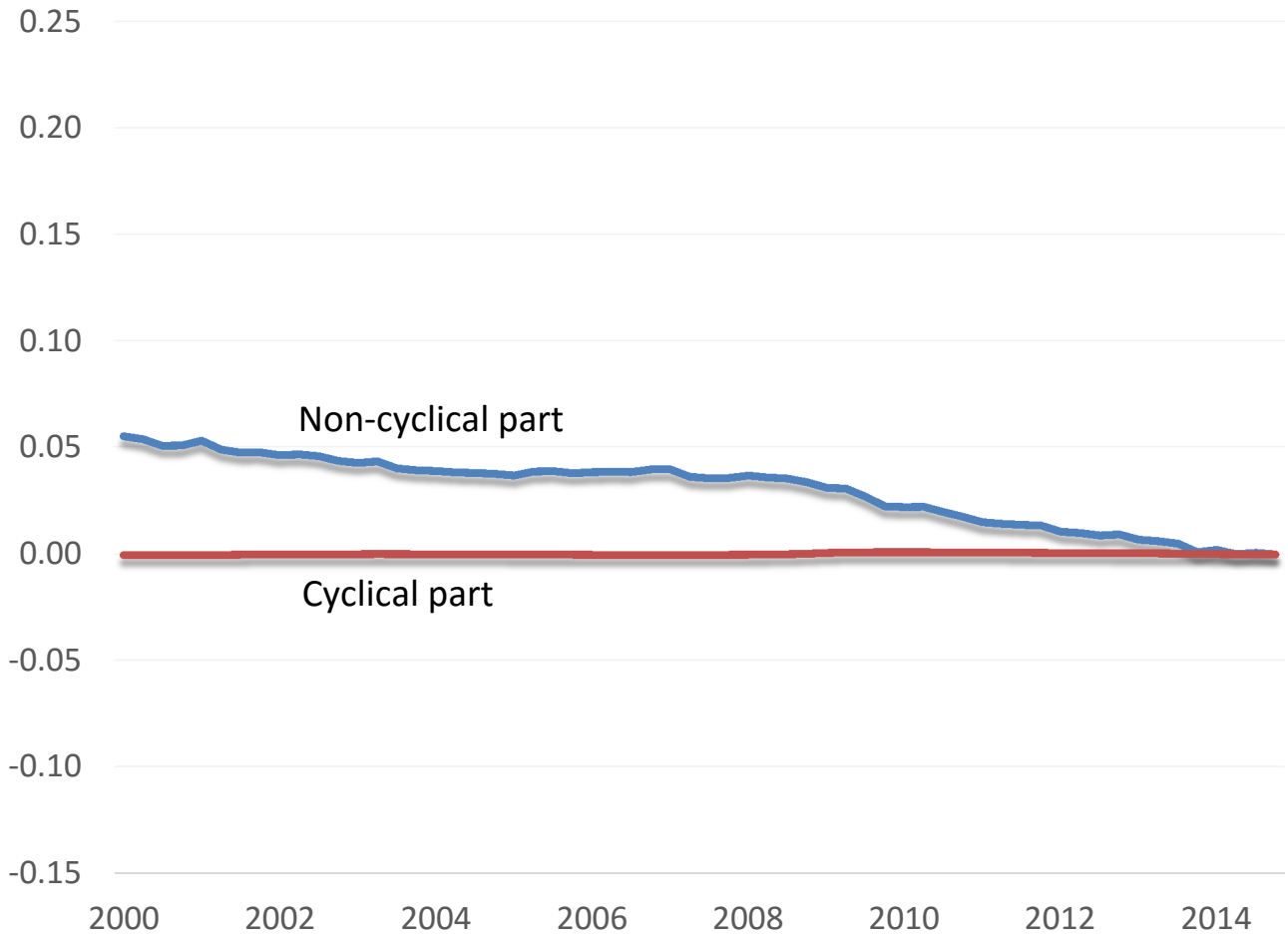
Business Earnings as a Ratio to the Value of Capital



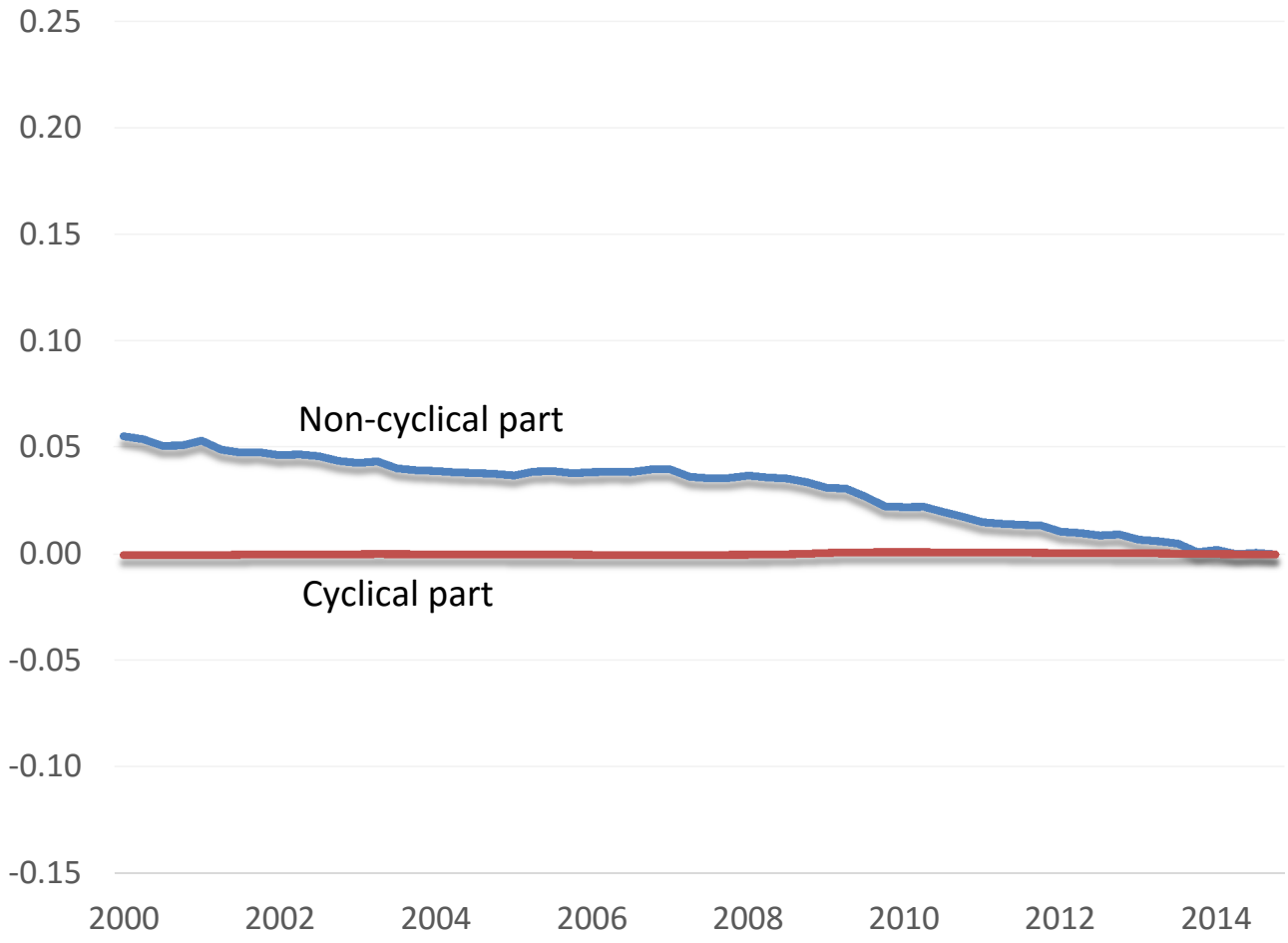
Working-Age Population, 2000 to 2014



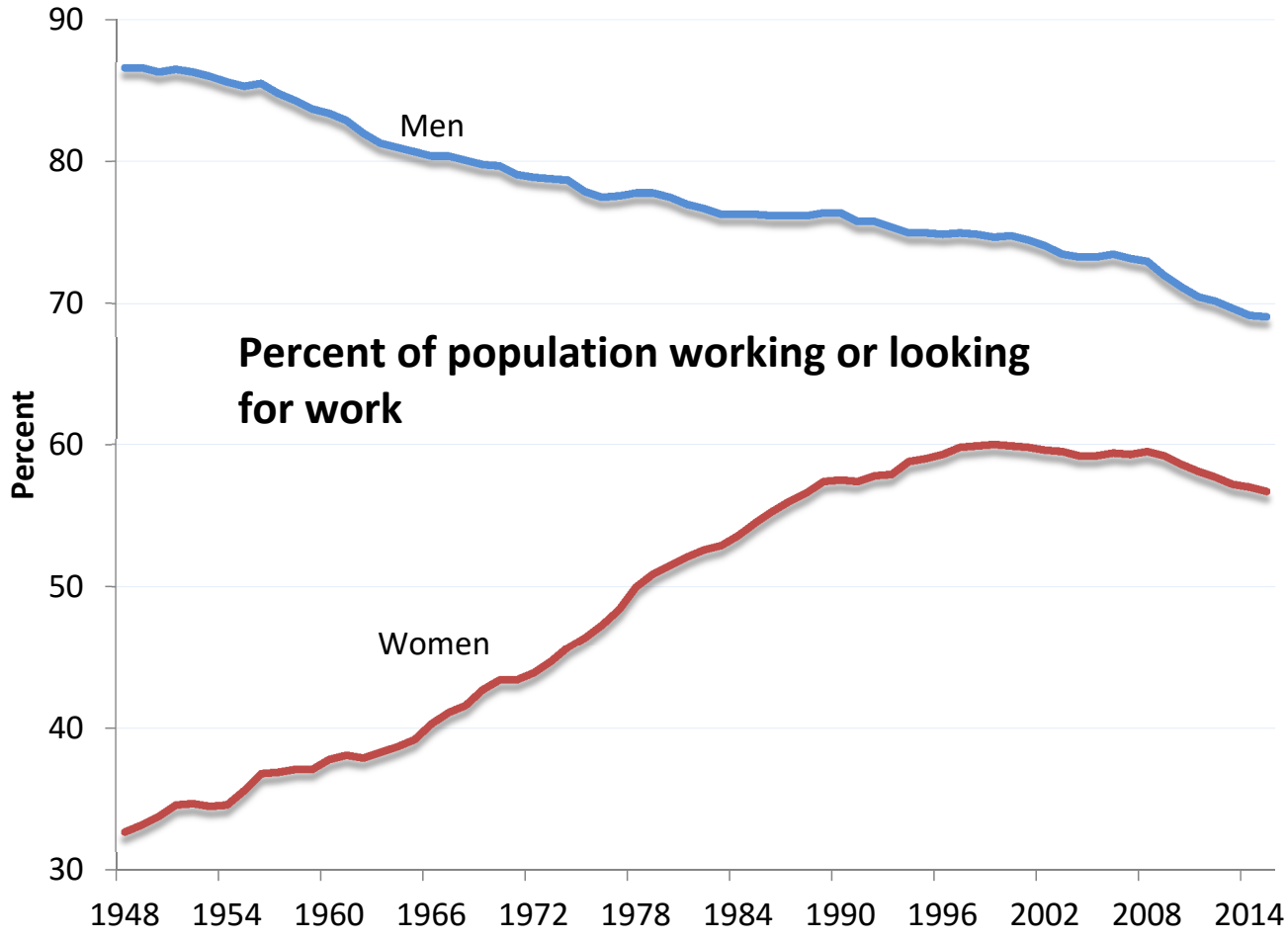
Labor-Force Participation Rate, 2000 to 2014



Labor-Force Participation Rate, 2000 to 2014



Labor-Force Participation Rates



Role of Family Income

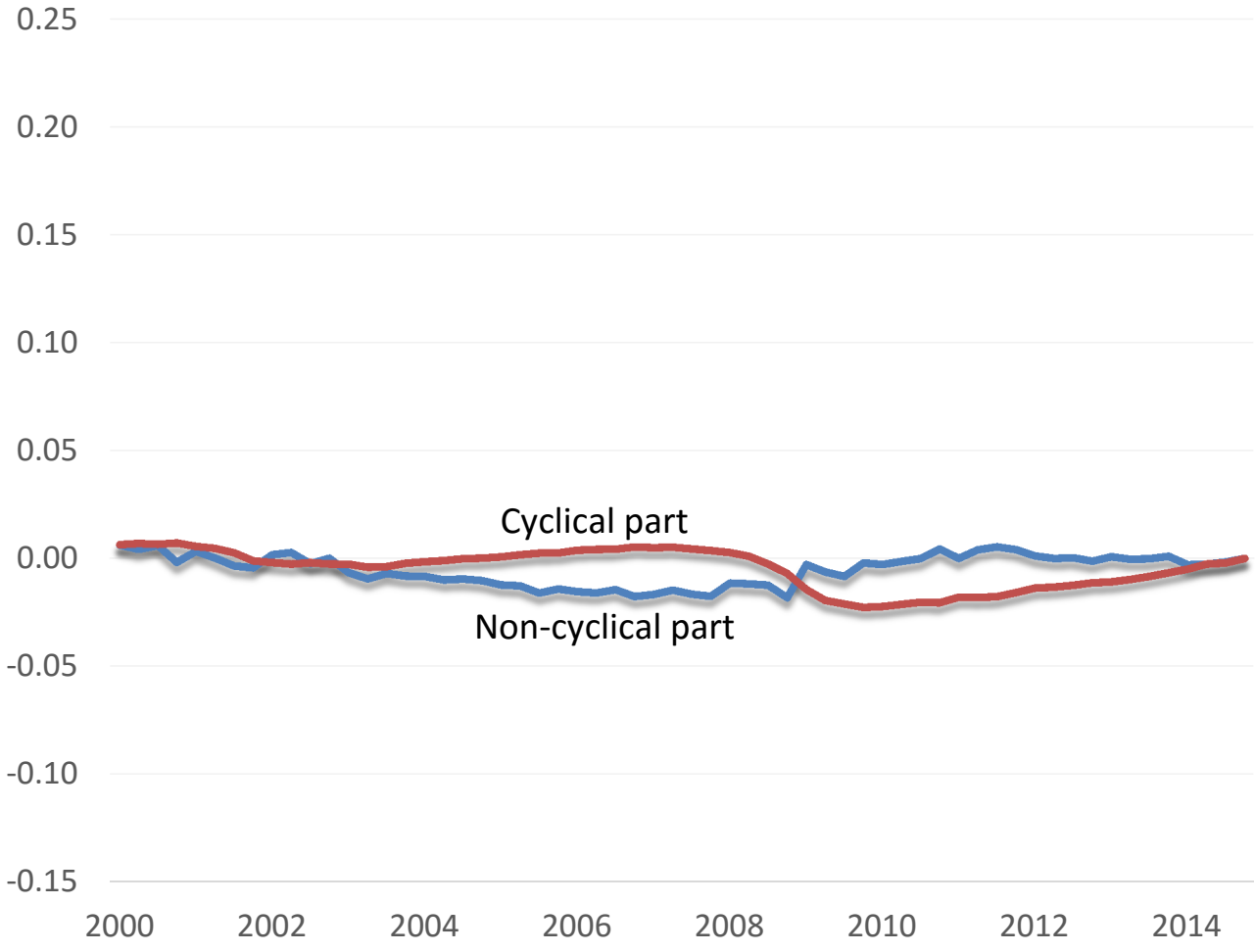
Labor force participation among prime-age workers across household income distributions

	2004	2007	2013
Total	83.8%	83.0%	81.2%
1st quartile (lowest income)	62.3%	61.2%	61.5%
2nd quartile	80.0%	78.0%	77.6%
3rd quartile	88.0%	87.3%	84.8%
4th quartile (highest income)	91.9%	91.4%	89.9%

Changes in Weekly Hours of Time Use, 2007 to 2014, People 15 and Older

	Personal care, including sleep	*Market work*	*Education*	*Leisure*	*Other*
Men	1.3	-1.6	-0.1	1.6	-1.2
Women	2.2	-1.4	0.0	1.2	-2.0

Hours per Worker, 2000 to 2014



Why Unemployment Fared Better than GDP, 2007 to 2014

Component	*Shortfall, percent*
Total factor productivity	4.4
Capital input	4.0
Population 16 and over	2.2
Labor-force participation rate	3.6
Hours per worker	-1.7
Ratio of private to total hours of work	-0.1
Labor quality	-0.6
Private real GDP	11.7