TURKISH AVIATION ACADEMY

İTÜ

Aviation Economics & Finance

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OUTLINE

Macroeconomics for Aviation Strategy & Management

- Cleaning up loose ends
  - Nominal and Real Exchange Rates
- Business Cycles and GDP
- GNP and GDP
  - Analyzing current accounts
- Okun's Law, Inflation, the Phillips Curve
- Yield Curves

Nominal and real Exchange Rates

- Nominal exchange rates – the price of one currency in terms of another; how many Turkish Lira can I buy with 1 Canadian $?
- ..but it this what we want to know?
- If I buy Turkish Lira I want to know what goods & services can I purchase with the Lira.
- Need 'Real Exchange Rate' [RER].
- *The RER seeks to measure the value of a country's goods against those of another country, a group of countries, or the rest of the world, at the prevailing nominal exchange rate.*

NOMINAL AND REAL EXCHANGE RATES

- How do we measure the 'RER'?
  - $RER = e \cdot \left({}^{P^T}/_{PCan} \right)$
  - where e is the nominal dollar-lira exchange rate and P^T is the [average] price of the good in Turkey and P^{can} is the [average] price of the same good in Canada.
  - Actually policy people are interested in the 'Real Effective Exchange Rate' [REER], The REER is an average of the bilateral RERs between the country and each of its trading partners, weighted by the respective trade shares of each partner
  - If currencies are 'behaving', there should be no r little change in the REER over time.

The Big Mac Index

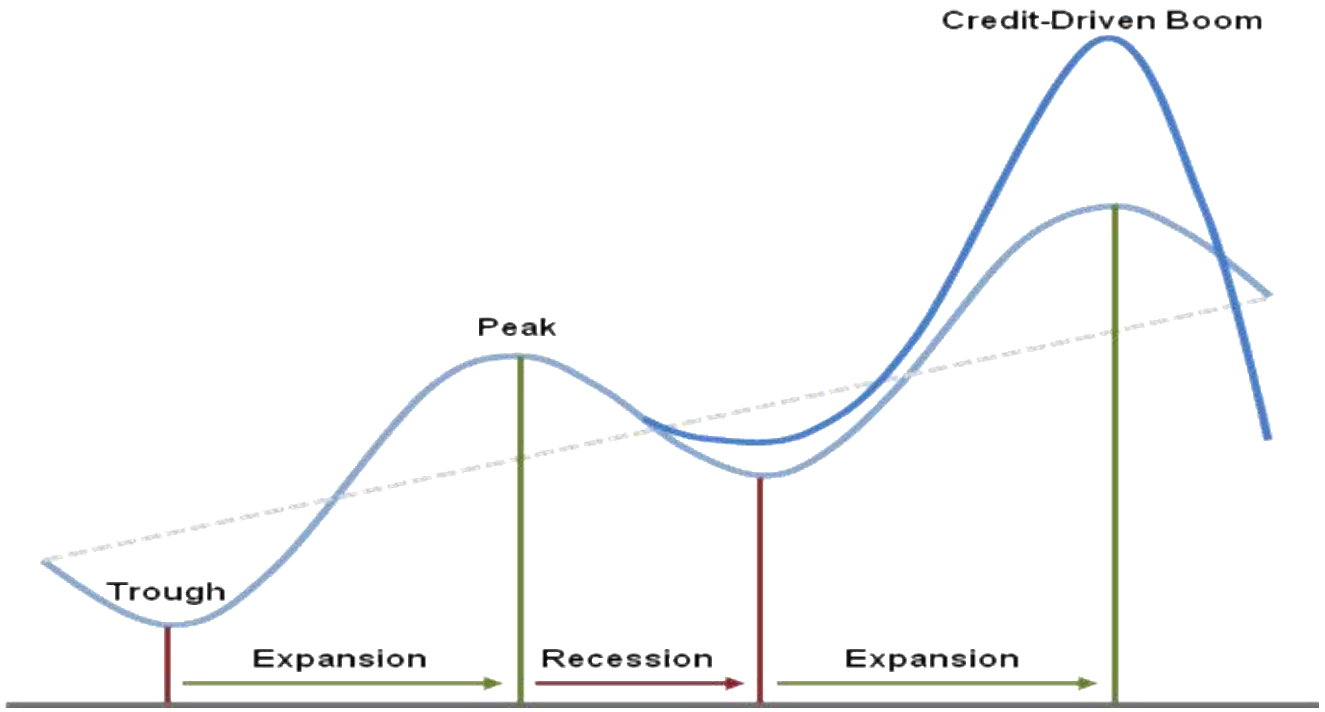
- What are some problems in comparing goods across countries?
- The Big Mac Index:

Counry	Local price	Dollar Exchange	Dollar Price	Dollar PPP	Implied Dollar Valuation			
Canada	5.7	1.23	4.64	1.19	-3.14	Can$ undervalued by 3%		
Turkey	9.25	2.33	3.96	1.93	-17.24	Lira undervalued by 17%		
U.S.	4.79	1	4.79	1	0			
	REER-Can	1.033631579	a person in US converts $4.79 to Can $ (multiply 4.79 x 1.23) and divide by price in Canada					
	REER-Turkey	1.206562162	a person in US converts their US$ (4.79) to Lira (multiply 4.79 x 2.33) and divide by price in Turkey					

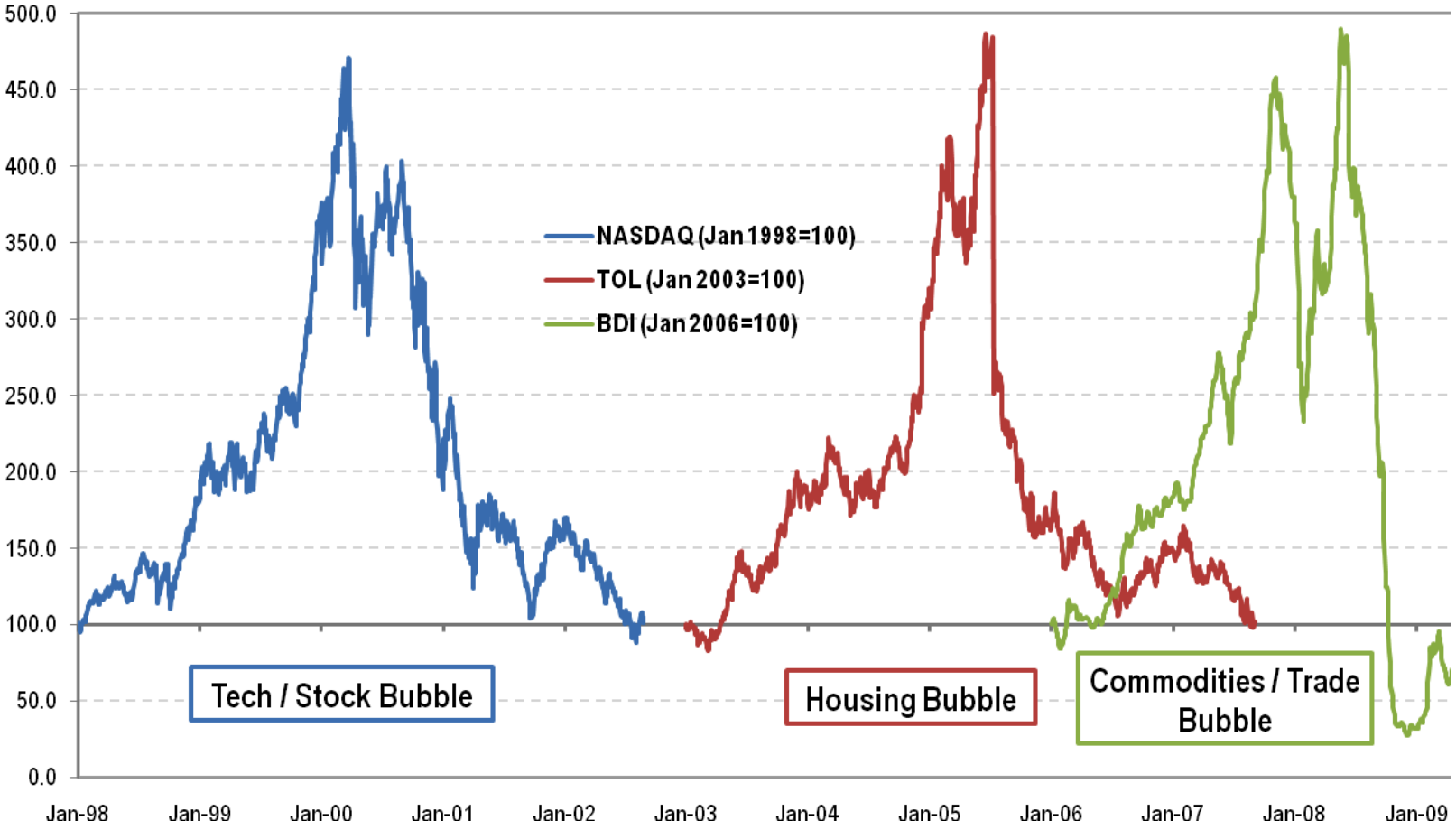
- Big Mac price in local currency-Big Mac price in $s gives implied PPP of Dollar.
  - May be less than perfect substitutes or currency may be 'artificially' kept low for policy reasons.

BUSINESS CYCLES AND GDP

Trends in GDP Growth and Swings about the Trend



Source : Notteboom and Rodrique (2009)



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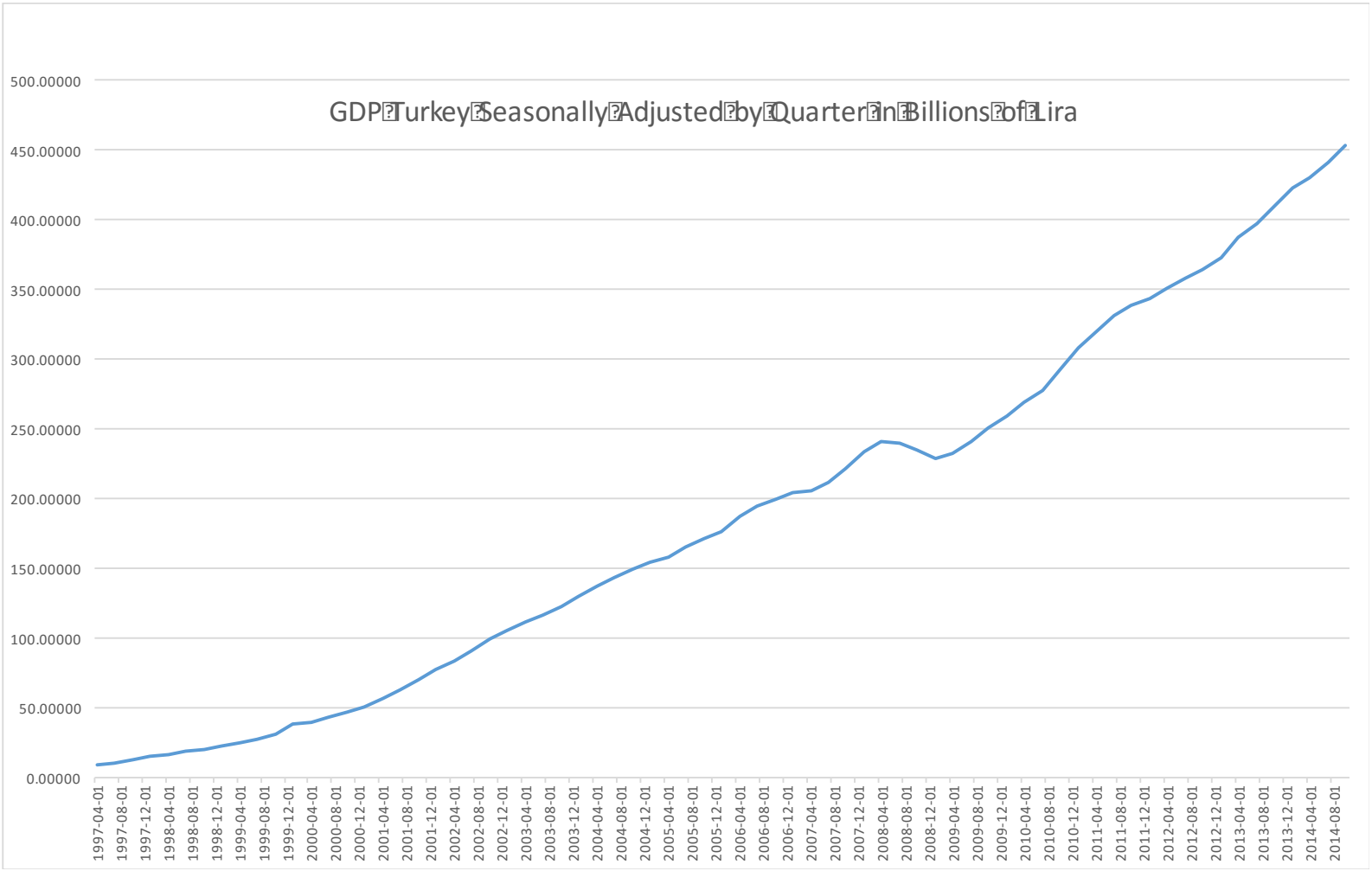
GDP Turkey Seasonally Adjusted by Quarter In Billions of Lira
500.00000
450.00000
400.00000
350.00000
300.00000
250.00000
200.00000
150.00000
100.00000
50.00000
0.00000
1997-04-01
1997-08-01
1997-12-01
1998-04-01
1998-08-01
1998-12-01
1999-04-01
1999-08-01
1999-12-01
2000-04-01
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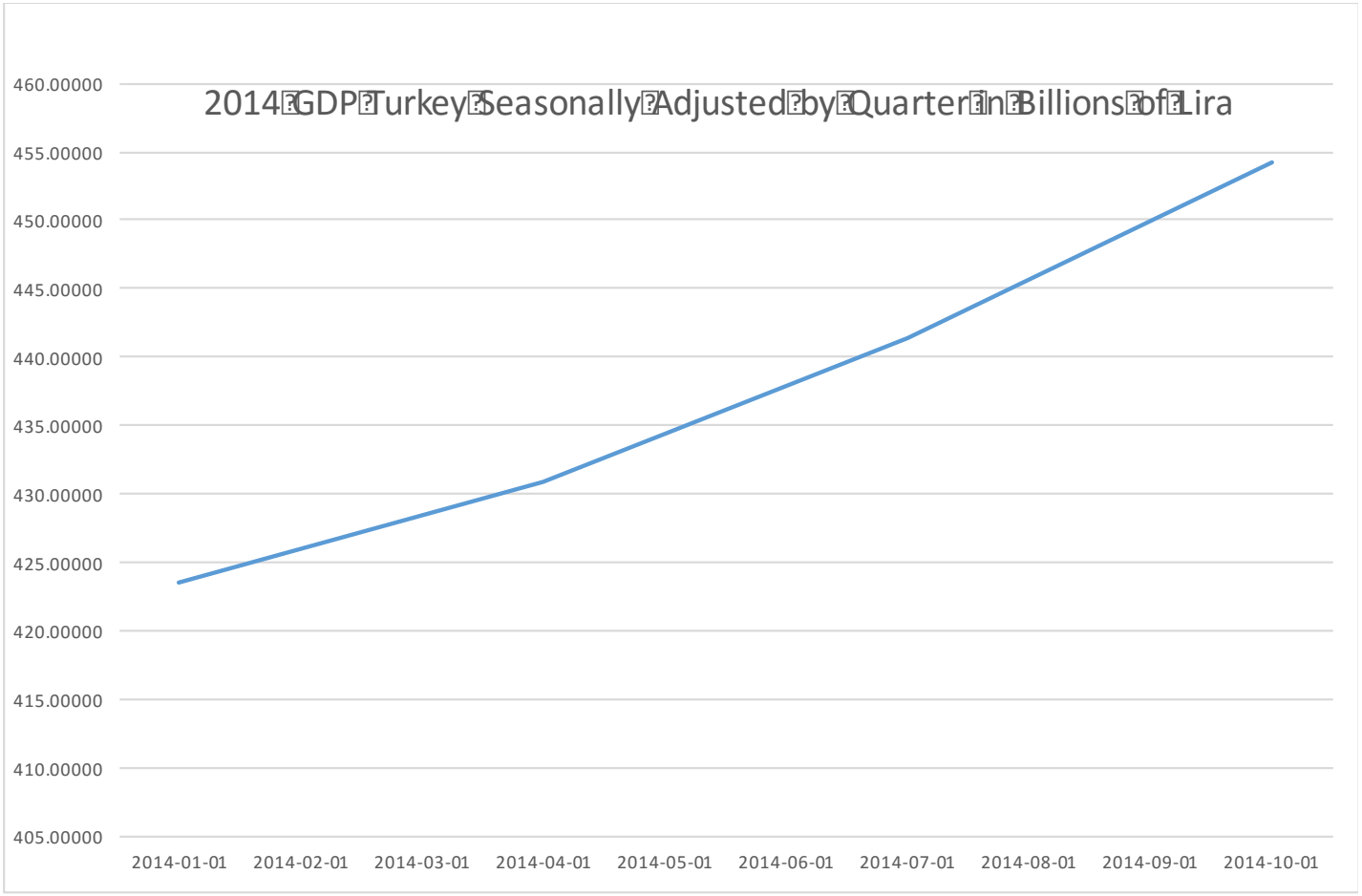
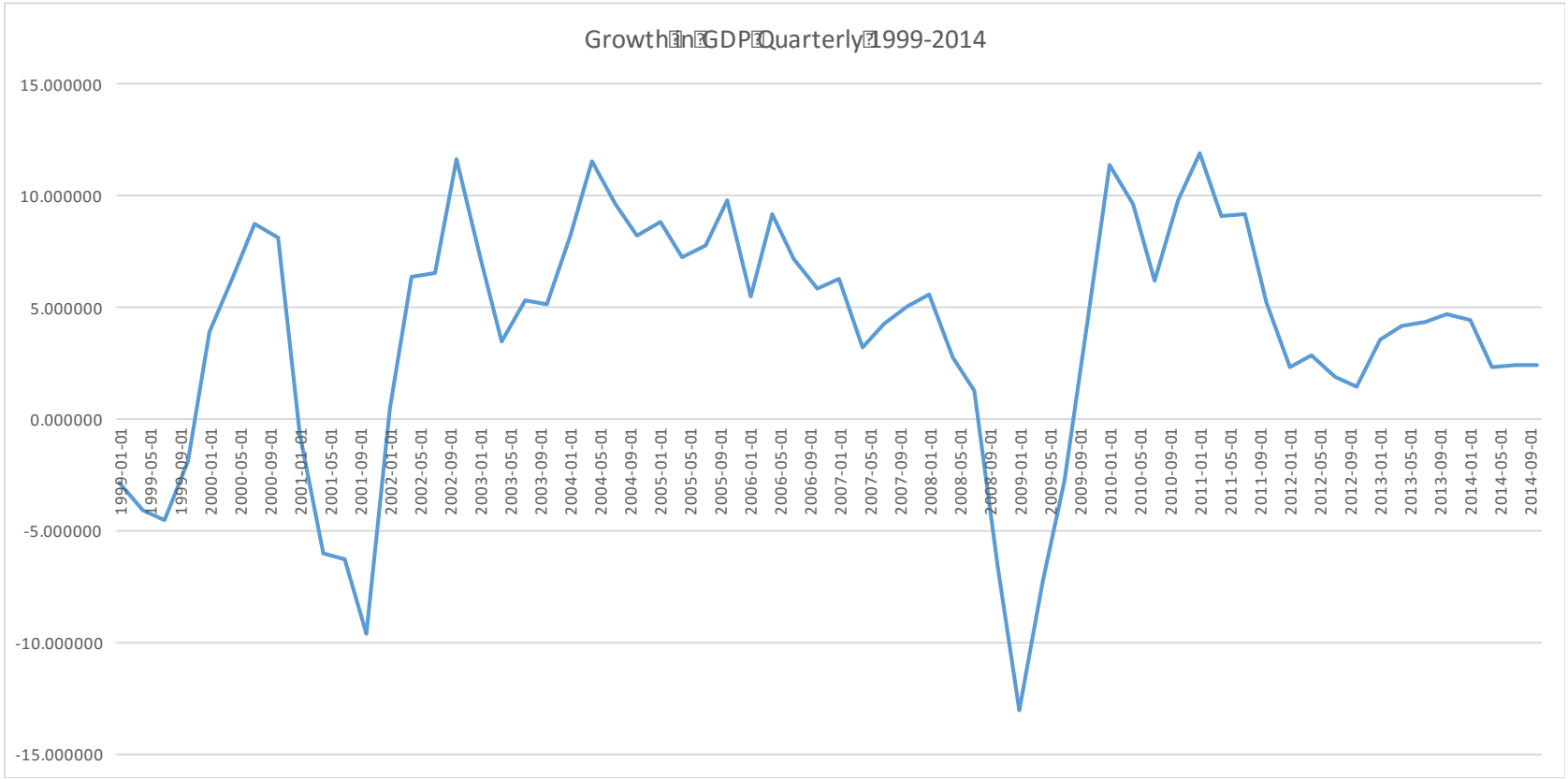
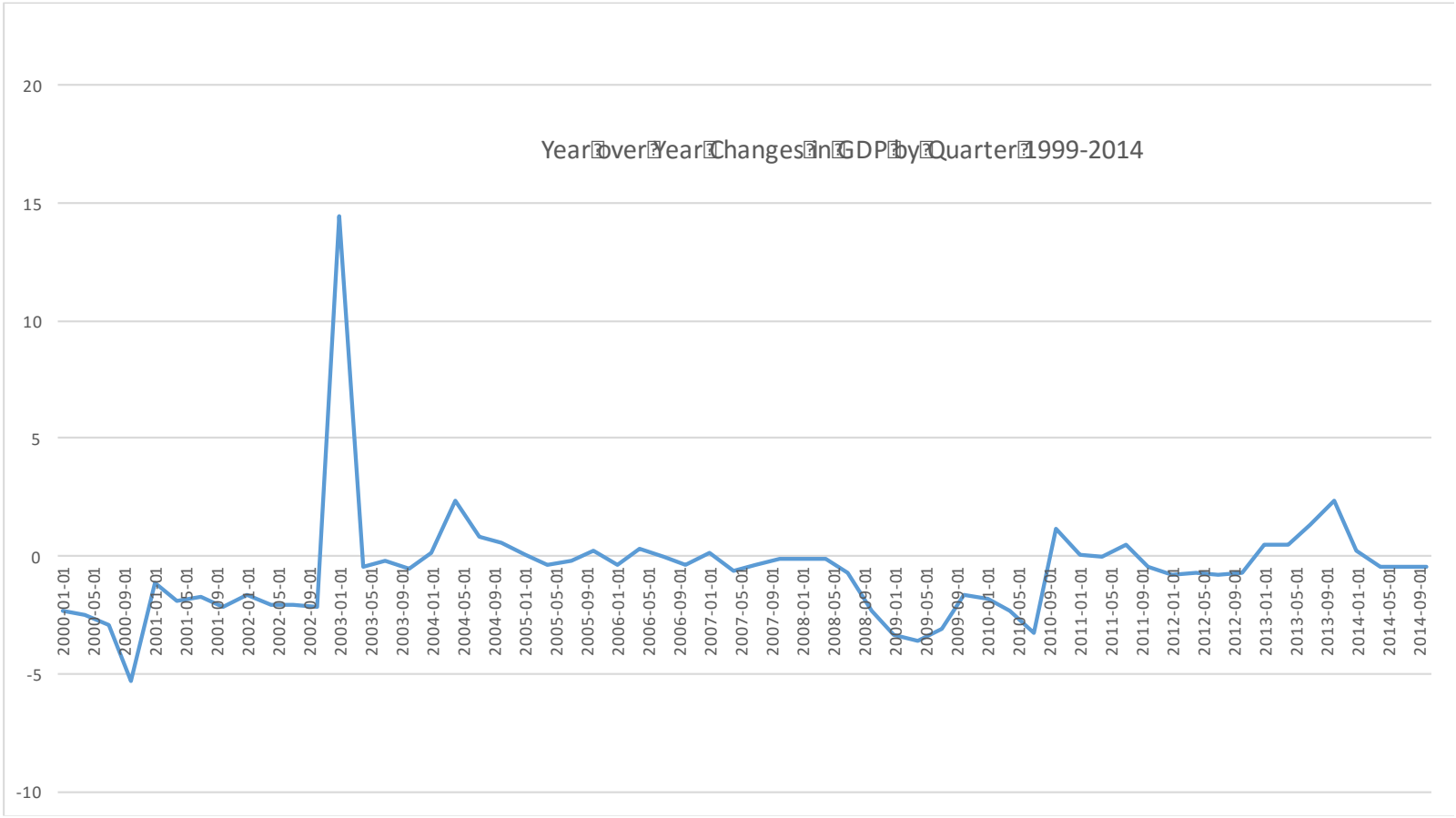
2014-04-01
2014-08-01

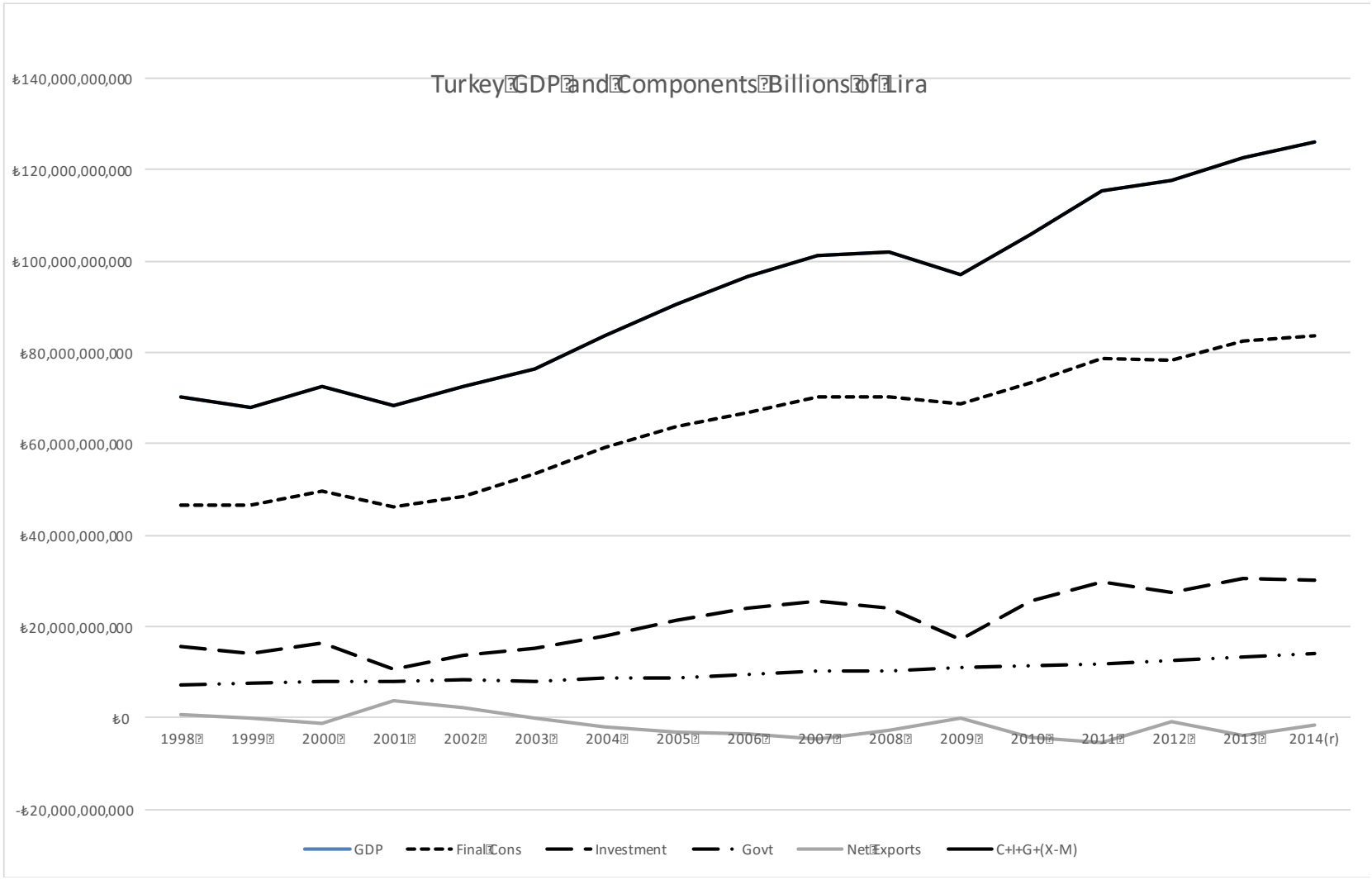

2014 GDP Turkey Seasonally Adjusted by Quarter In Billions of Lira
460.00000
455.00000
450.00000
445.00000
440.00000
435.00000
430.00000
425.00000
420.00000
415.00000
410.00000
405.00000
2014-01-01
2014-02-01
2014-03-01
2014-04-01
2014-05-01
2014-06-01
2014-07-01
2014-08-01
2014-09-01
2014-10-01

Two Views of Changes in GDP: Monthly Growth



TWO VIEWS OF CHANGES IN GDP: YEAR OVER YEAR GROWTH

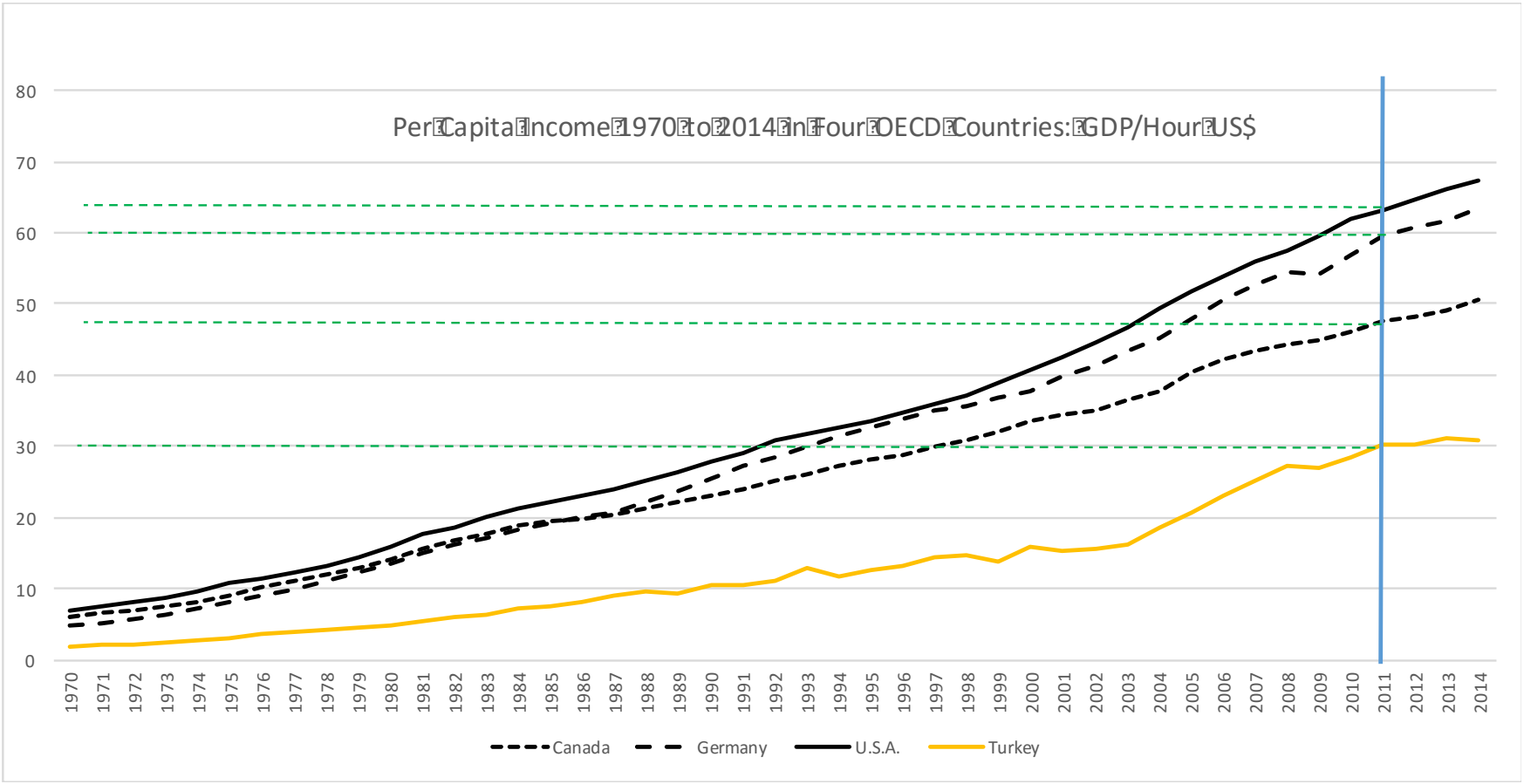



Turkey GDP and Components Billions of Lira
₺140,000,000,000
₺120,000,000,000
₺100,000,000,000
₺80,000,000,000
₺60,000,000,000
₺40,000,000,000
₺20,000,000,000
₺0
-₺20,000,000,000
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014(r)
GDP
Final Cons
Investment
Govt
Net Exports
C+I+G+(X-M)

WHY IS KNOWING MACRO VALUES IMPORTANT?

- Elasticity estimates of passenger growth wrt GDP growth of 1.57
  - A 1 percent increase in GDP leads to a 1.57 percent increase in passenger traffic
  - Likely an over-estimate since other things were changing: airfares, liberalization, number of routes, international trade share of GDP

Panel Fixed Effects Model		
8 cross section		
12 years; 1996-2007		
Variable (in Logs)	**Coefficient**	**T-Statistic**
Constant	-0.2849	-1.34
GDP	0.0652	2.10
Trade	0.8382	3.34
Connectivity	0.2201	2.37
Fuel Price	-0.2785	-3.34
Foreign Direct Investment	0.1306	2.28
Time	0.0884	1.80
9/11 Dummy	-0.1144	1.26
Adjusted R-sq	0.96	
Log Likelihood	168.96	


Per Capita Income 1970 to 2014 in Four OECD Countries: GDP/Hour US$
80
70
60
50
40
30
20
10
0
1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
Canada
Germany
U.S.A.
Turkey

Business Cycles

- The ebb and flow of economy
- Generally reported as growth values (monthly or quarterly growth versus yea rover year growth)
- $(GDP_t - GDP_{t-4})/GDP_{t-4}$
- If reported on annualized basis use 4 x $(GDP_t - GDP_{t-4})/GDP_{t-4}$
  - This is what press uses
- There is a distinction between GDP and GNP
  - GNP = GDP – factor payments to foreigners (dividends, interest payments, rent to foreign residents owning asset sin domestic economy, wages of foreigners being paid in domestic economy)
  - GNP will differ more from GDP as amount of foreign debt on which interest is paid increases and/or where economy has large numbers of foreign multi-nationals that receive profits on foreign operations

GDP AND GNP

- NFA – net foreign assets = assets owned by Turks abroad – liabilities of Turks toward foreigners = Turkish foreign assets – Turkish foreign debt
  - NFA > 0, creditor country
  - NFA < 0 debtor country
- If *i* is average interest rate on net foreign assets
  - *iNFA* = net factor income from abroad
- Can re-write national income equation to be
  - GDP + M = C + I + G + X
  - Total supply of goods in country = Total goods purchased in the economy

ANALYZING THE CURRENT ACCOUNT - CA

- Current account of balance of payments
  - $GNP_t = GDP_t + i_tNFA_t = C_t + I_t + G_t + (NX_t + i_tNFA_t)$
  - $= C_t + I_t + G_t + CA_t$ where $CA_t = NX_t + i_tNFA_t$
  - This describes the current account balance:
  - Current Account = trade balance + net factor income from abroad

- The CA is the difference between national savings and national investment since
  - National Savings S = GNP – C – G
  - i.e. as a country consumption is both private (C) and public (G)
  - Thus CA = S - I

CURRENT ACCOUNT BALANCE AS % OF GDP

Country	2011	2012	2013	2014
Australia	-3	-4.3	-3.4	-3
Austria	1.6	1.5	1	0.8
Belgium	-1.1	-0.7	-0.2	1.6
Canada	-2.7	-3.3	-3	-2.1
Chile	-1.1	-3.6	-3.7	-1.2
Denmark	5.7	5.6	7.2	6.3
France	-1	-1.5	-1.4	-0.8
Germany	6.1	6.8	6.4	7.5
Greece	-9.9	-2.4	0.6	0.9
Hungary	0.8	1.8	4	3.9
Ireland	-2.7	1.5	4.3	6.1
Italy	-3.1	-0.5	0.9	1.9
Japan	2.2	1	0.8	0.5
Korea	1.5	4.1	6.2	6.3
Netherlands	9.1	10.8	11	10.8
Norway	12.3	12.4	10	9.4
Poland	-5	-3.4	-1.3	-1.3
Portugal	-6	-2.1	1.4	0.6
Spain	-3.2	-0.3	1.4	0.8
Sweden	6.9	6.6	7.3	6.8
Switzerland	6.8	9.9	10.7	7.1
Turkey	-9.6	-6.2	-7.8	-5.8
United Kingdom	-1.7	-3.7	-4.4	-5.8
United States	-3	-2.8	-2.3	-2.2

How to Interpret and Use CA Status

- If a country invests more than it saves, it must be true that GNP (what it is producing) is smaller than C + I + G, therefore
  - Since I > S, CA < 0 or in deficit
- If a country continually has C < 0, it is borrowing from foreigners, and dent will increase over time
- Stock is a measure at point in time, flow is measured over time
  - $K_{t+1} = K_t + I_t$ – depreciation
- If CA < 0, it means stock of foreign debt is increasing
  - If CA < 0, I = 0, since CA = S = GNP – C – G, the country is running down its assets OR is borrowing to pay for excess consumption (since C + G > GNP)

How to Interpret and Use CA Status

- Suppose I > S? Is that better ? CA is still < 0
- If investment is more than savings, must borrow to finance I, so CA < 0; GNP is less than (C + I + G)
- To finance excess I (over savings) can:
  - Run down financial foreign assets
  - Borrow from rest of world to finance I
  - If continue country becomes net debtor
  - Since $NFA_{t+1} - NFA_t = CA_t$ and $NFA_{t+1} = NFA_t + NX_t + i_t NFA_t$

Both lead to a reduction in net foreign assets

ARE CURRENT ACCOUNT DEFICITS GOOD OR BAD?

- CA deficit can be caused by:
  - Increase in national investment
  - Fall in national savings (a fall in private savings &/or increase in budget deficits)
- Increase in CA good if used to finance I that produces new tradable goods (goods that can be sold in foreign markets) this is opportunity to run surplus in future
- BUT if I is in non-tradable sector (e.g. housing) these cannot be sold abroad, reduces ability to repay long term foreign debt
- CA deficit ok if fall in private savings since generally transitory but bad if fall in public savings: large and persistent structural budget deficits may result in an unsustainable build-up of foreign debt.

Other Important relationships-Business Cycles

- Financial variables can be used to forecast future state or direction of the economy:
  - Leading Indicators (some examples)
    - 1. Hours of production workers in manufacturing
    - 5. New claims for unemployment insurance
    - 8. Value of new orders for consumer goods
    - 19. S&P 500 Composite Stock Index
    - 20. New orders for plant and equipment
    - 29. Building permits for private houses
    - 32. Fraction of companies reporting slower deliveries
    - 83. Index of consumer confidence
    - 99. Change in commodity prices
    - 106. Money growth rate (M2)

OKUN'S LAW, INFLATION, THE PHILLIPS CURVE

- Okun's Law: relationship between growth rate of GDP and changes in the unemployment rate.
  - Growth rate of GDP = (Natural Growth Rate of GDP) - 2 (Change in the Unemployment Rate)
  - $(Y_t - Y_{t-1})/Y_{t-1} = 2.5\% - 2 \times (U_t - U_{t-1})$ or
  - if the unemployment rate stays the same relative to the previous year, real GDP in a year grows by around 2.5% per year; this is the **normal long-run growth rate of the economy**
  - 2.5% is assumed to be the 'natural growth rate' of the economy.

OKUN'S LAW, INFLATION, THE PHILLIPS CURVE

- Philips Curve – a relationship between the inflation rate and the unemployment rate.
  - relation suggests that when the unemployment rate is low inflation tends to increase while when the unemployment rate is high inflation tends to decrease
    - Expected rate of inflation in year t: (p_t^e)
    - The deviation of the unemployment rate (U_t) in year t from the natural unemployment rate (U_t^n).
    - A supply shock (x) (for example, an oil price shock).
    - $p_t = (P_t - P_{t-1})/ P_{t-1}$
    - **$p_t = p_t^e - a (U_t - U_t^n) + x$** or **$p_t = p_{t-1} - a (U_t - U_t^n) + x$**
    - the difference between the actual rate of unemployment and the natural rate of unemployment to the change in inflation. When the actual unemployment rate exceeds its natural rate, inflation decreases; when the actual unemployment rate is less than the natural rate, inflation increases.

YIELD CURVES AND BOND PRICES

- Yield curve: A line that plots the interest rates, at a set point in time, of bonds having equal credit quality, but differing maturity dates. The most frequently reported yield curve compares the three-month, two-year, five-year and 30-year U.S. Treasury debt.
- Why important? used as a benchmark for other debt in the market, such as mortgage rates or bank lending rates. The curve is also used to predict changes in economic output and growth.
- The shape of the yield curve is closely scrutinized because it helps to give an idea of future interest rate change and economic activity.
  - three main types of yield curve shapes: normal, inverted and flat (or humped)

price is fundamental. Once you know the price of a bond, you can easily compute its yield- the price is the present discounted value of the principal

$$\mathbf{100 = p_1(1 + i).}$$

- Real interest rates (r): $r = i - p^e$ or $\mathbf{i_t = r_t + (P_{t+1} - P_t)/P_t}$

U.S. Treasury Yield Curves

CLASSICAL VERSUS KEYNESIAN MODELS

- Classical Theory (AD & AS) capture key elements of macro-economy well
  - the effects of productivity changes on output, real wages, and employment
  - the relations among saving, investment, government spending, and real interest rates
  - the connections between money growth, inflation, and exchange rates
  - But
  - It is not perfect and there are gaps- emerge The Keynesian Theory

KEYNESIAN THEORY

- The Keynesian theory takes many of the elements used in the Classical theory, but adds to them the premise that prices do not clear markets in the short run
- this one modification changes some of the theory's short-run predictions in dramatic ways
  - the most important change concerns the effect of higher money growth on interest rates
    - In the Classical theory higher money growth leads to higher inflation and thus, other things equal, higher nominal rates of interest.
    - the data seem to indicate that the long-run effect of money growth on interest rates is just as the Classical theory predicts, but the data also suggest that the short-run effect is the opposite- higher money growth lowers interest rates

WHICH IS BETTER CLASSICAL OR KEYNESIAN?

- The theories are not competitors but complementary
- Which is is to be preferred depends on the issues you want to think about
  - the Classical theory is better for long-run properties and the Keynesian theory is better for the short run
  - Underlying model is IS-LM model in which 'prices have a life of their own', *therefore "Quantities are then determined by the "demand" for output (who buys it), rather than "supply" (who makes it), as it is in the Classical theory* "
  - Thus the effort is on the demand side of the model

SUMMARIZE THE DIFFERENCES BETWEEN CLASSICAL THEORY AND KEYNESIAN THEORY

- In the Classical Theory, quantities (output) are determined by the "Supply" of output (who makes it) that depends on technology (the production function) and the equilibrium in the labor market. "Aggregate Demand" affects only the price level: so monetary policy affects only prices.
- in the classical theory, any increase in aggregate demand induced by an increase in the money supply does not affect the level of output: it only leads to an increase in the price level
- Summary

1. The Classical theory exhibits complete separation between real variables and inflation. There is, by construction, no effect of money growth on real output or the real rate of interest.
2. In the Classical theory, inflation is driven by money growth (the quantity theory) and nominal interest rates by inflation.
3. Based on the data, the theory's predictions look better for long-run trends than for short-run fluctuations.
4. Extremely high rates of inflation are generally associated with high rates of money growth, often the result of financing large fiscal deficits by printing money. In this sense, there's no simple distinction between monetary and fiscal policy.

SUMMARIZE THE DIFFERENCES BETWEEN CLASSICAL THEORY AND KEYNESIAN THEORY

- In the Keynesian Theory, it is assumed that the economy is not operating at full employment. Since some machines and workers are unemployed, the supply of output can be increased without an increase in the price level.
- Where is the increase in output coming from in the Keynesian Theory. The Keynesian theory with fixed prices is mute on this point: as long as there are unemployed resources and production is below capacity, it is assumed that firms are willing to increase output when demand goes up without increasing prices
- The central idea of the Keynesian theory is that prices, or inflation rates, have a great deal of inertia: they do not respond immediately to changes in economic conditions or policy. That allows monetary policy to influence the real rate of interest and output in the short run.

END OF MODULE 16