

Macroeconomics

ECON 204 – Macroeconomic Theory II
Lecture 28th Feb. 2025

Chapter 3

Business Cycle Measurement

Macroeconomics?

- Models built to explain macroeconomic phenomena.
- The important phenomena are *long-run growth* and *business cycles*.

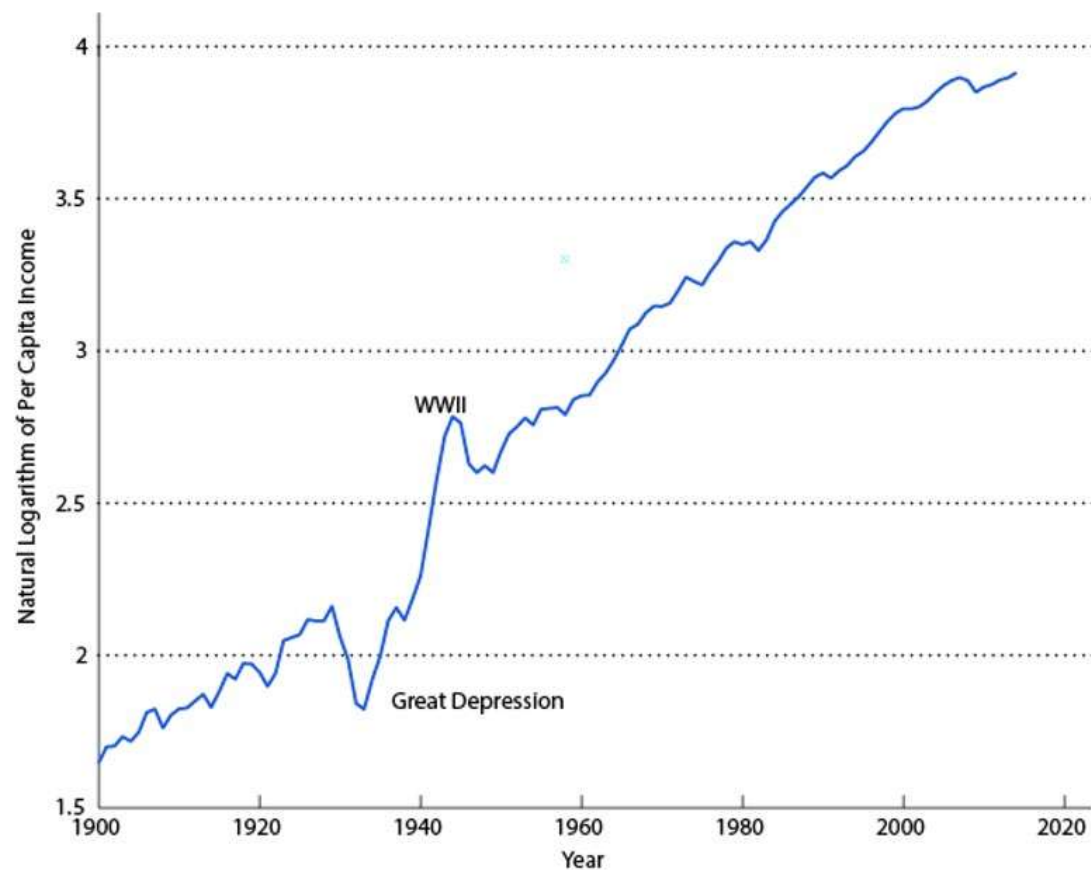
Business Cycles

- 3.1 State the key regularities in GDP fluctuations.
- 3.2 Explain the importance of comovement among economic time series.
- 3.3 State the key properties of comovements among the components of GDP.

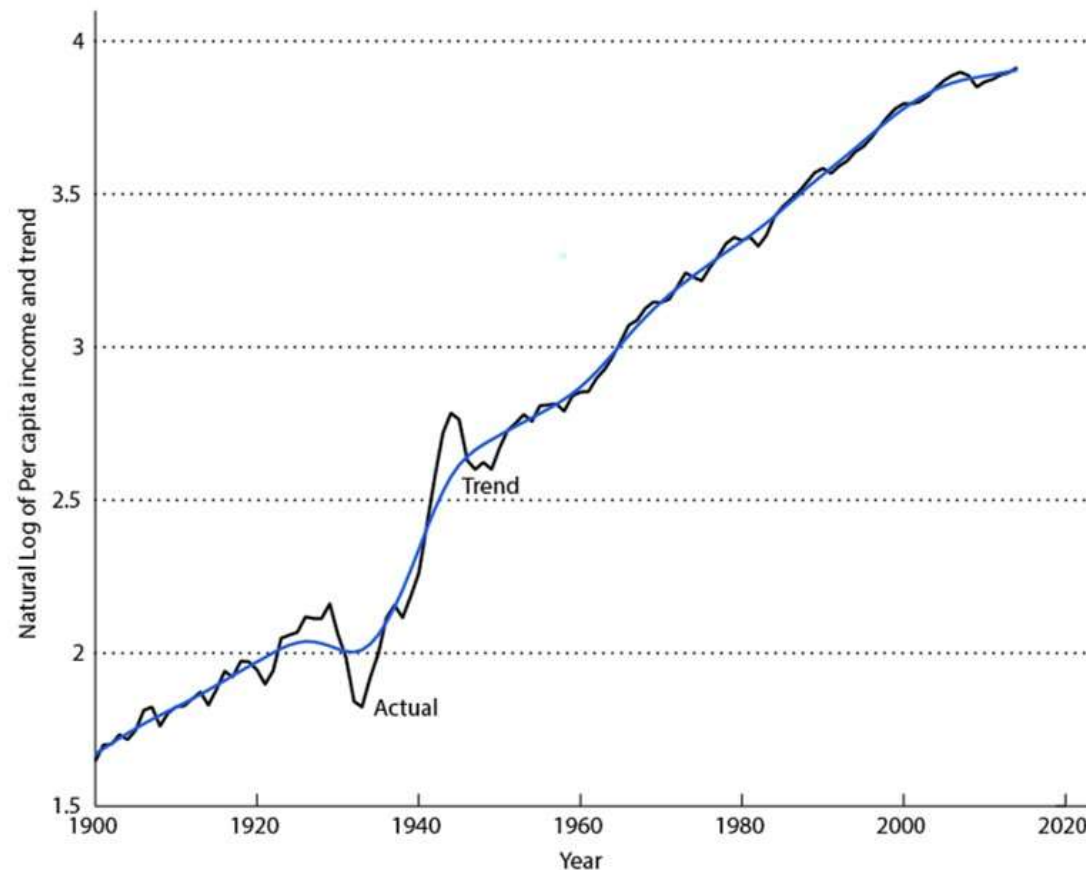
Business Cycles

- 3.4 Discuss why co-movements between the price level and real GDP and between the inflation rate and real GDP are important to our understanding of business cycles.
- 3.5 State the key comovements among labor market variables and real GDP.

Natural Logarithm of Per Capita Real GDP



Natural Logarithm of Per Capita Real GDP and Trend

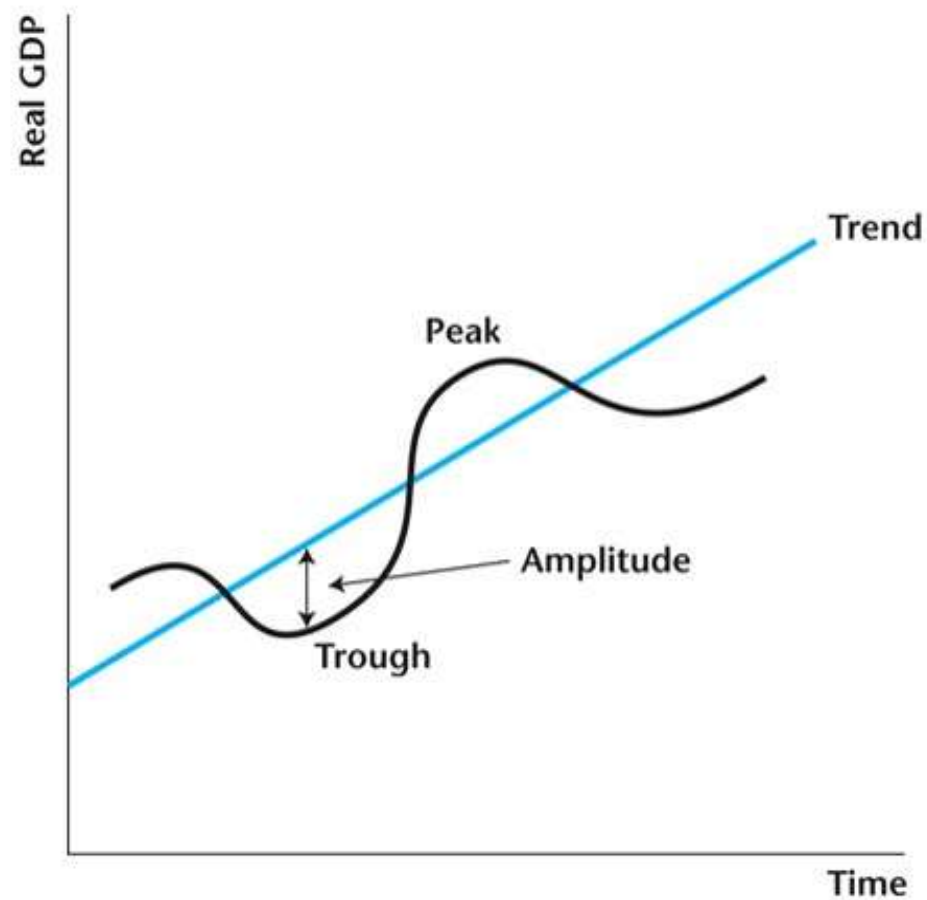


Regularities in GDP Fluctuations

- Business Cycles are *fluctuations about trend in real GDP*.
- The turning points in the deviations of real GDP from trend are *peaks* and *troughs*.

Figure 3.1

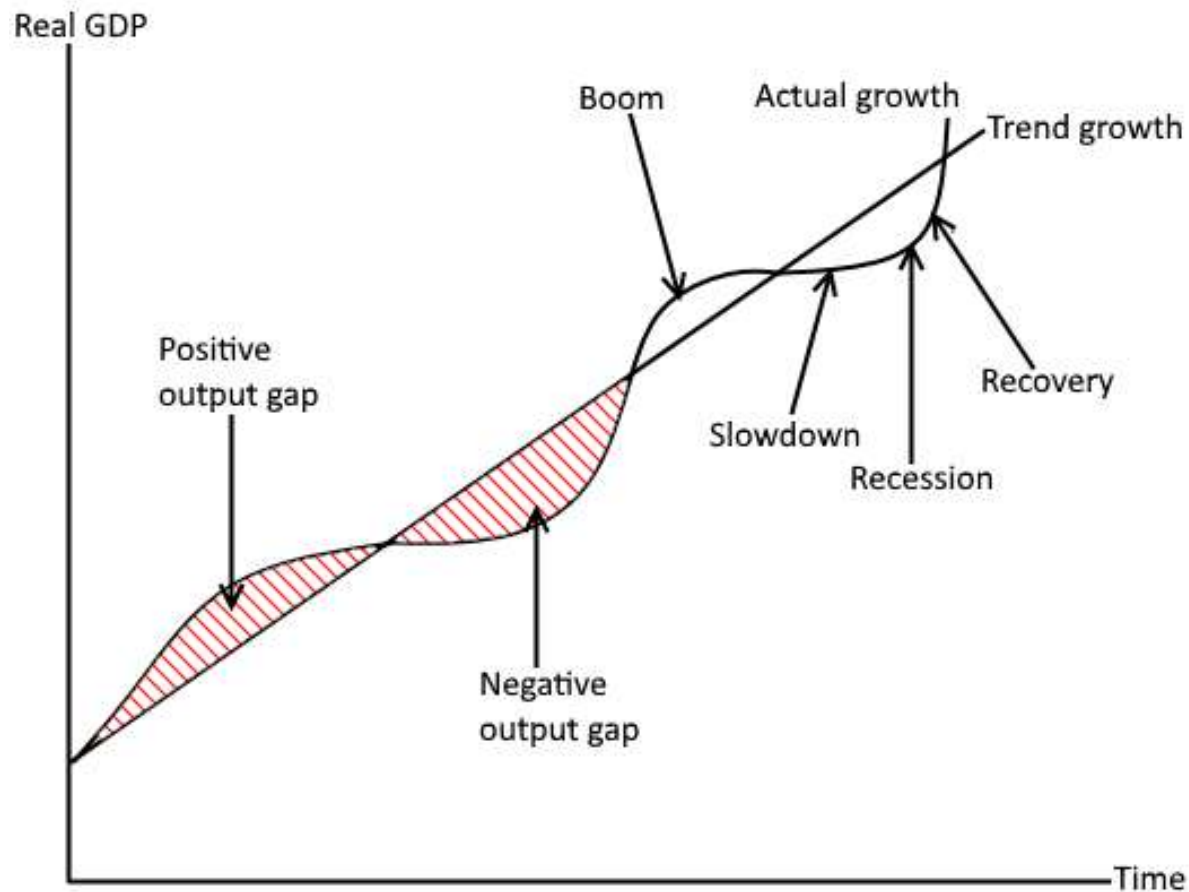
Idealized Business Cycles

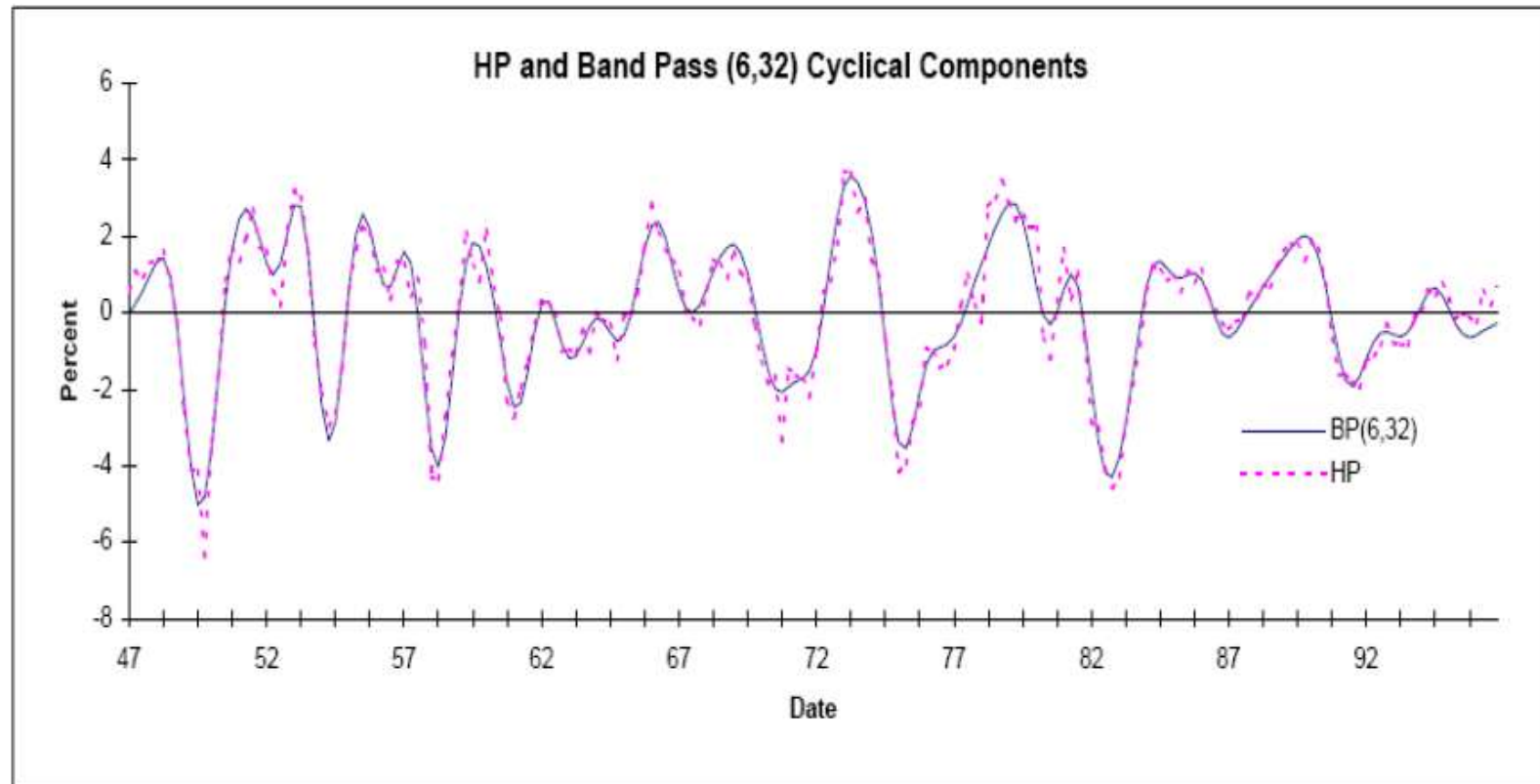


Regularities in GDP Fluctuations

- Business Cycles are *fluctuations about trend in real GDP*.
- Persistent positive deviations from trend are *booms* and persistent negative deviations from trend are *recessions*.

Idealized Business Cycles

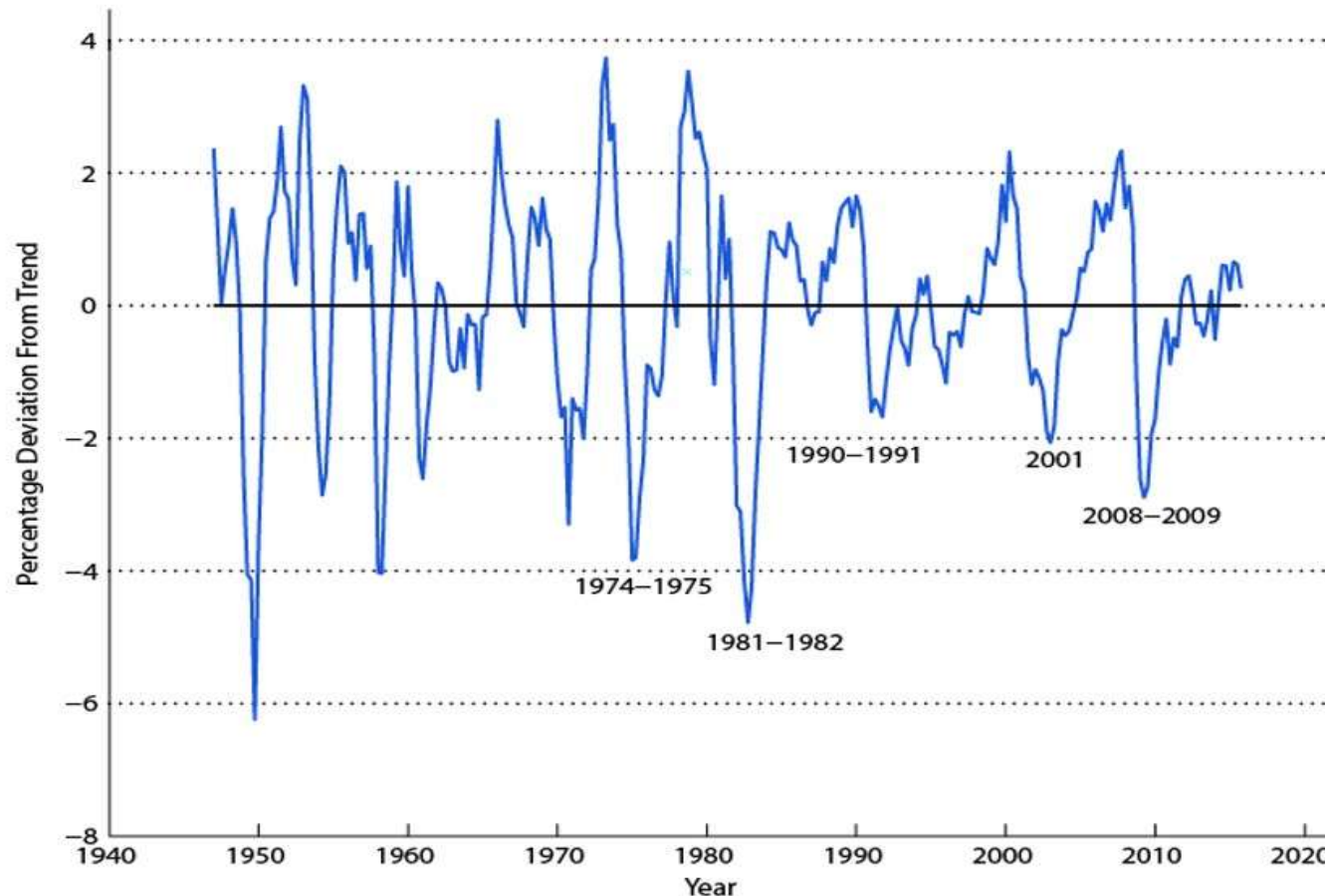




Deviations From Trend in Real GDP are Irregular

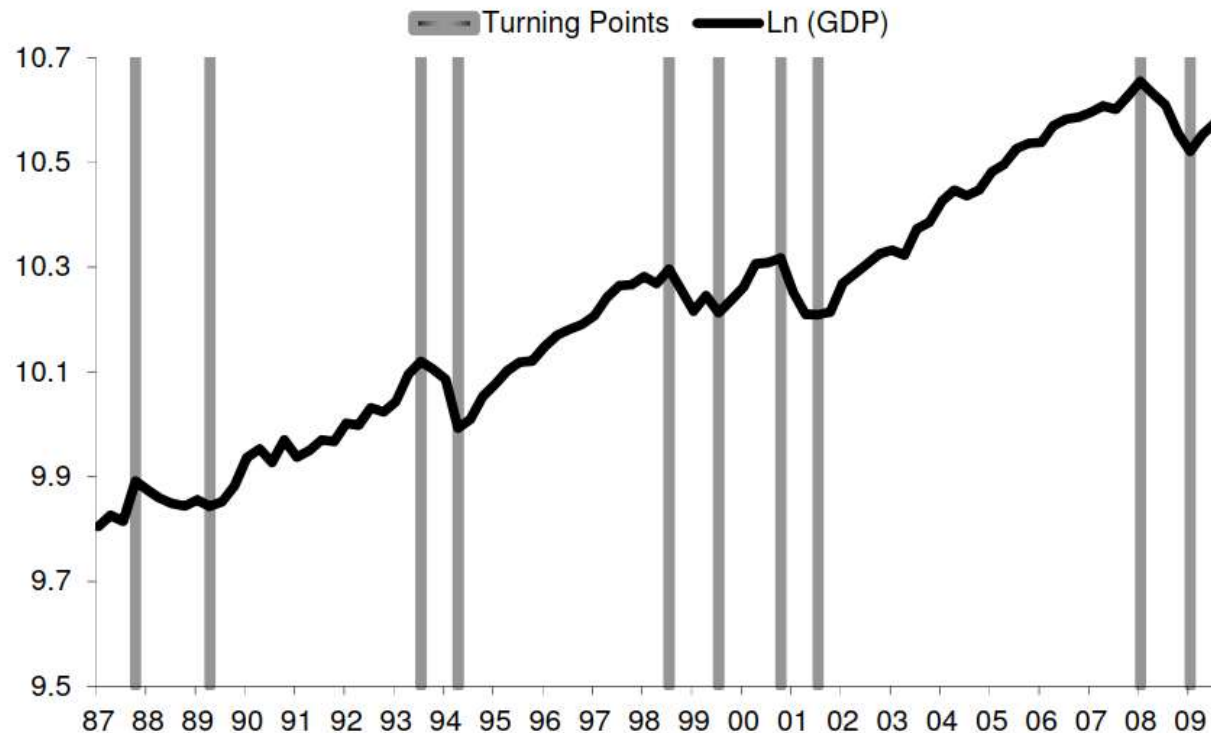
- The fluctuations in GDP about trend are quite choppy.
- There is no regularity in the amplitude of fluctuations in real GDP about trend.
- There is no regularity in the frequency of fluctuations in real GDP about trend.
- **BUT: deviations from trend are persistent – important for short-run forecasting!**

Percentage Deviations from Trend in Real GDP – US (1947-2012)



Fluctuations, Real GDP, Turkey (1987-2009)

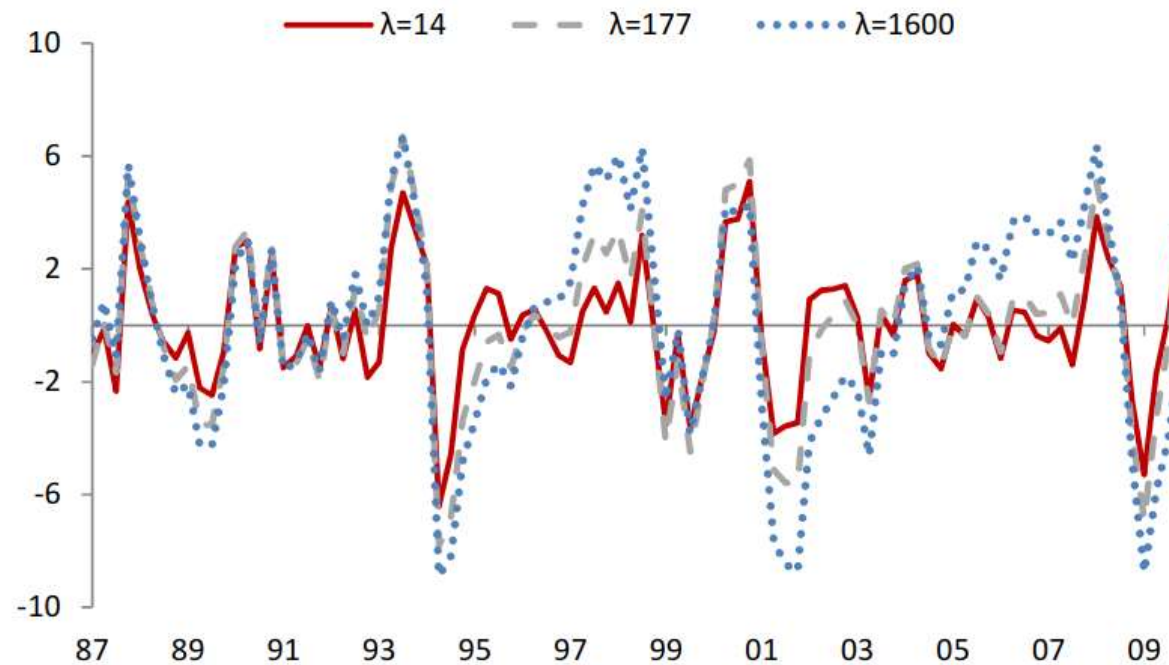
Figure 1: Turning Points in Turkish Real GDP* (1987:1-2009:4)



Source: CBRT

Percentage Deviations from Trend in Real GDP – Turkey (1987-2009)

Figure 2: Cyclical Components of Real GDP with Different HP Smoothing Parameters



Source: CBRT

Figure 3.3

Time Series Plots of x and y

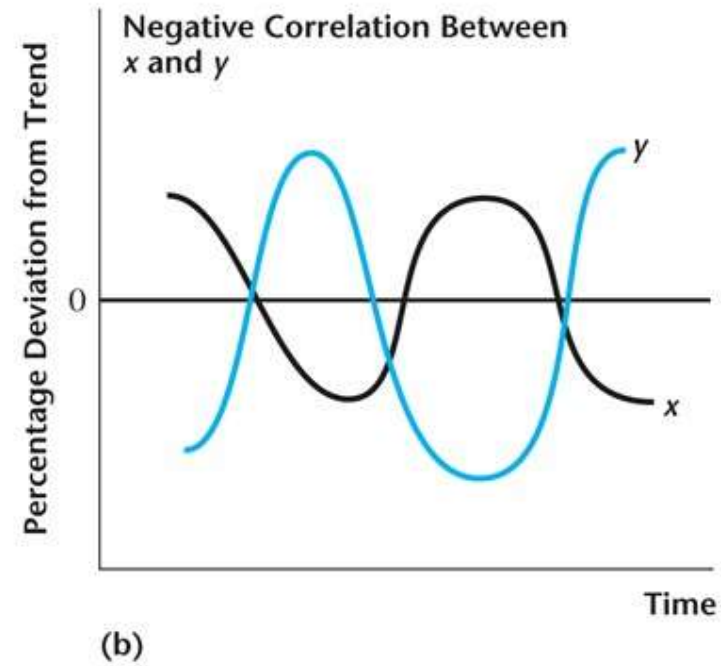
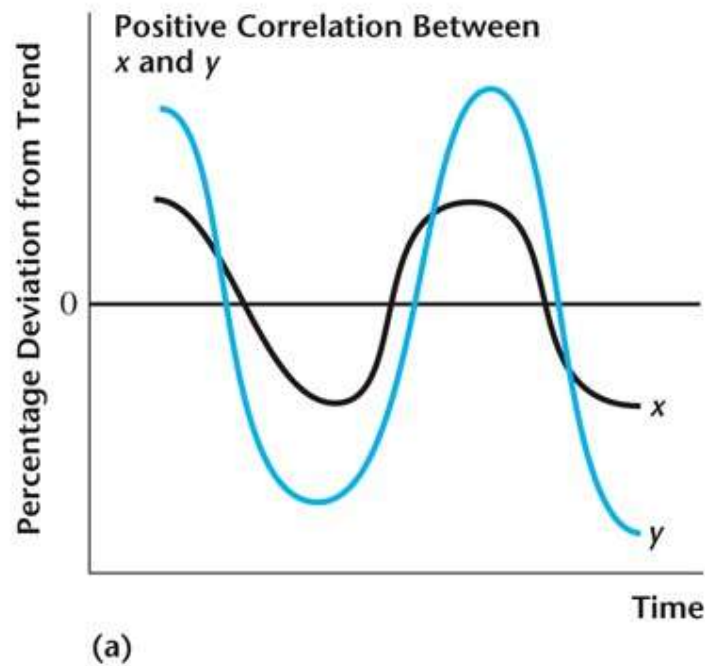
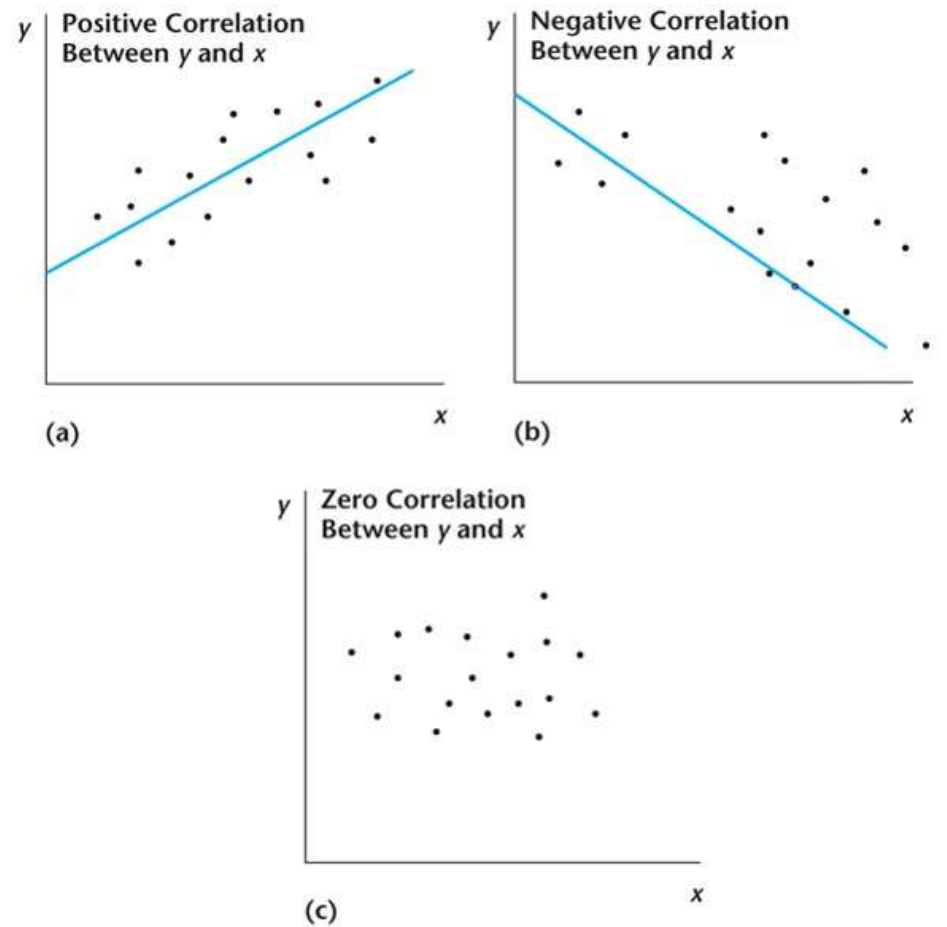


Figure 3.4

Correlations Between Variables y and x



Correlation with Real GDP

- If the deviations from trend in a macroeconomic variable are positively (negatively) correlated with the deviations from trend in real GDP, then that variable is *procyclical* (*countercyclical*).
- If a macroeconomic variable is neither procyclical nor countercyclical, it is *acyclical*.

Figure 3.5 Imports and GDP

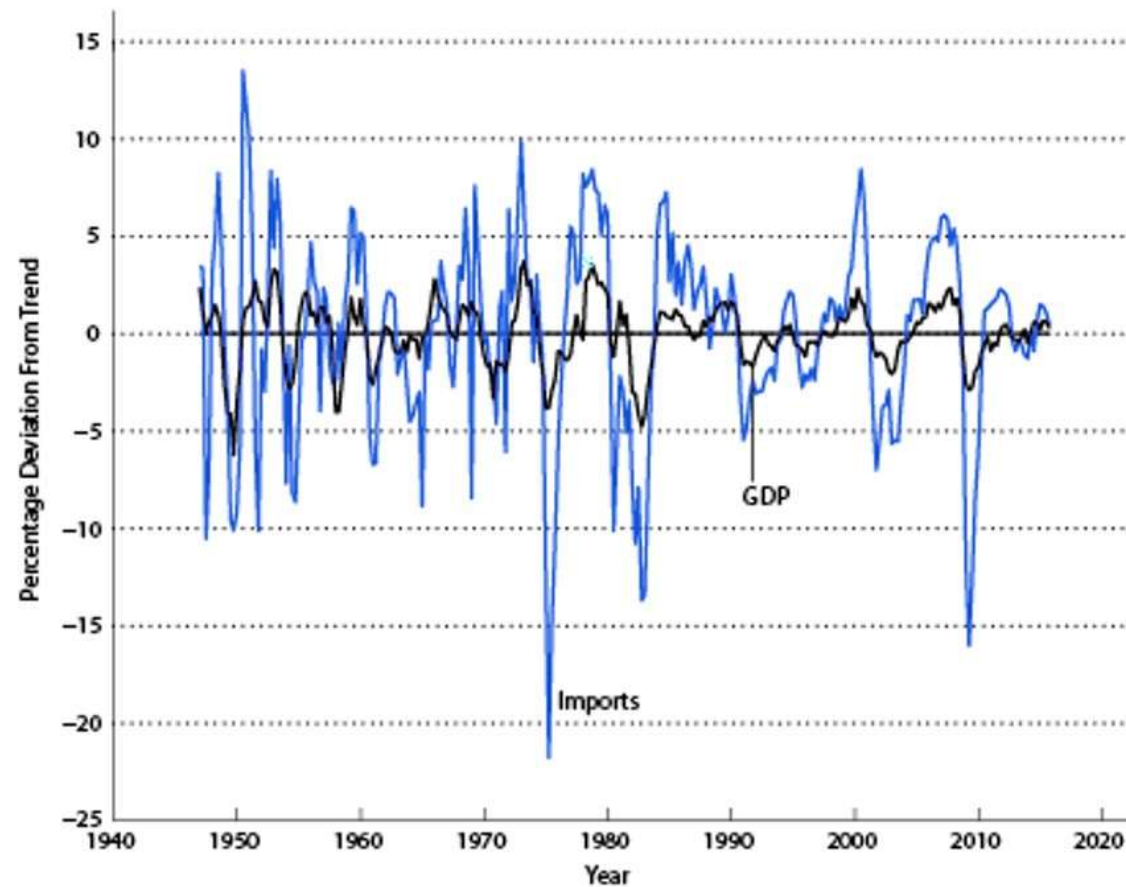


Figure 3.6 Scatter Plot of Imports and GDP

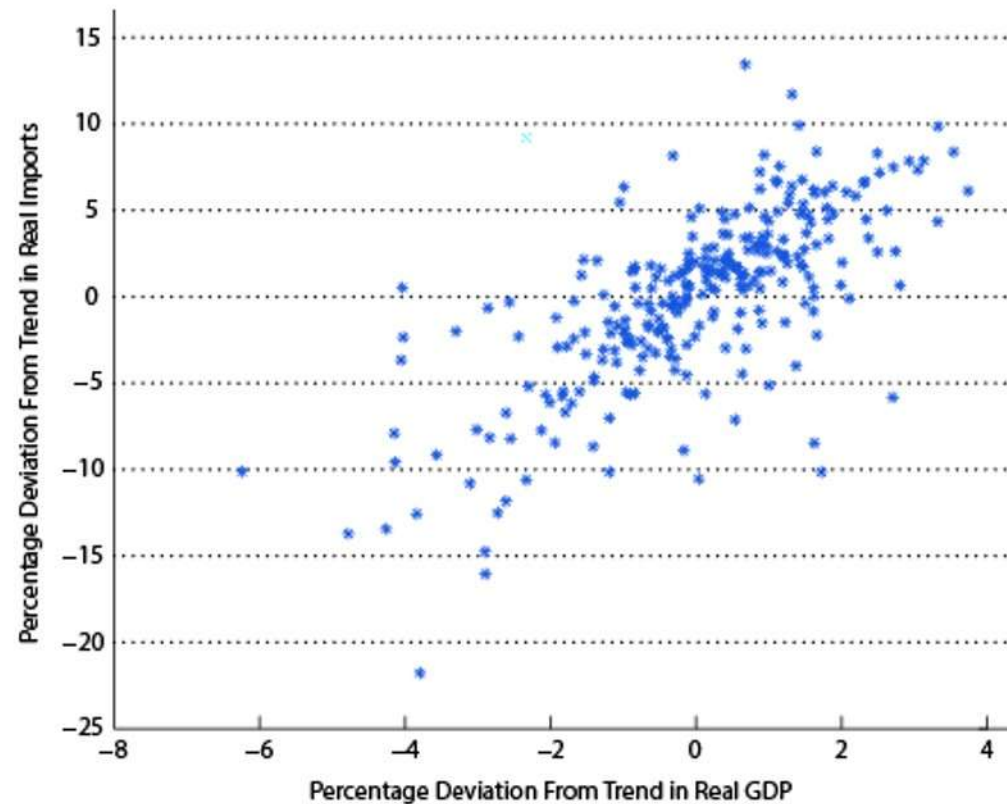


Figure 3.7 Leading and Lagging Variables

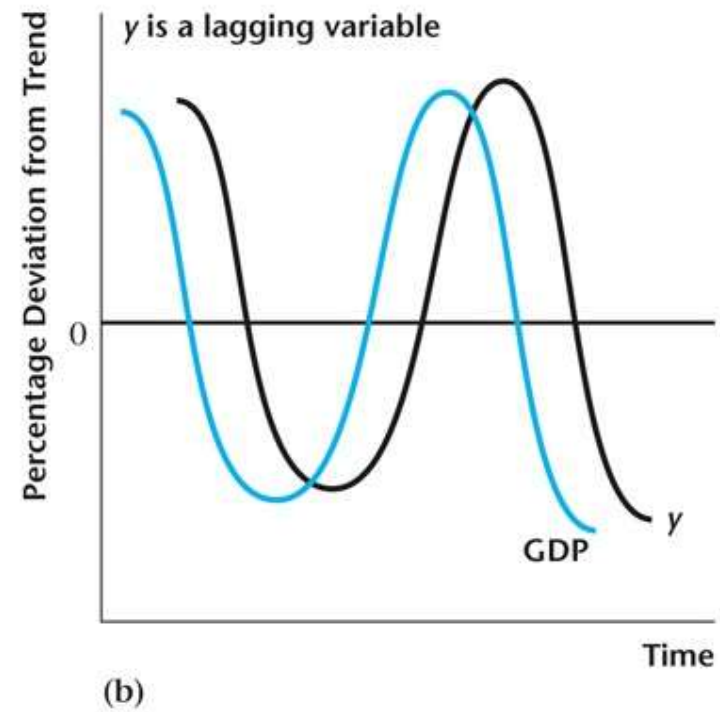
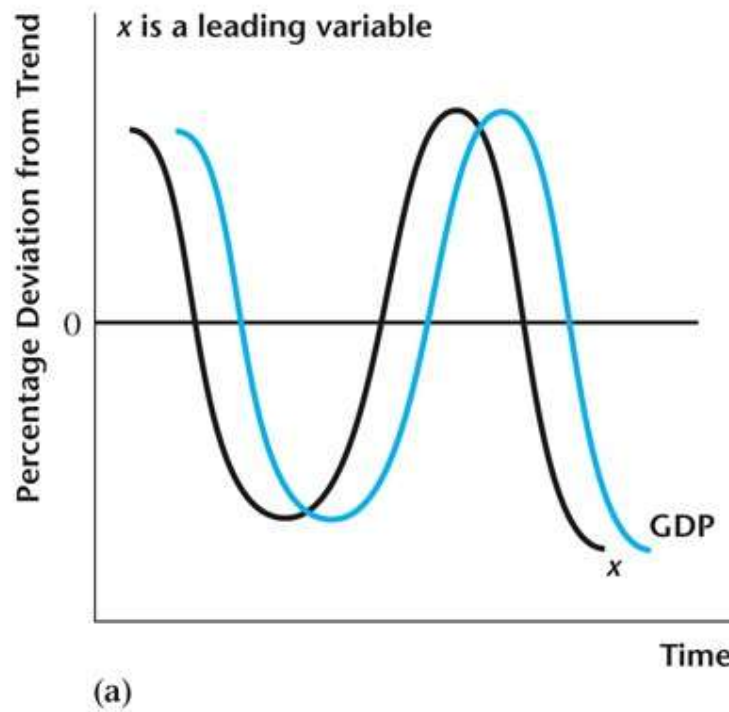
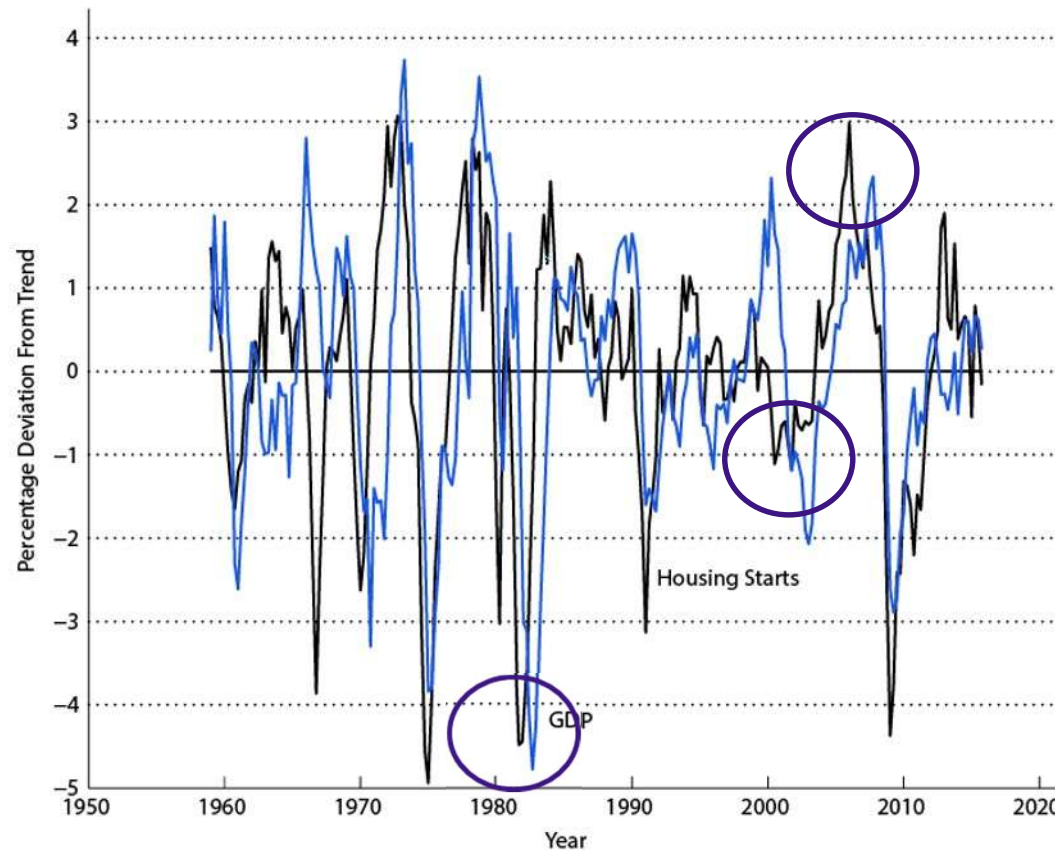


Figure 3.8 Percentage Deviations in Real GDP and Housing Starts



Behavior of Key Macroeconomic Variables

- Components of GDP: consumption and investment.
- The price level and inflation.
- Labor market variables: employment, real wage, average labor productivity.

Figure 3.9

Percentage Deviations from Trend in Real Consumption and Real GDP

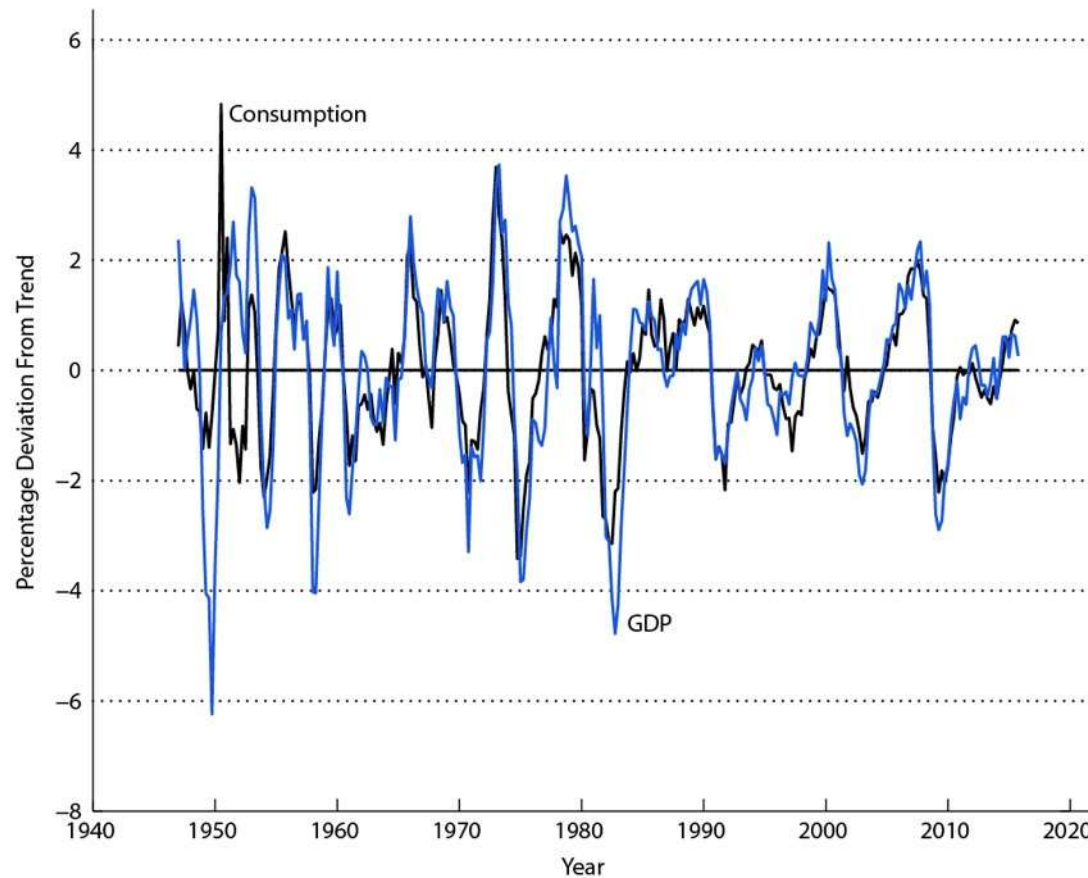


Figure 3.10 Percentage Deviations from Trend in Real Investment and Real GDP

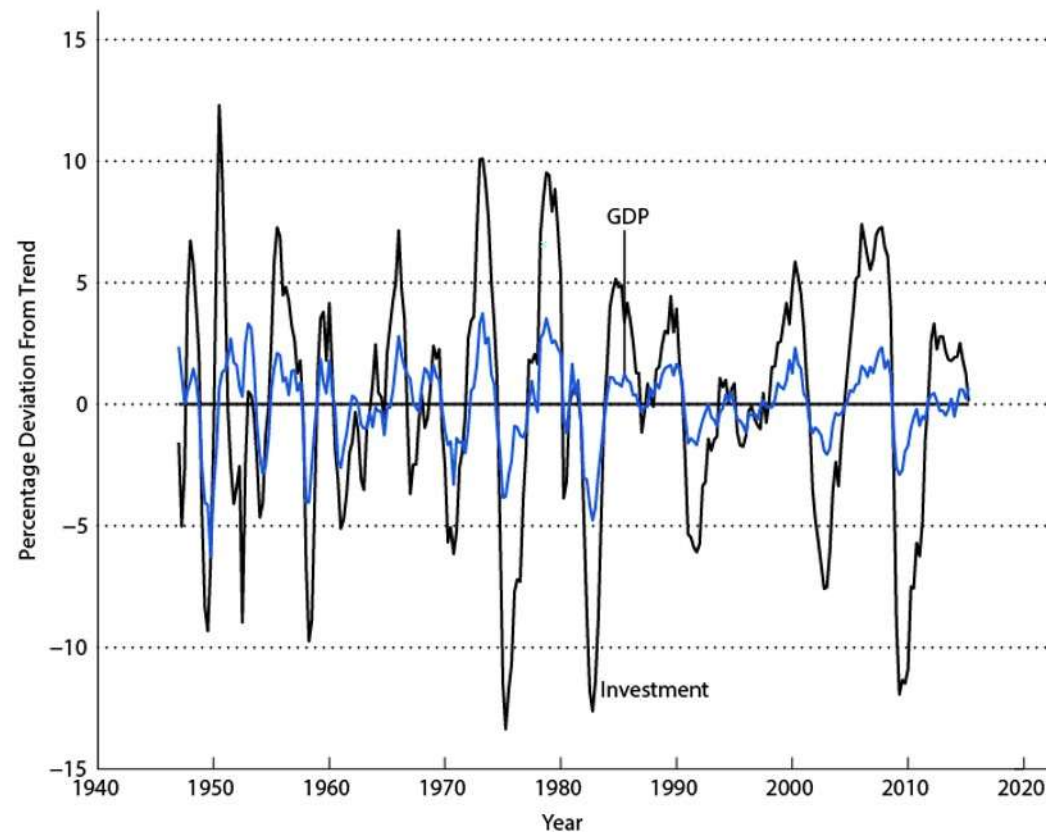


Figure 3.11 Percentage Deviations From Trend in the Price Level and Real GDP

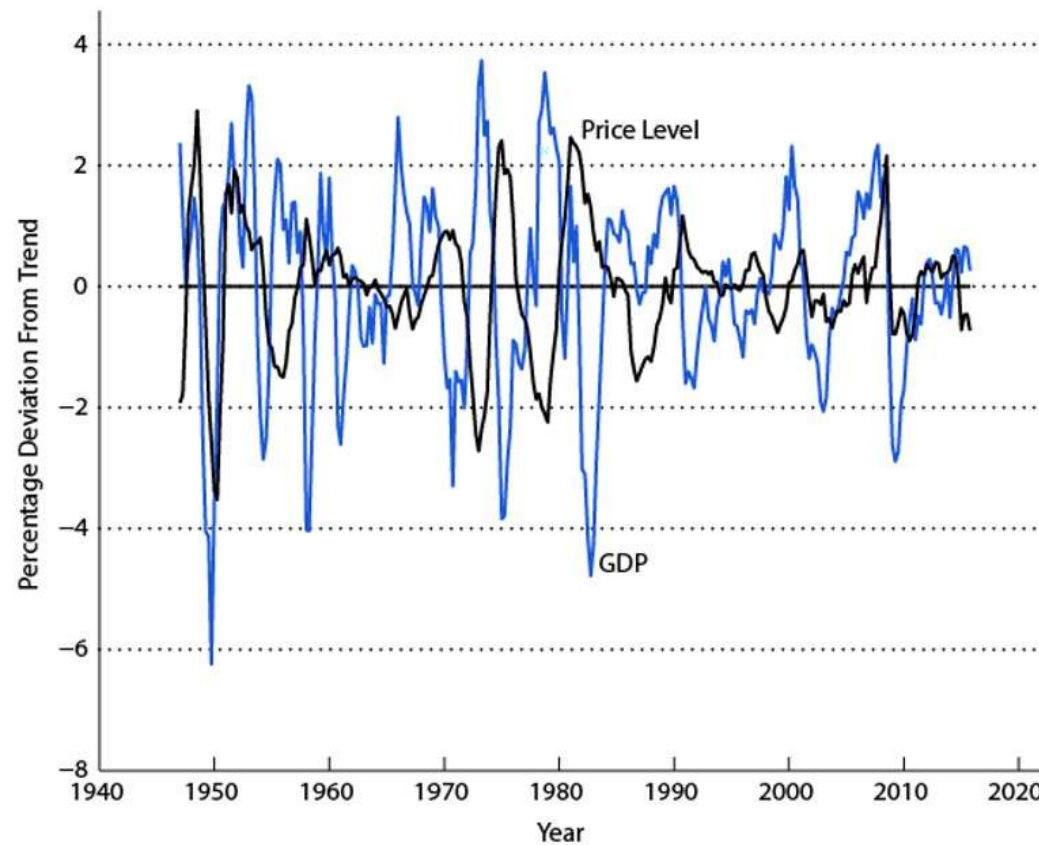


Figure 3.13 Percentage Deviations from Trend in Employment and Real GDP

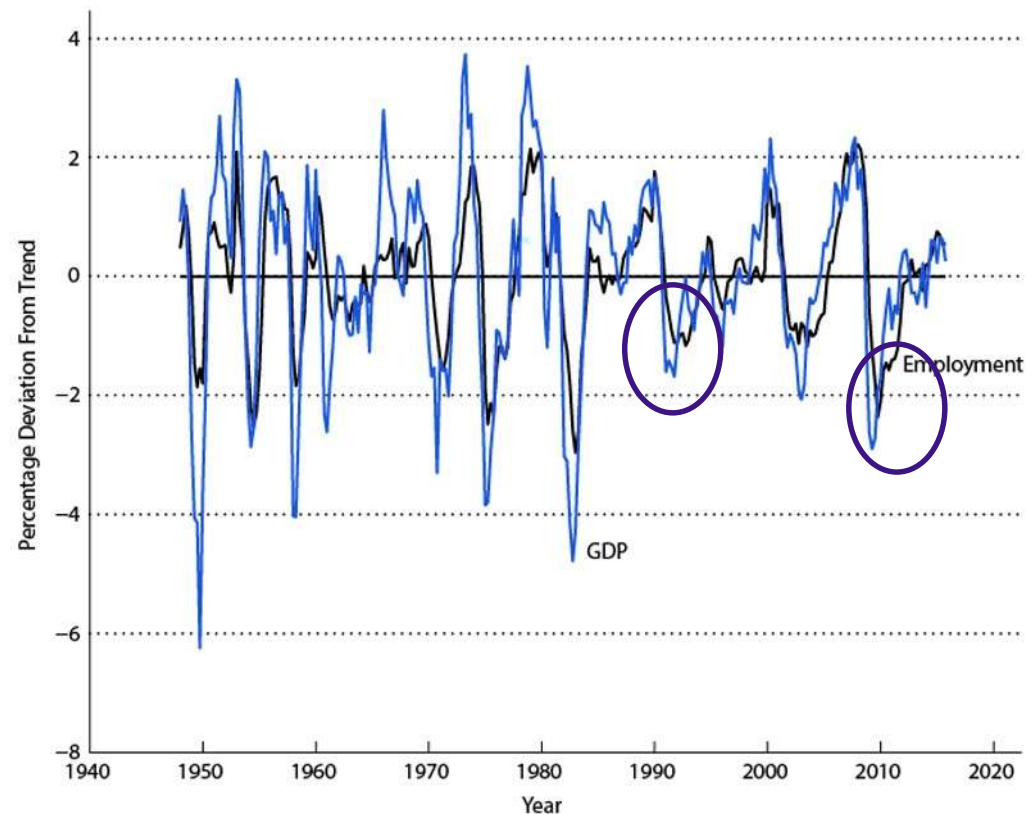
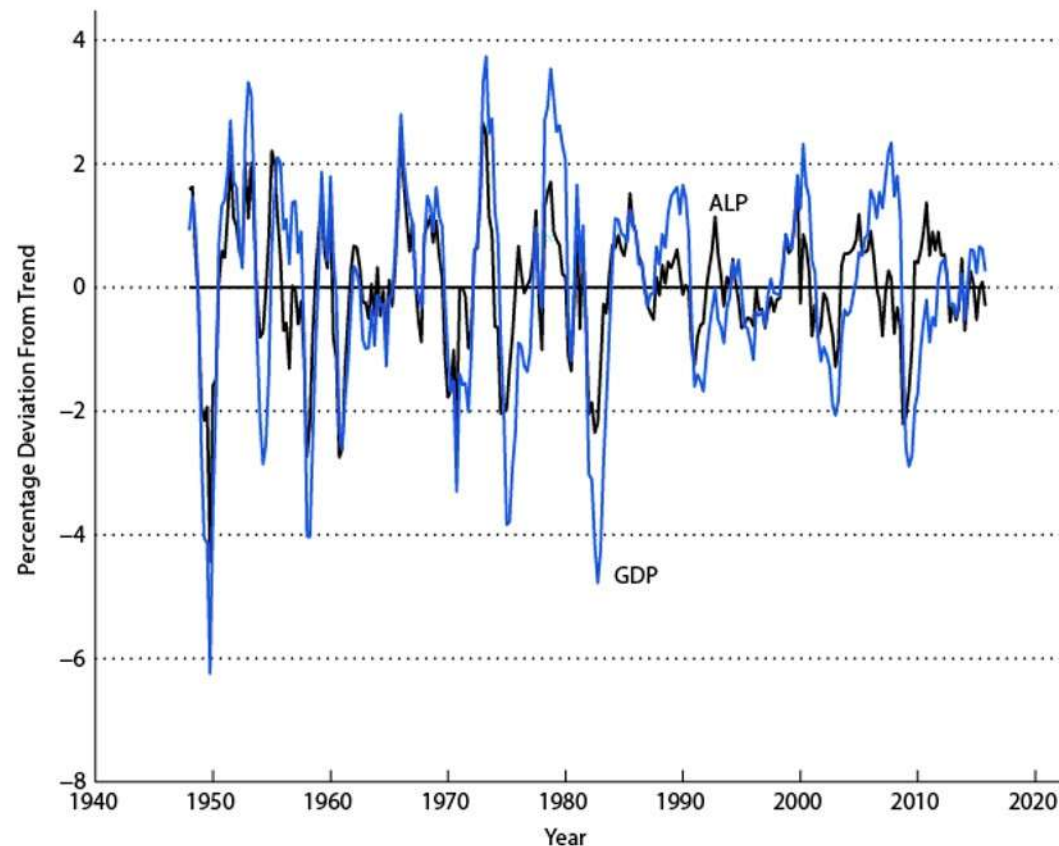
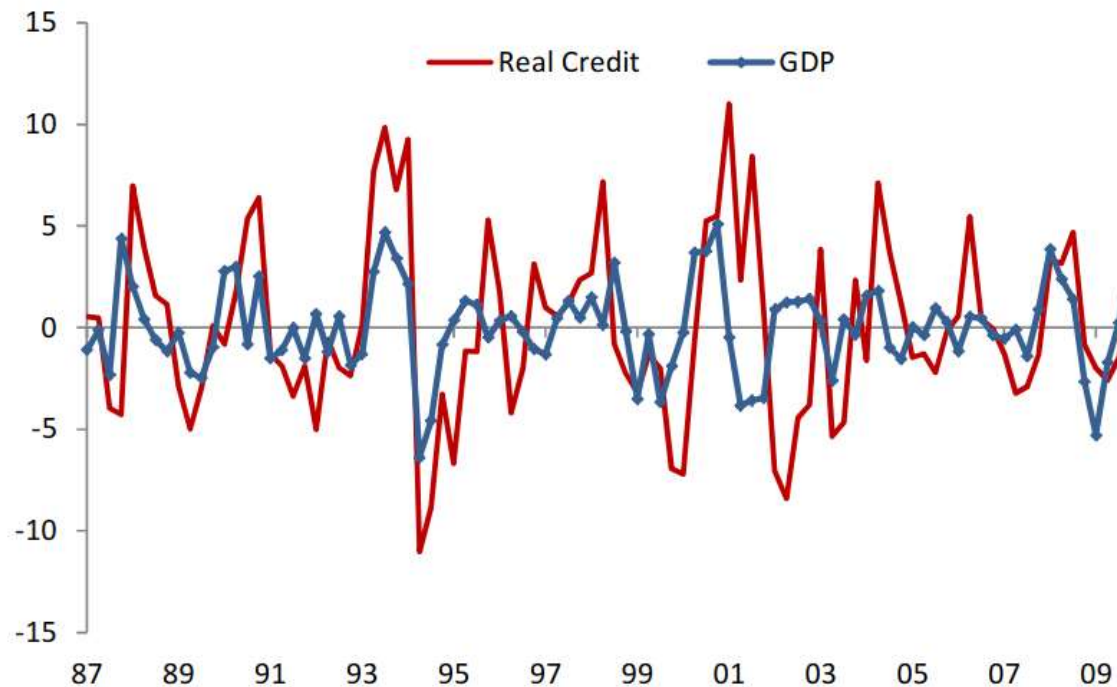


Figure 3.14 Percentage Deviations from Trend in Average Labor Productivity and Real GDP



Percentage Deviations from Trend, Real GDP and Real Credit, Turkey (1987-2009)

Figure 4: Percentage Deviations from HP Trend ($\lambda=14$): GDP and Real Credit



Source: CBRT

Figure 3.15

Seasonally Adjusted and Unadjusted Unemployment Rate

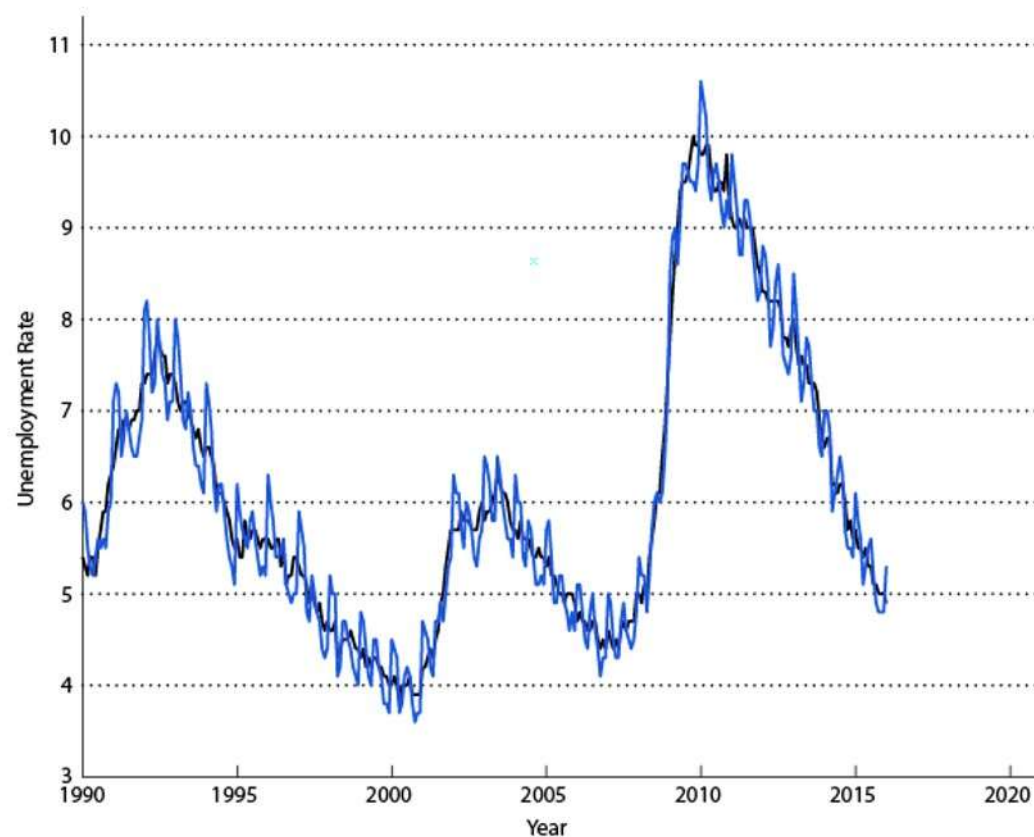
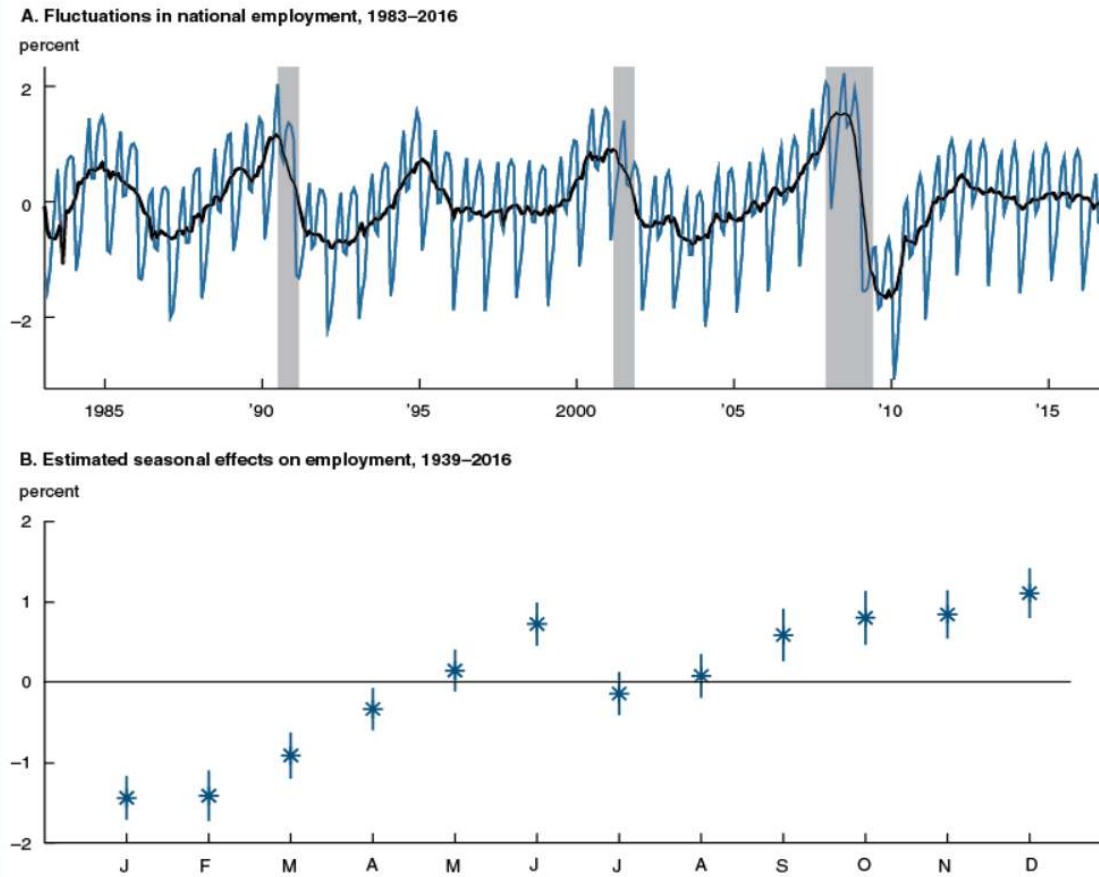


Figure 1. Seasonal fluctuations in national employment



Notes: Panel A plots Hodrick–Prescott-filtered (HP-filtered) nonseasonally adjusted log national employment data (blue line) and HP-filtered seasonally adjusted log national employment data (black line). The shaded areas in panel A indicate official periods of recession as identified by the National Bureau of Economic Research. Panel B plots the point estimates of the monthly dummy coefficients (β_k) from equation 1 (asterisks) for employment, together with plus and minus two-standard-error bands (vertical lines that run through the asterisks). See the text for further details.

Source: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Current Employment Statistics*, from Haver Analytics.

<https://www.chicagofed.org/publications/economic-perspectives/2018/3>

Table 3.1

Correlation Coefficients and Variability of Percentage Deviations from Trend

	Correlation Coefficient	Standard Deviation (% of S.D. of GDP)
Consumption	0.77	77
Investment	0.80	301
Employment	0.78	65
Average Labor Productivity	0.77	63

Table 3.2 Summary of Business Cycle Facts

	Cyclicalities	Lead/Lag	Variation Relative to GDP
Consumption	Procyclical	Coincident	Smaller
Investment	Procyclical	Coincident	Larger
Employment	Procyclical	Lagging	Smaller
Real Wage	Procyclical	?	?
Average Labor Productivity	Procyclical	Coincident	Smaller