Introduction to Business Cycle Data

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February 19, 2019

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- Business cycle fluctuations are costly:
  - Misallocations of capital and labor.
  - Particularly painful for workers that become unemployed and for the families of workers who become unemployed.

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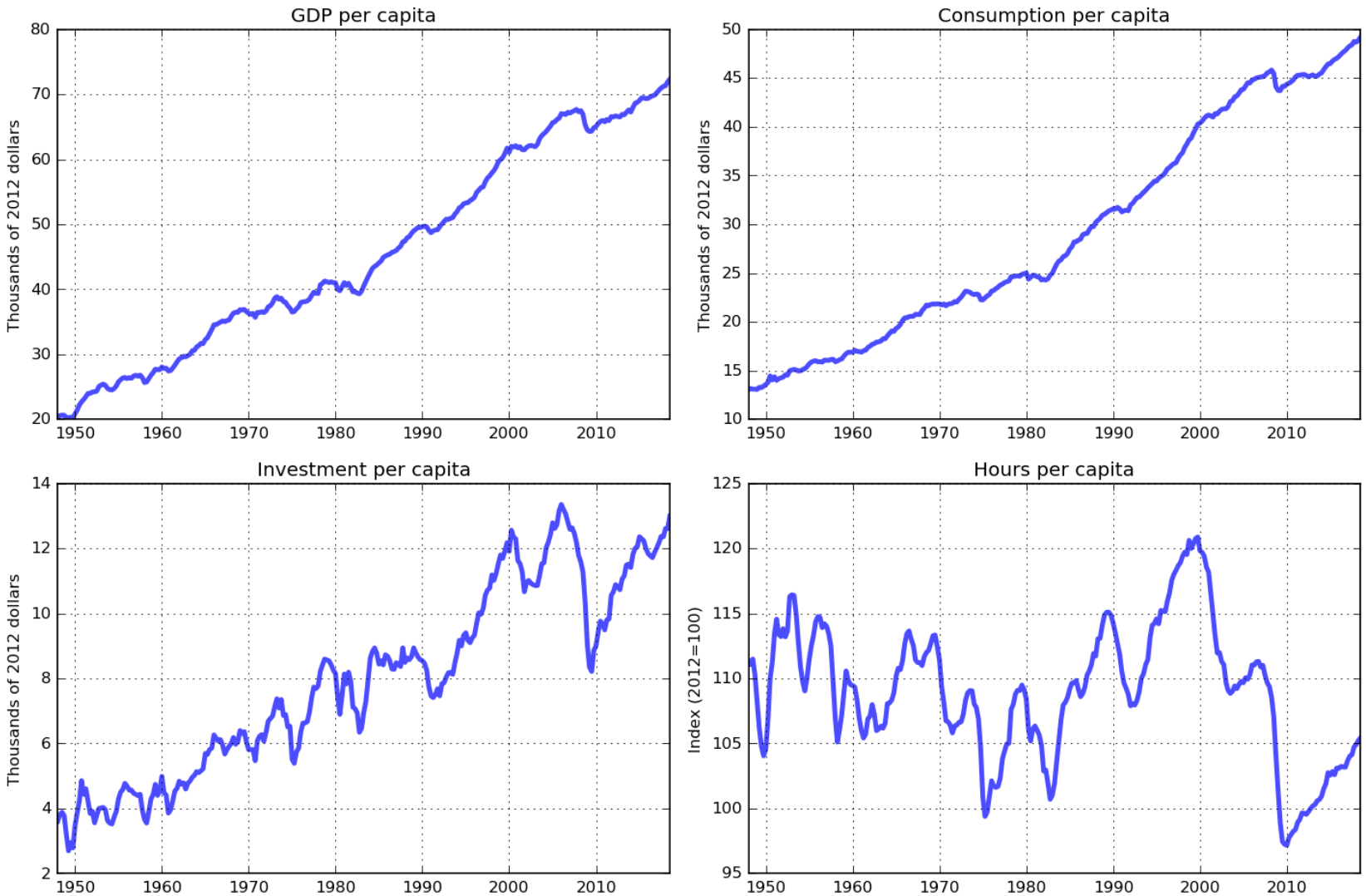
- Both approaches have merits and shortcomings and elements of both are integrated into contemporary business cycle theory.

Figure 1: **GDP, consumption, investment, and hours** for the US from January 1948 to July 2018. Source: FRED.



Trend and Cycle Components

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- The cyclical component is the difference between the value of a time series and the trend:

$$X_t^{cycle} = X_t - X_t^{trend} \tag{2}$$

Trend and Cycle Components

- Often it's useful to express the cyclical component of a time series as the difference between the (natural) log of the series and the log of the trend:

$$\hat{x}_t = \log(X_t) - \log\left(X_t^{trend}\right) \approx \frac{X_t - X_t^{trend}}{X_t^{trend}} \quad (3)$$

- The log-deviation from trend is approximately equal to the percent deviation of the series from trend (divided by 100).

Trend and Cycle Components

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and:

$$\log X_t - \log X_t^{trend} = \log 220 - \log 215 = 0.0230 \tag{7}$$

Figure 2: **GDP, consumption, investment, and hours** per capita for the US from January 1948 to July 2018. Source: FRED.

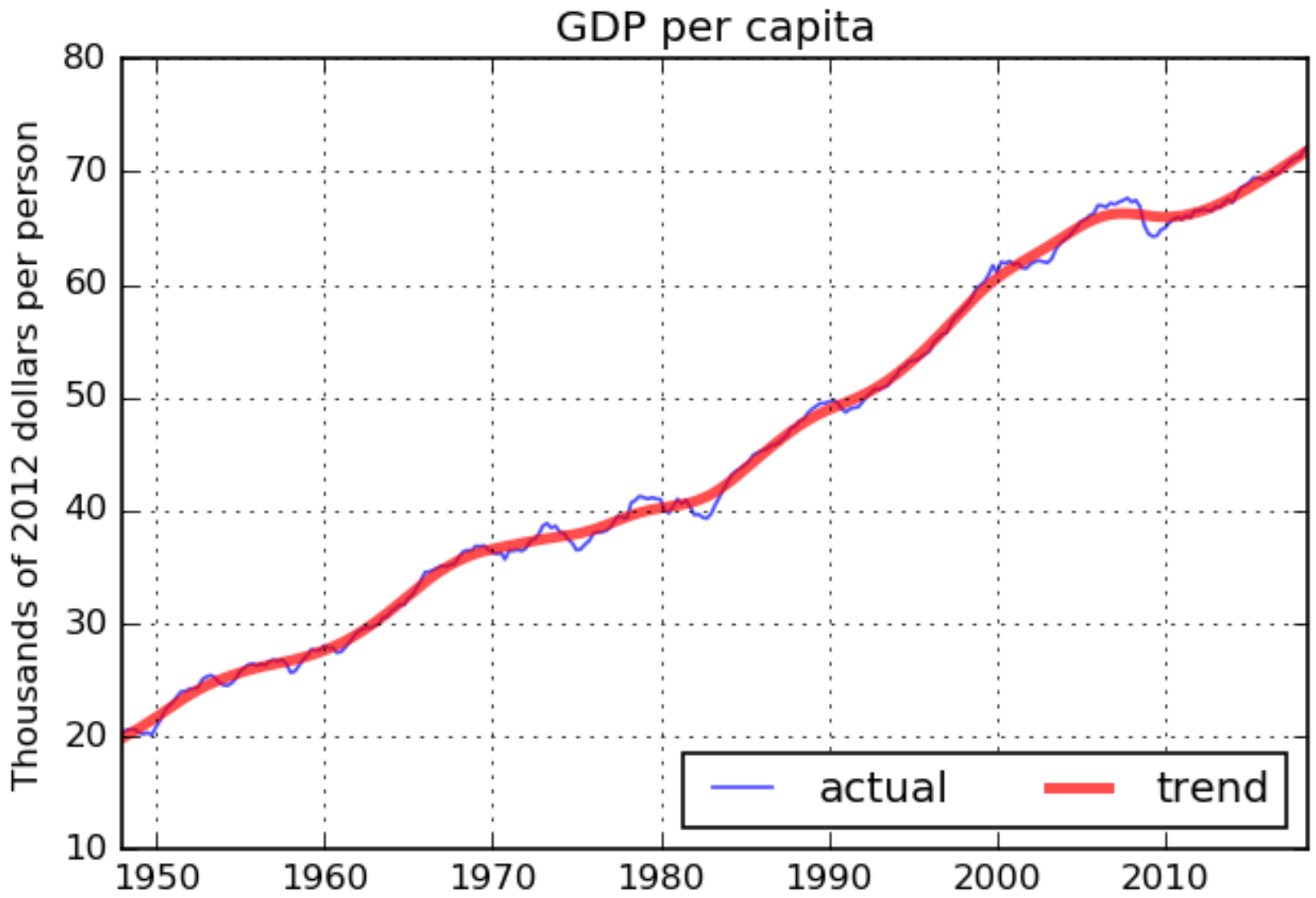

Figure 3: **US GDP per capita:** actual, trend, and cycle from January 1948 to July 2018. Source: FRED.

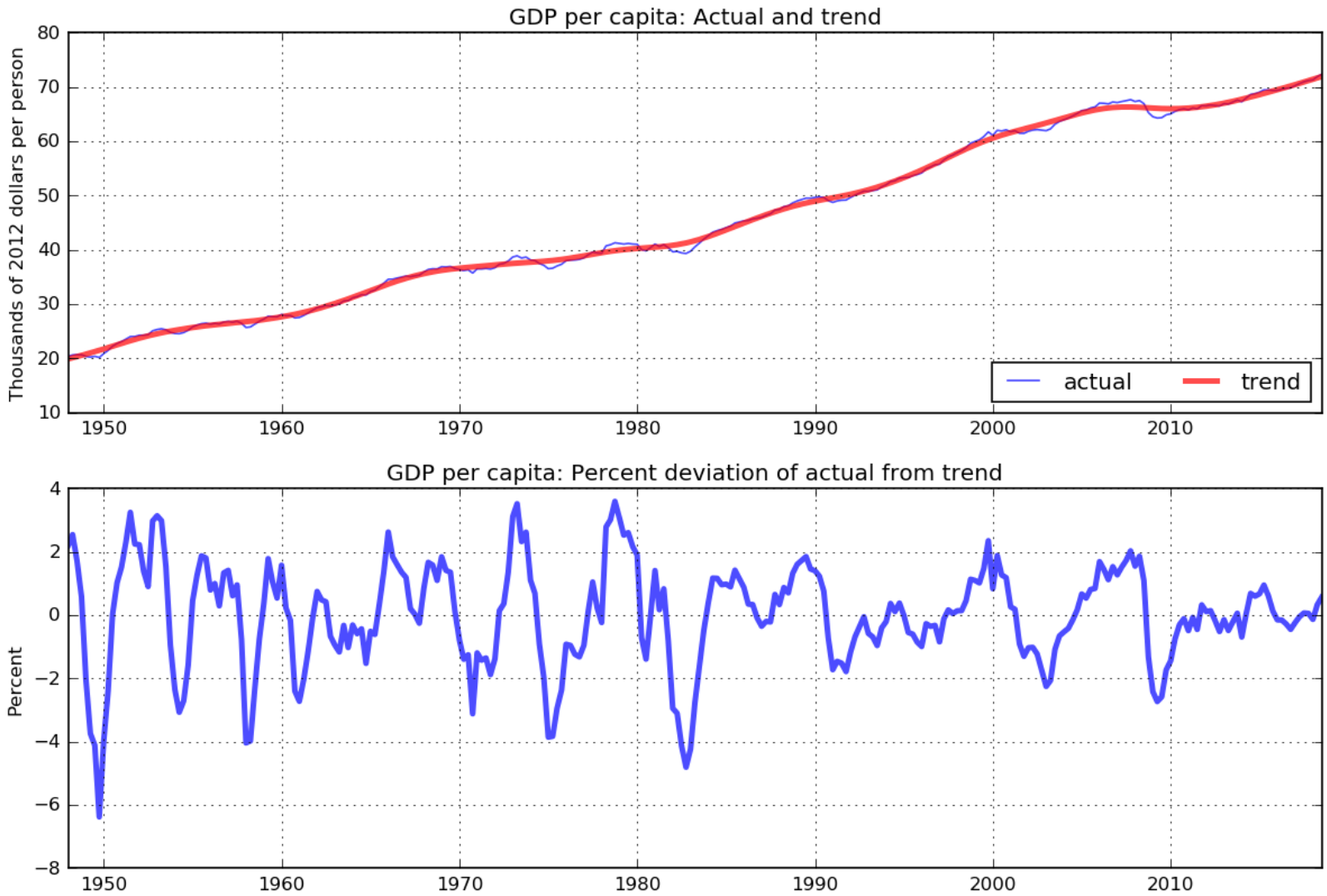

Figure 4: **Business cycle components of GDP, consumption, investment, and hours** for the US from January 1948 to July 2018.

Source: FRED.

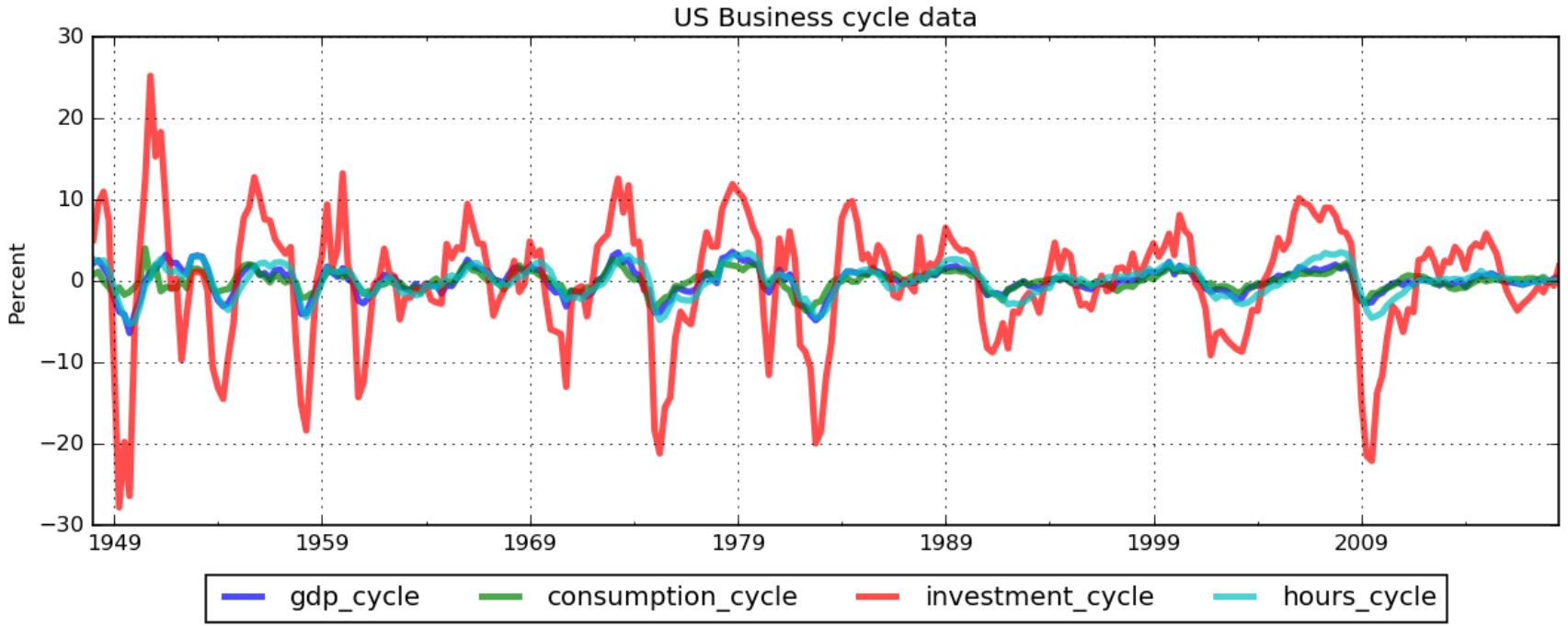

Table 1: **Standard deviations of real business cycle data** from January 1948 to July 2018. Units are percent deviations from trend.

Source: FRED.

GDP	1.620
Consumption	1.157
Investment	7.492
Hours	1.892

Table 2: **Correlations of real business cycle data** from January 1948 to July 2018. Units are percent deviations from trend. Source: FRED.

	GDP	Consumption	Investment	Hours
GDP	1.000	0.795	0.848	0.875
Consumption	0.795	1.000	0.682	0.706
Investment	0.848	0.682	1.000	0.790
Hours	0.875	0.706	0.790	1.000