

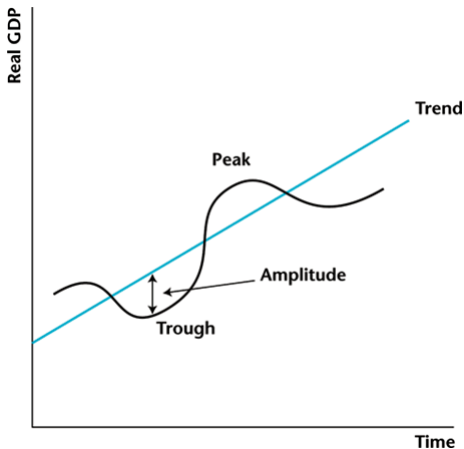
ECON3102-005  
CHAPTER 3: BUSINESS CYCLE  
MEASUREMENT

Neha Bairoliya

Spring 2014

# REGULARITIES IN GDP FLUCTUATIONS

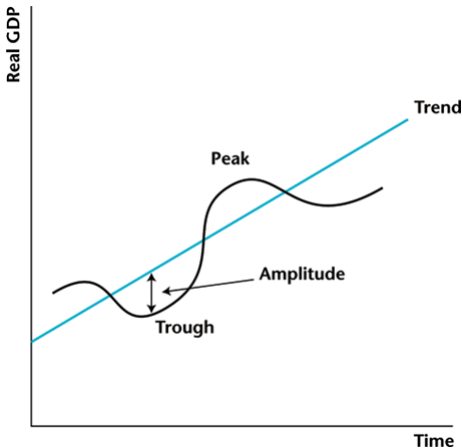
Business Cycles are fluctuations about trend in real GDP.



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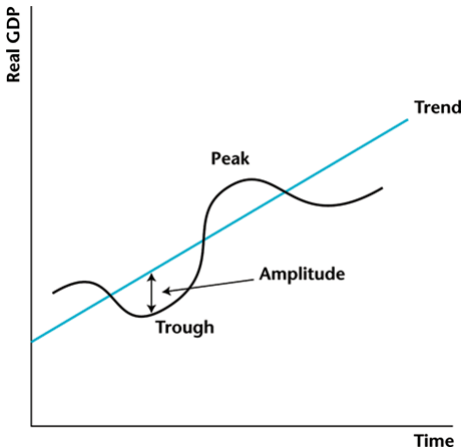
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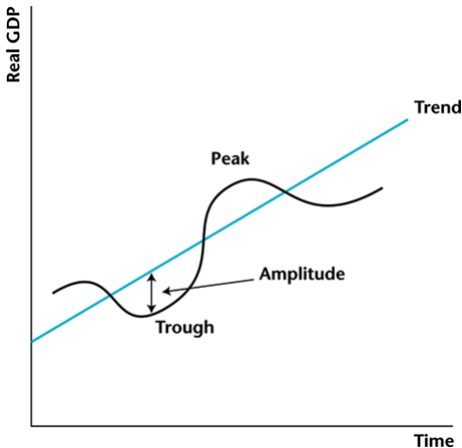
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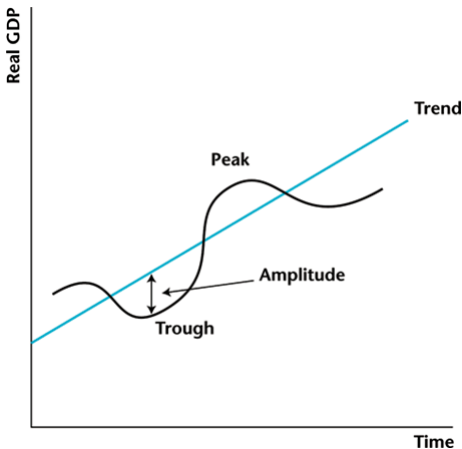
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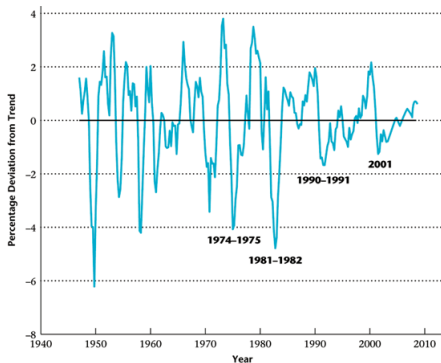
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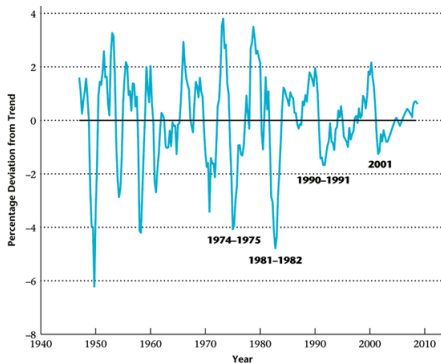
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- Persistent positive deviations from trend are booms and persistent negative deviations from trend are recessions.
- The amplitude of the business cycle is the maximum deviation from trend.
- The frequency of the business cycle is the number of peaks in RGDP that occur per year.

# IRREGULARITIES IN GDP FLUCTUATIONS



Source: U.S. Department of Commerce.

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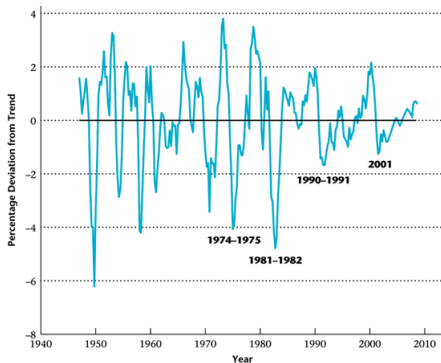


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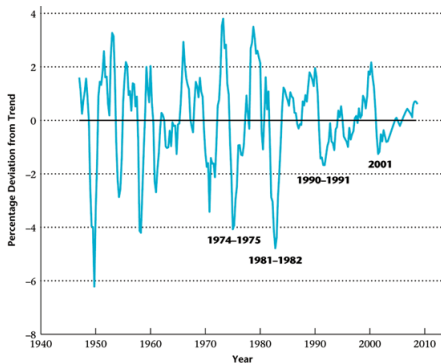
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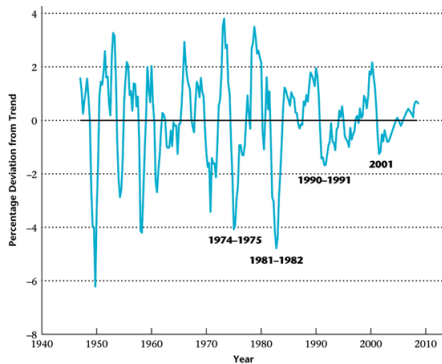
# IRREGULARITIES IN GDP FLUCTUATIONS



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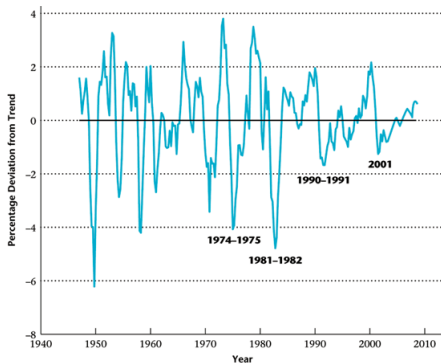
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# SO, IS THERE ANY HOPE OF ANTICIPATING BUSINESS CYCLES?



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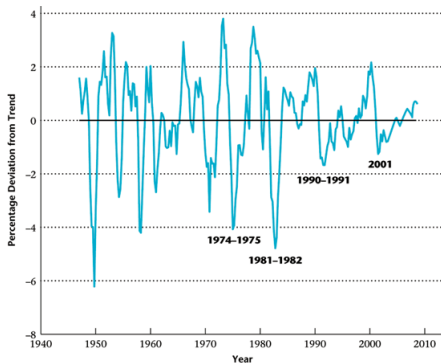
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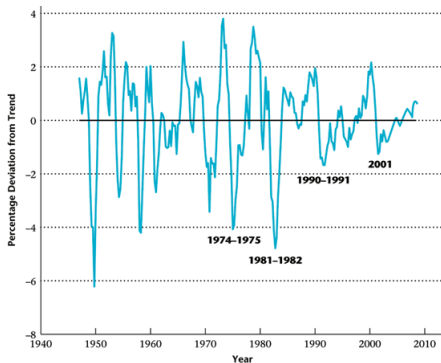
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# SO, IS THERE ANY HOPE OF ANTICIPATING BUSINESS CYCLES?



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- While short-term forecasting is relatively easy (sometimes)
- long-term forecasting is nearly impossible.
- This is why we say that business cycles are unpredictable.

## OTHER MACRO INDICATORS

- Macroeconomic variables often fluctuate together in patterns that exhibit strong regularities. These patterns are known as comovements.

## OTHER MACRO INDICATORS

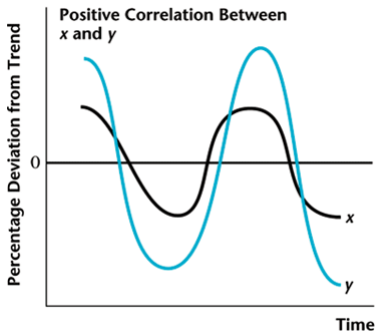
- Macroeconomic variables often fluctuate together in patterns that exhibit strong regularities. These patterns are known as comovements.
- To identify comovements we often rely in observation of the variables graphs.

Generally, graphs of macroeconomic variables come in two different flavors:

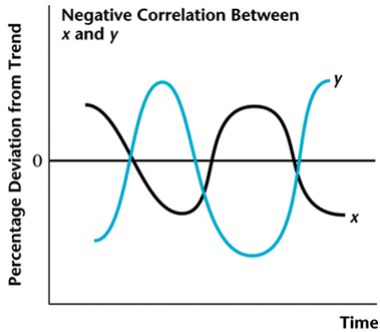
- Scatter plots
- Time-series plots



# TIME-SERIES PLOTS



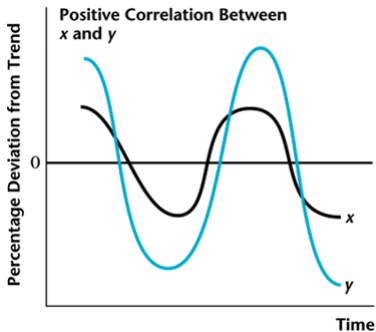
(a)



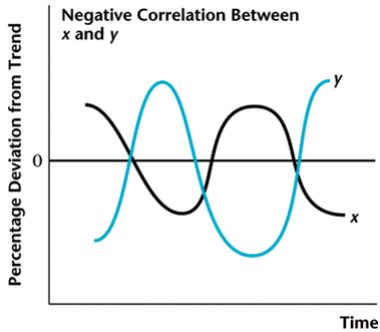
(b)

- Example: variables  $X$  and  $Y$

# TIME-SERIES PLOTS



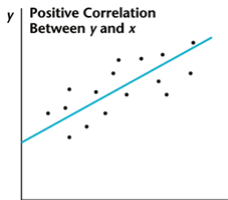
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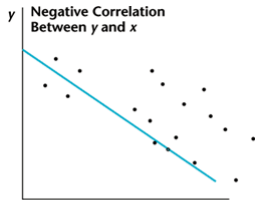
(b)

- Example: variables  $X$  and  $Y$
- Variable values are on the  $Y$ -axis. Time is on the  $X$ -axis.

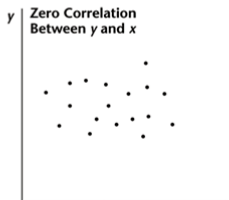
# SCATTER PLOTS



(a)



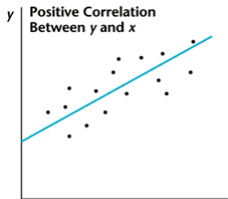
(b)



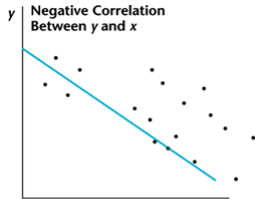
(c)

- Example: variables  $X$  and  $Y$

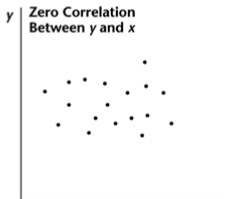
# SCATTER PLOTS



(a)



(b)



(c)

- Example: variables  $X$  and  $Y$
- One variable is on the  $X$ -axis, and the other on the  $Y$ -axis.

# CORRELATION WITH REAL GDP

We are mostly interested in how individual economic variables comove with GDP.

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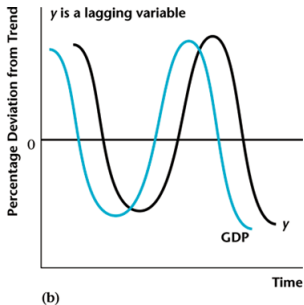
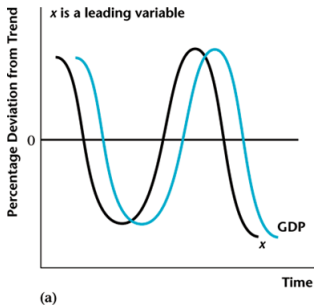
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- An economic variable is countercyclical if its deviations from trend are negatively correlated with deviations from trend in RGDP.
- Variables which are neither procyclical nor countercyclical are called acyclical.

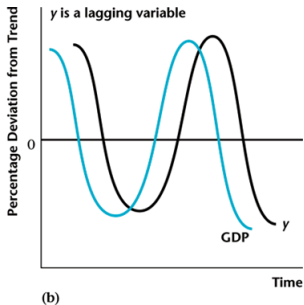
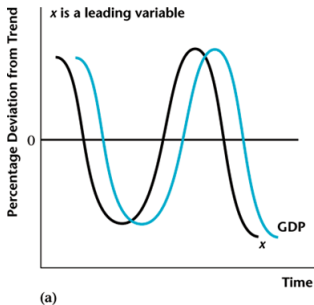


## CORRELATION WITH REAL GDP (CONT'D)



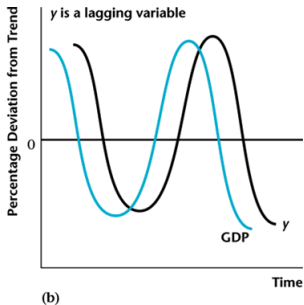
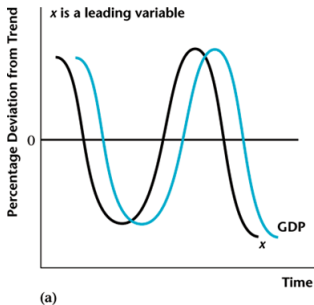
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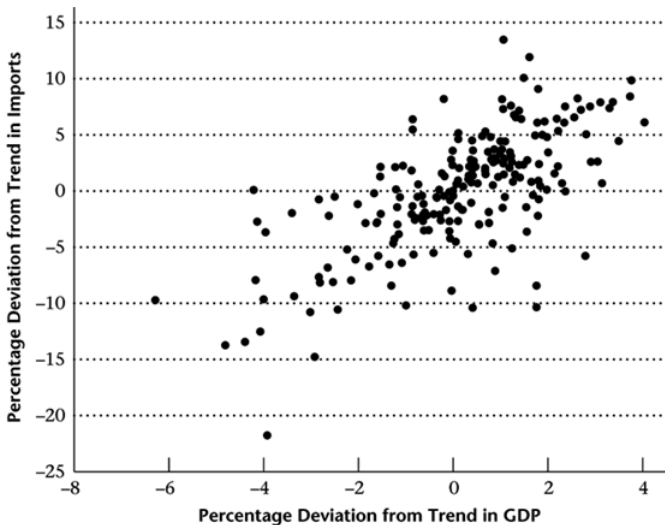


- If a macro variable helps in predicting the future path of RGDP, we say call it a leading variable.
- If RGDP helps in predicting the future path of the variable, it is a lagging variable.
- Variables which neither lead nor lag RGDP are called coincident variables.

## ANOTHER MEASURE

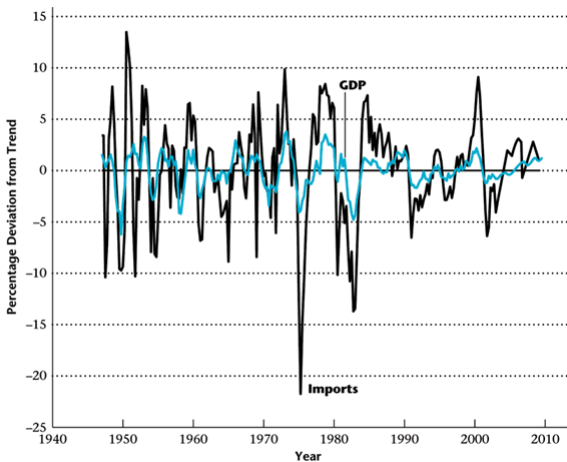
Volatility: a measure of cyclical variability is the standard deviation of the percentage deviations from trend.

# EXAMPLE: IMPORTS AND RGDP (SCATTER PLOT)



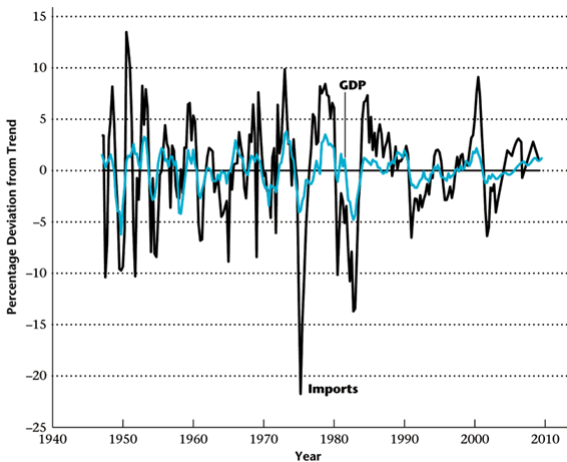
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

# EXAMPLE: IMPORTS AND RGDP (TIME-SERIES PLOT)



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## EXAMPLE: IMPORTS AND RGDP (TIME-SERIES PLOT)



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- Imports are procyclical and more volatile than RGDP.

# MODEL AND BEHAVIOR OF KEY MACROECONOMIC VARIABLES

If we are to construct a macroeconomic model which helps us understand business cycles and the economy, it'd better be the case that it is able to replicate the regularities and comovements that we observe in RGDP and its components!



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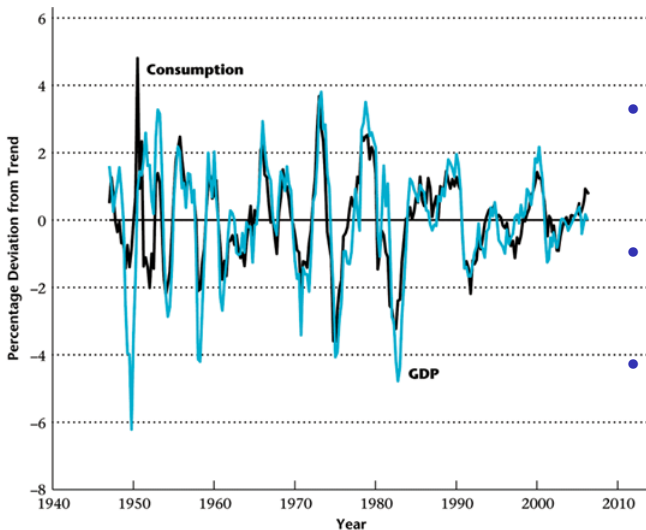
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- Components of GDP: consumption and investment.
- Nominal variables: price level and money supply.
- Labor market variables: employment, real wage, average labor productivity.

# CONSUMPTION AND GDP

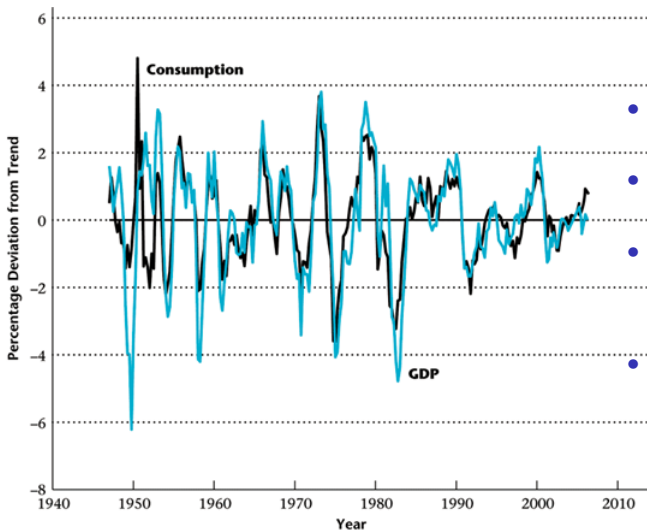


- Procyclical or countercyclical?

- Lead or lag?

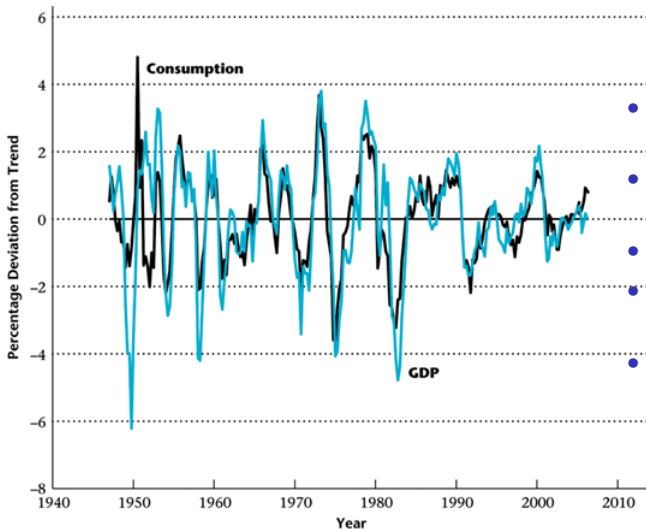
- More volatile than GDP?

# CONSUMPTION AND GDP



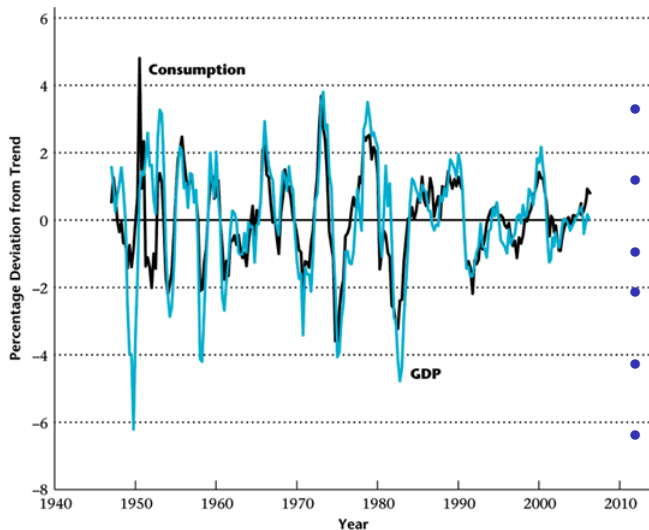
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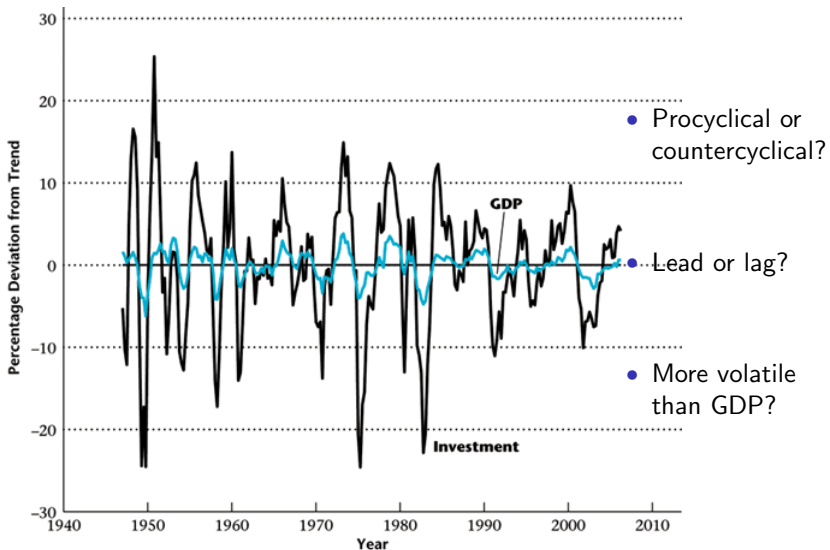
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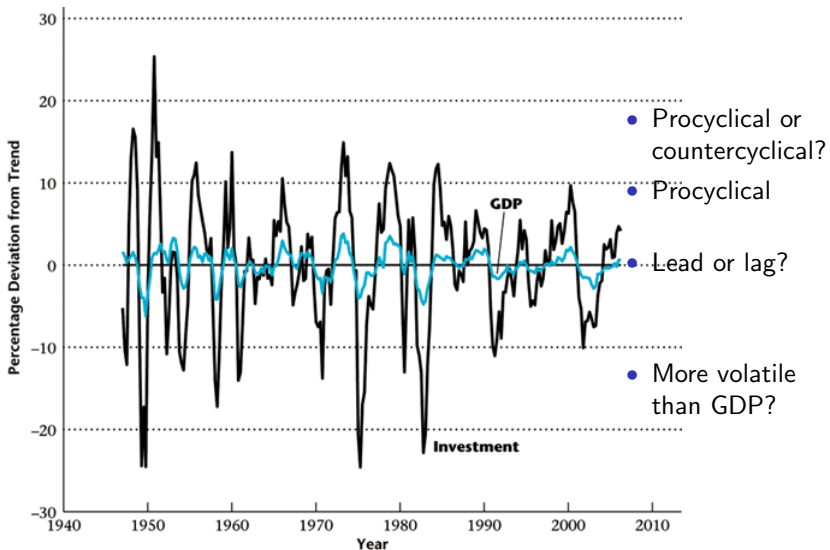
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- No

# INVESTMENT AND GDP

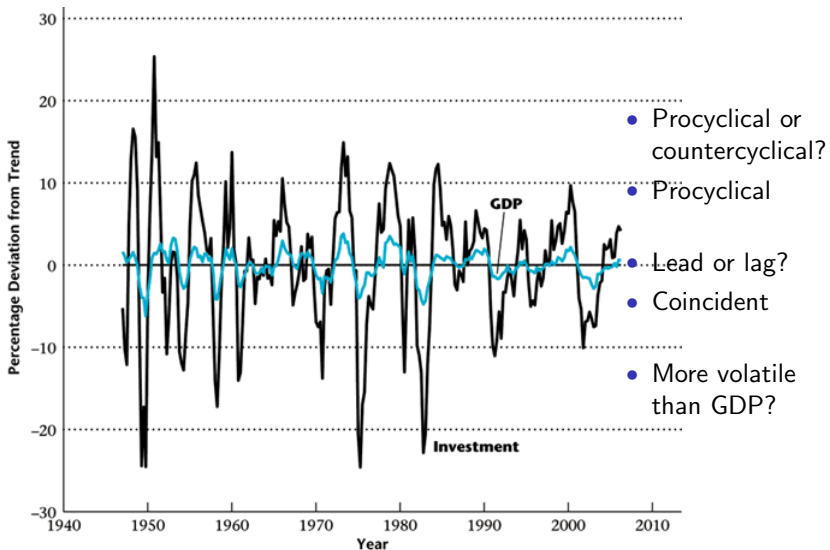




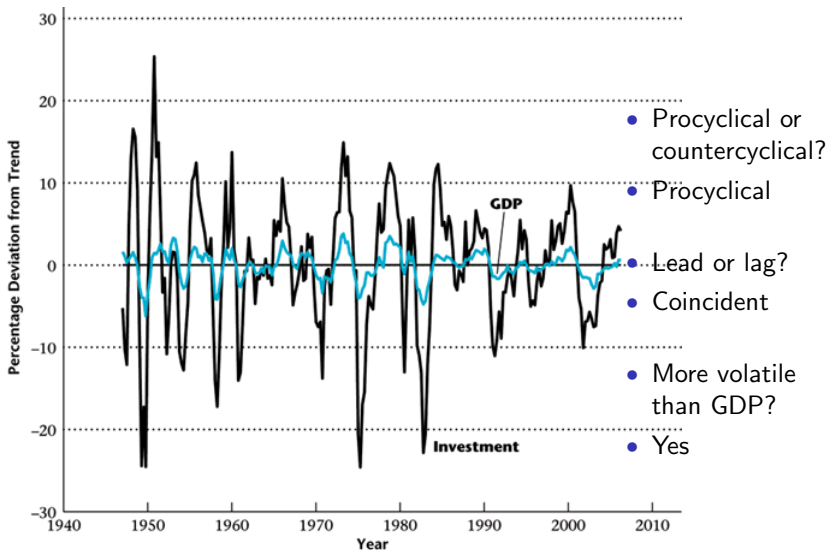
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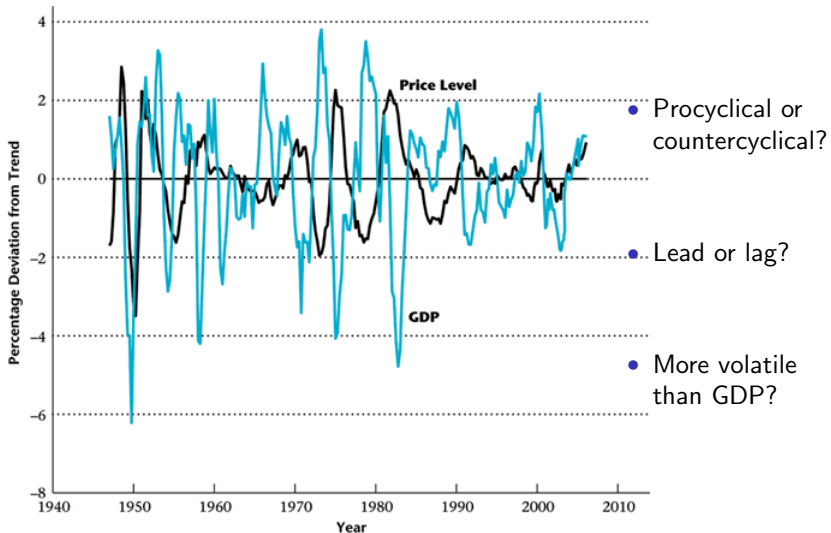
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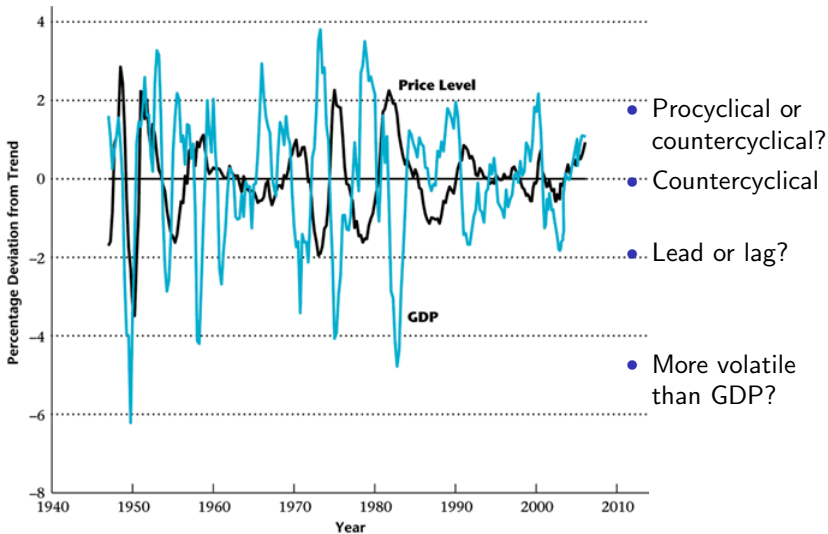
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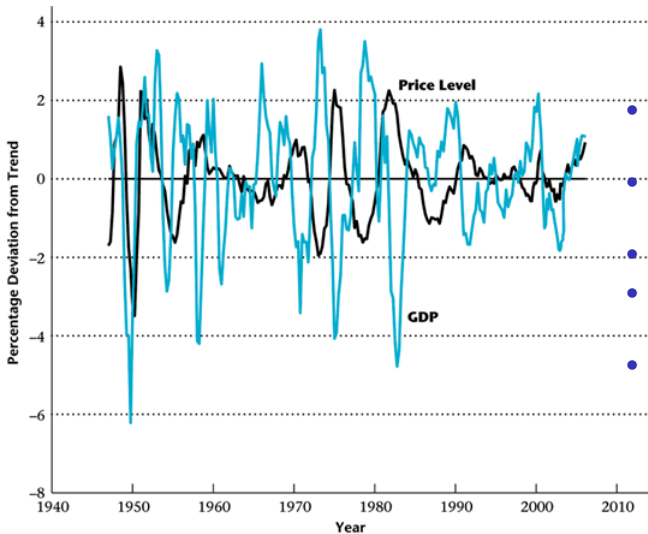
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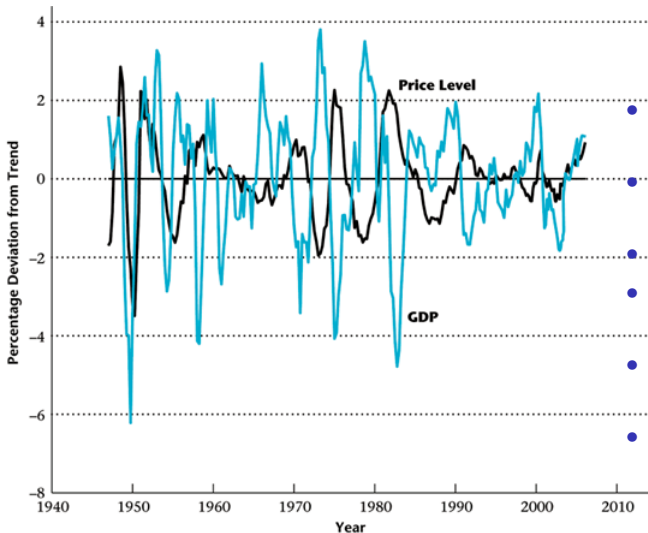


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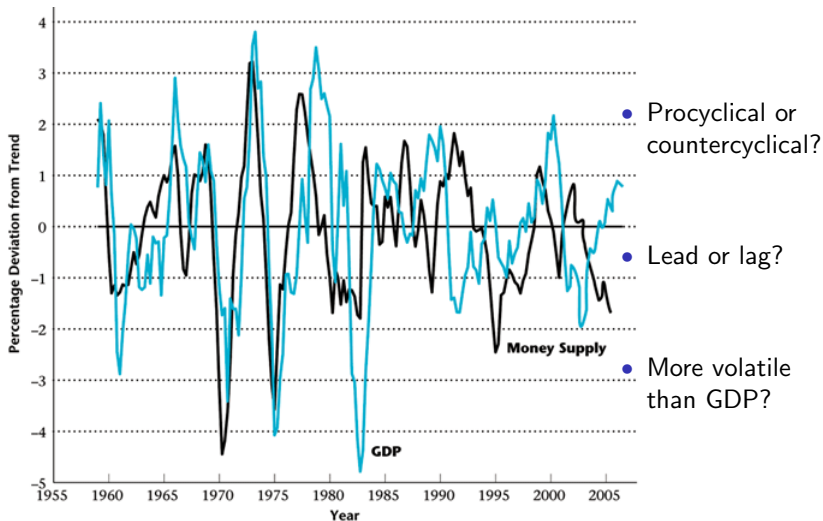
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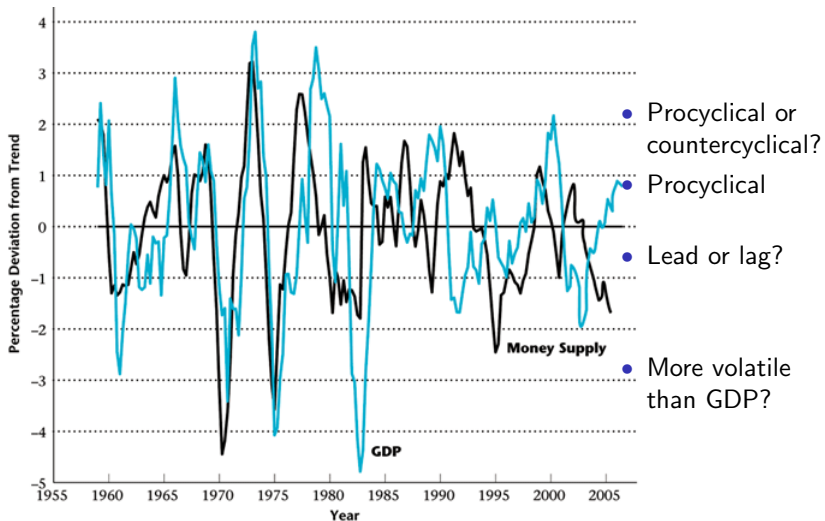
# MONEY SUPPLY AND GDP



Source: U.S. Department of Commerce, Bureau of Economic Analysis, and Board of Governors of the Federal Reserve System.

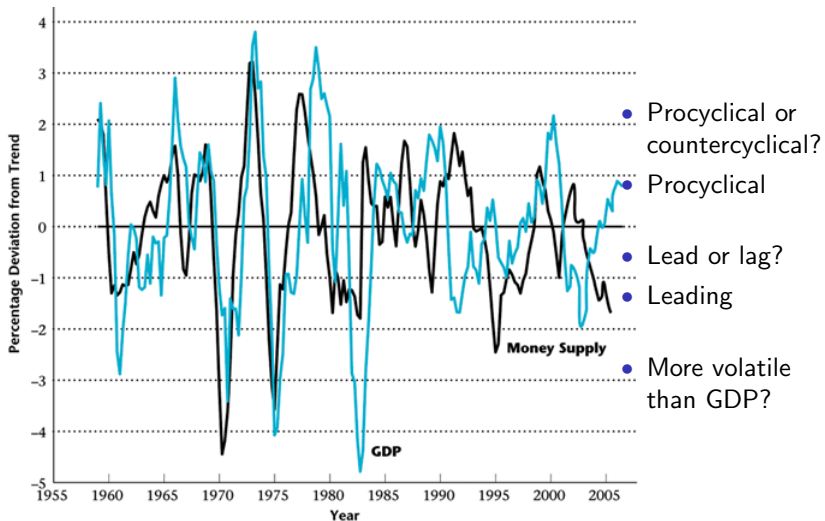


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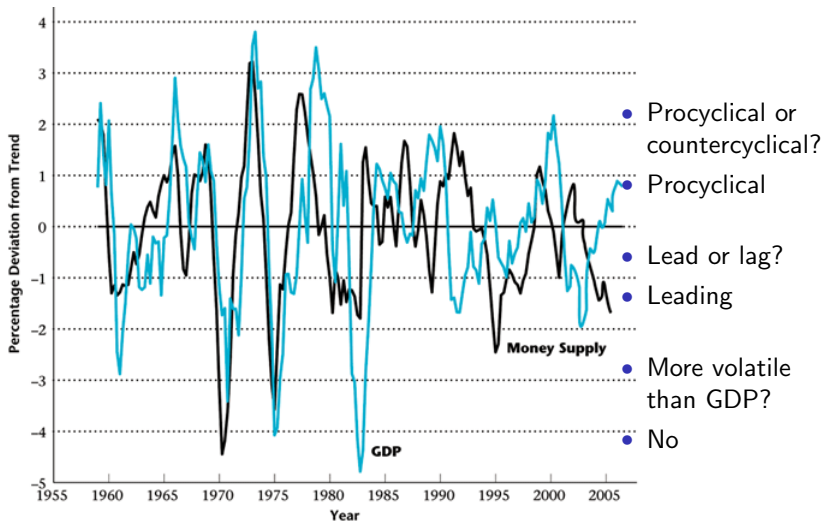
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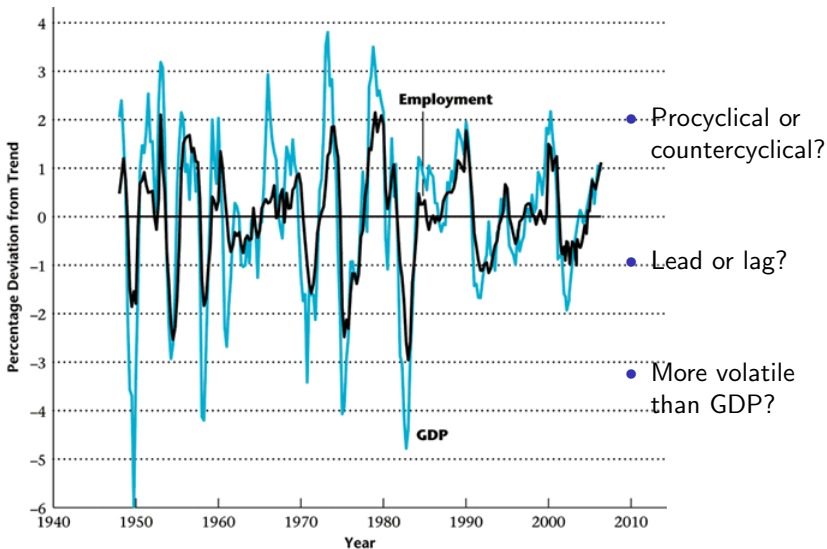
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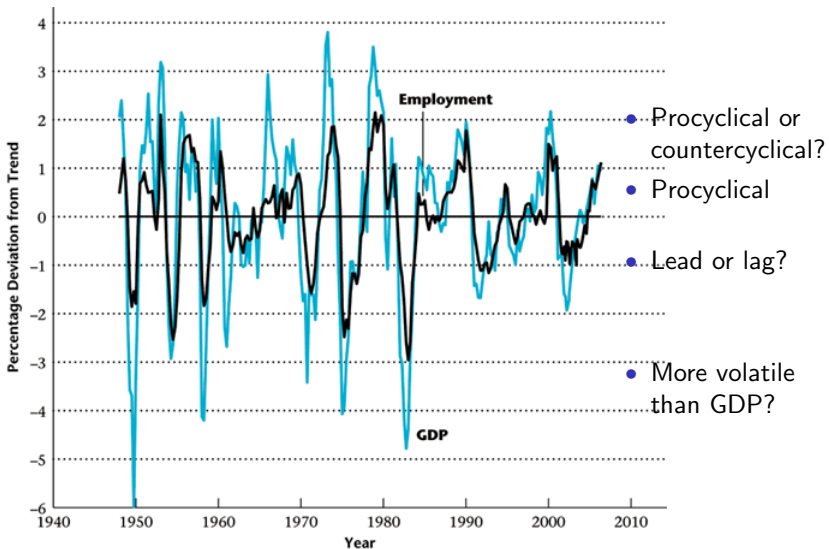


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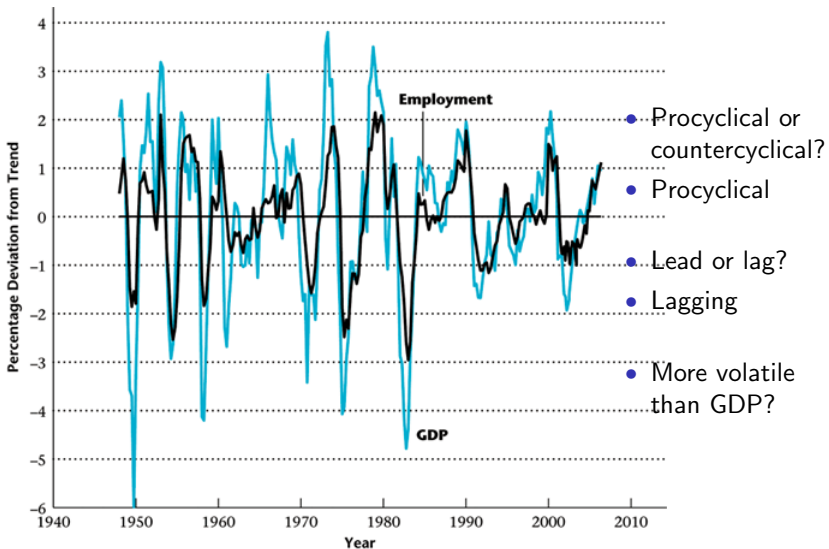
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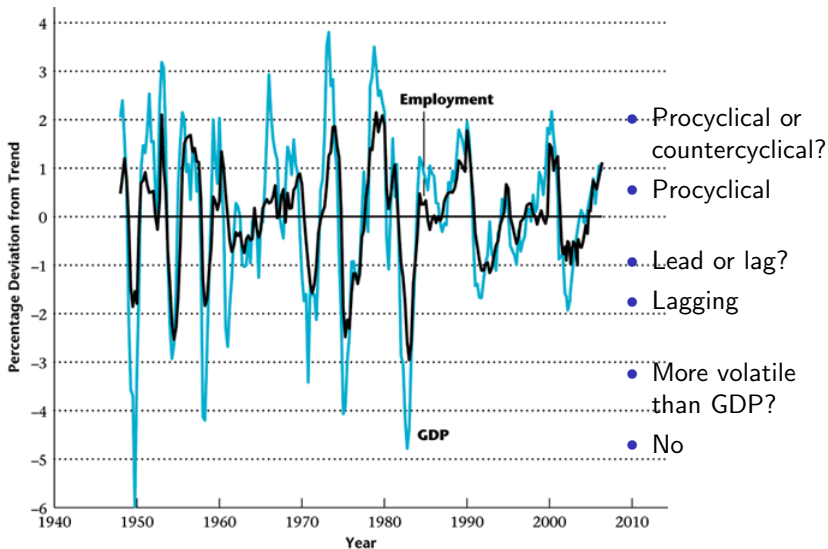
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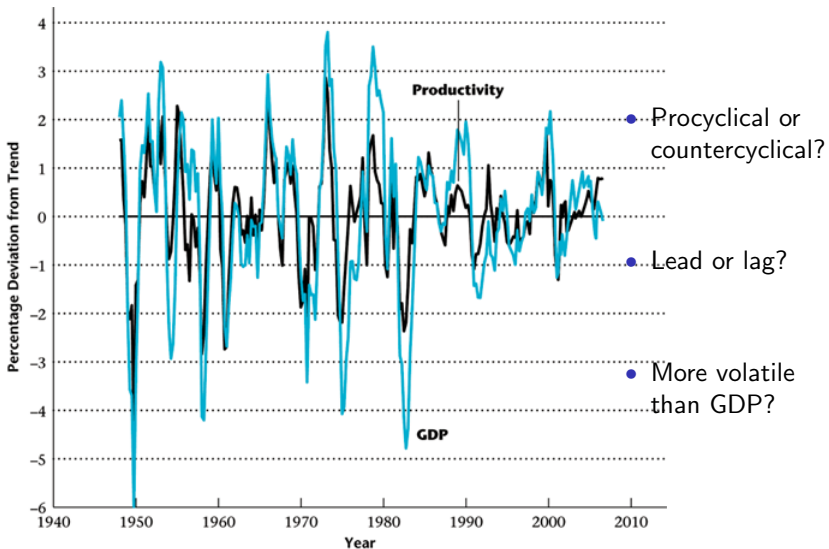
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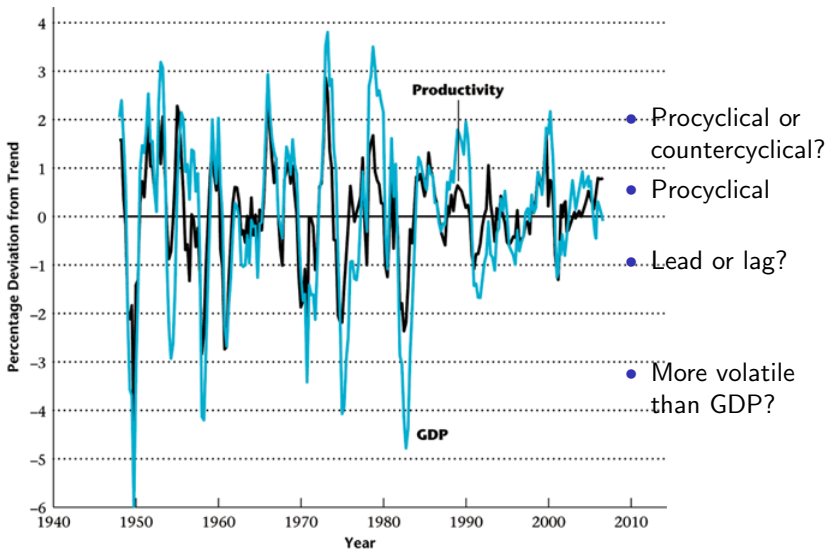


# AVERAGE LABOR PRODUCTIVITY AND GDP

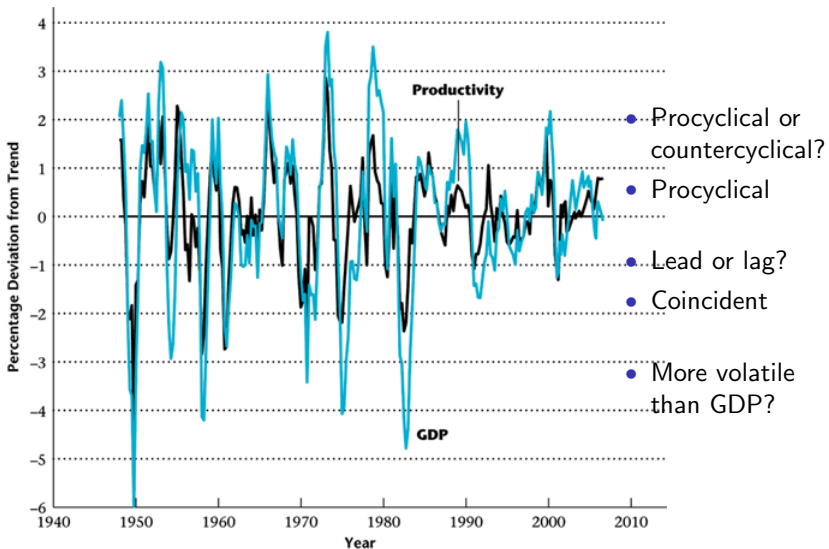




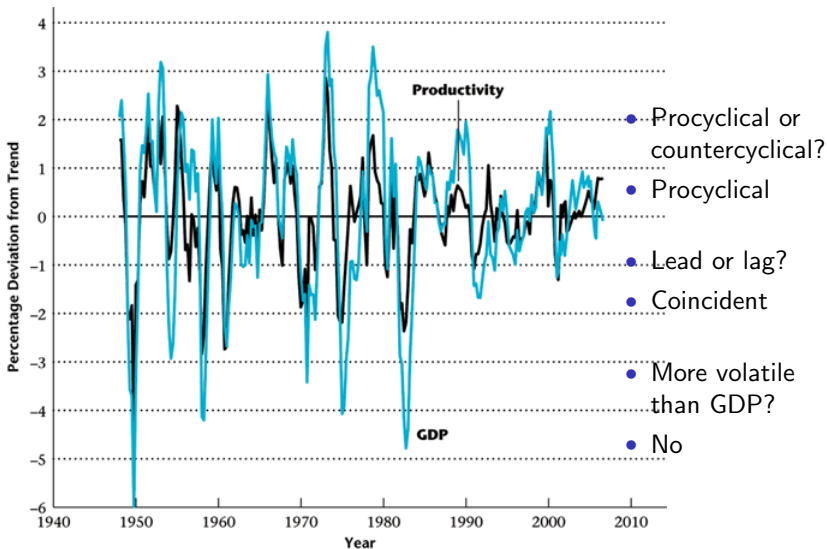
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# SUMMARY

Our models should be able to replicate the following table.

	<b>Cyclicality</b>	<b>Lead/Lag</b>	<b>Variability Relative to GDP</b>
Consumption	Procyclical	Coincident	Smaller
Investment	Procyclical	Coincident	Larger
Price Level	Countercyclical	Coincident	Smaller
Money Supply	Procyclical	Leading	Smaller
Employment	Procyclical	Lagging	Smaller
Real Wage	Procyclical	?	?
Average Labor Productivity	Procyclical	Coincident	Smaller