Macroeconomics after J.M. Keynes

- In 1950s and 1960s Keynesian economic policy became very popular in Western world.

- The 2nd World War gave boost to practical Keynesianism – massive government spending in many areas of the economy.

- Some followers of Keynes in 1950s-60s introduced the so-called policy of functional finance (FF policy).

Policy of functional finance

- FF policy – to use monetary and fiscal policy to achieve high employment, price stability and high growth.
- In practice:
  - In times of growing unemployment government has to increase budget deficit and the money supply
  - In times of low unemployment government has to do the opposite - decrease budget deficit and decrease the money supply

Macroeconomics and policy in 1950s-60s

- Golden Age of interventionism in economic policy
- (Modified) Keynes's economic theory and policy became central in Western world.

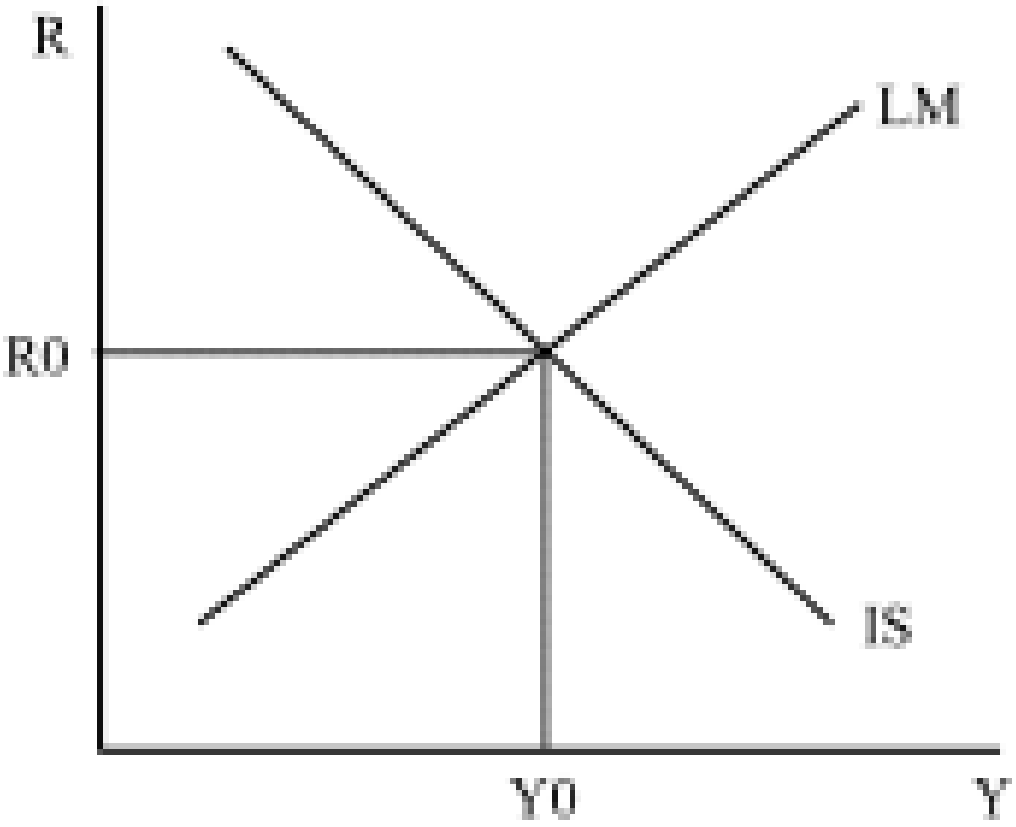
Neoclassical reaction to Keynes

- Neoclassical economists already in 1937 attempted to incorporate Keynesian economic into neoclassical framework.
- The project of absorbing Keynesian views occupied the minds of neoclassical economists for about another two decades (to the mid 1950s).
- In this period a new approach to macroeconomics appeared, which synthesized neoclassical and Keynesian views – **neoclassical synthesis** (NS).
- NS constituted the heart of macroeconomics of business cycles up to the 1980s.

IS-LM model

- IS curve represented combinations of interest rates and output for which planned savings and planned investment were equal.
- The LM curve represented combinations in which the demand for money equalled the fixed supply of money.
- The crossing point of the curves determined the equilibrium level of output and interest rate where both commodity and money markets clear.

The IS-LM Model



IS-LM model

- In IS-LM model you could obtain both Keynesian and neoclassical models as special cases (for example you could obtain Keynesian solution with the assumption of LM is perfectly interest elastic (horizontal) and classical with LM being perfectly interest inelastic (vertical)).
- In 1950s-1960s neoclassical synthesis (IS-LM model) was thought of as a correct representation of the problem of business cycles. Economists disagreed only with respect to the values of the parameters of the model.
- Model allows for analyzing various effects of combinations of fiscal and monetary policies on the level of national income and employment.
- Served as a popular tool for interventionist stabilization policy.

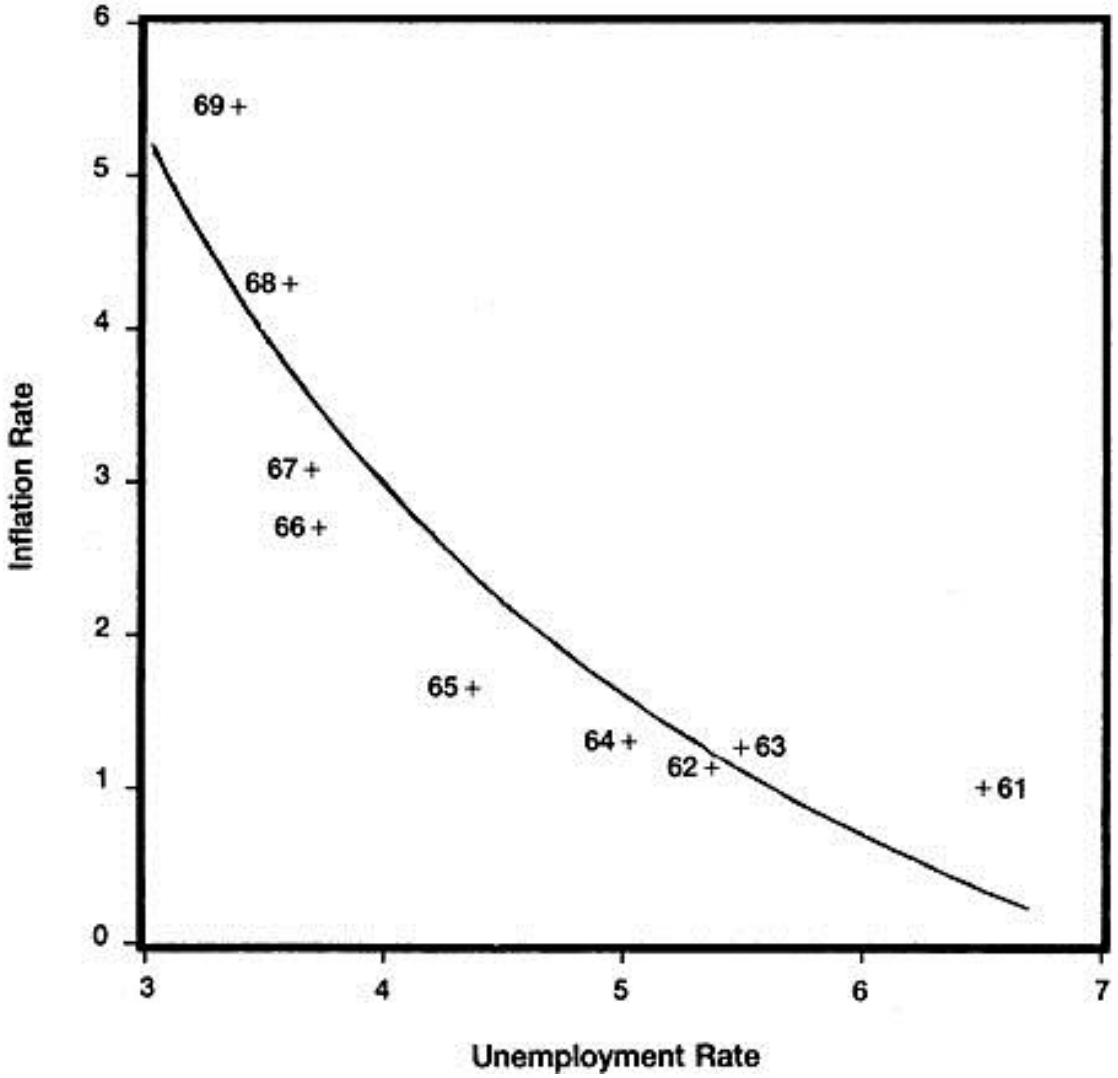
Keynes and IS-LM model

- IS-LM model says nothing about the cause of the business cycle
  - Volatility of investments for Keynes
- IS-LM model does not include Keynes's analysis of uncertainty
  - For Keynes uncertainty affects both demand for investments and demand for cash money
- The model does not explain the general level of prices (mainstream critique)

Philips curve

- In late 1950s, IS-LM model was supplemented with Philips curve as a tool of explaining the level of prices in the economy.
- Philips curve describes negative relationship between inflation and unemployment.
- Philips curve gave another powerful argument for government interventionism – it suggested that you can control at least one important macro variable – inflation or unemployment.

Philips curve



Decline of IS-LM analysis

- IS-LM model was rejected in macroeconomics in 1970s
- Problems with IS-LM model:
  - does not accurately explain inflation
  - not formulated in terms of GE model
- So, neoclassical synthesis died out in 1970s.

The opposition to Keynesian economics in 1950s-1960s: **Monetarism**

- Founder

  Milton Friedman (1912-2006)

- Similar to classical and neoclassical macroeconomics in spirit, assumptions and conclusions
- Economic fluctuations are temporary and automatically erased by market powers, if government does not intervene in the economy

Three major contributions of monetarists to scientific economics

- (1) *Money supply as a major cause of business cycles*: that movements in the money supply have been the primary cause of business fluctuations and that movements in aggregate demand for goods have relatively little impact.
- (2) *natural rate of unemployment hypothesis*: belief that there exists a unique rate of unemployment that is associated with non-accelerating inflation and that, in the long run, the economy will settle at such an unemployment rate.
- (3) *superiority of monetary policy rules*: assertion that monetary policy is much more effective than fiscal policy in fighting business cycles; following a steady money supply growth rule is, at least in the long run, better than a discretionary, counter-cyclical monetary policy.

Money as the cause of business cycles

- Keynesians argued that movements in aggregate demand (esp. investments) are the primary cause for business cycles
- Friedman wanted to show that it is money supply and especially changes introduced by the goverment or its institutions (monetary powers)
- Friedman, Anna Schwartz, *A Monetary History of the United States* (1963)
- Historical-econometric study - both numbers and the story
- They analyzed many historical episodes of economic depressions and tried to find phenomena preceded them – in this way to find causes of the businesss cycles
- They searched mainly for forces that changed money supply, like such as monetary policy decisions, bank panics, etc.

Money as the cause of business cycles

- They „found” that expansions/contractions in nominal GDP were always preceded by expansions/contractions in the money supply.
- „Found” because it is a contested result, critics argue that it was not rigorous econometrically
- Among other arguments, Friedman and Schwartz argued that the Great Depression of the 1930s was *not* the result of insufficient aggregate demand but rather that it resulted from a fall in the supply of money, the result of a misconceived contractionary Federal Reserve monetary policy

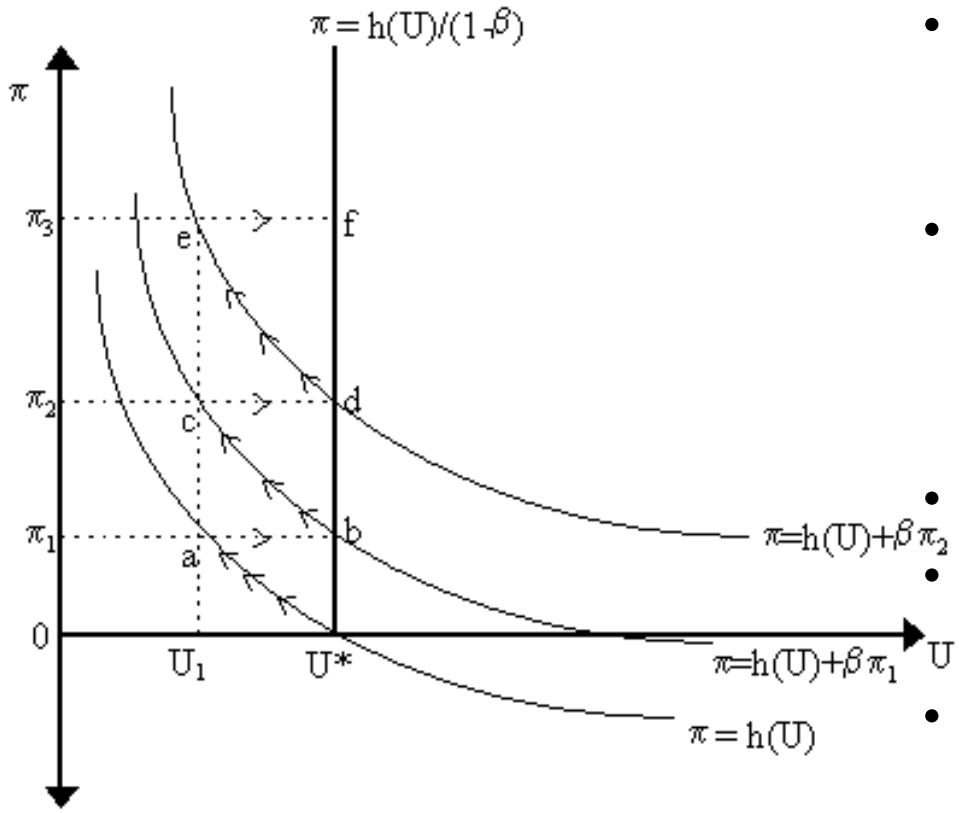
Money as the cause of business cycles

- In this way, they wanted to justify monetarist view that changes in money supply, especially these designed on purpose by the government are the primary cause of economic depressions
- Against Keynesians, they argued that changes in money supply introduced by government are the main cause of business cycles, while Keynesian reasons (changes in aggregate demand) are less important
- So, it is not capitalism and businesspeople which are to be blamed for business cycles, but the government

Natural rate of unemployment

- Philips curve – a negative relationship between inflation and unemployment
- Suggests that there is a permanent trade-off between these two variables and that it could be used in policy-making
- Friedman and others in 1968 provided theoretical arguments against long-run trade-offs between inflation and unemployment
- In their models, workers' decisions about labour supply depend on the expected real wage (i.e. corrected by the expected inflation rate)

Natural rate of unemployment



- Let's start at U*
- Infation expected by workers is 0
- Governement increased aggregate demand in order to reduce unemployment
- Workers increase labour supply (perceived price inflation still 0, they think that their real wages have increased) - move to the point (a)
- They suffer from 'money illusion'
- But in the end they realize that there is price inflation at Pi_1
- They decrease L_S - move to the point (b)
- So the long-run Philips curve is vertical at the natural rate of unempl.

Natural rate of unemployment

- Implications of Friedman's analysis
- There is no trade-off between inflation and unemployment in the long-run
- You can not use monetary policy to acheive permanently the preferred combination of these two objectives (inflation and unemployment rates)
- Strong anti-Keynesian, anti-interventionist argument (in the area of stabilization policy)
- Argument based on the so-called adaptive or static expectations of workers about prices – inflation is perceived today to be what it was yesterday (simple extrapolation)

Monetary policy by fixed rules

- Instead of trying to fight or smooth out the business cycle by discretionary changes in money supply, monetary authority (e.g. the Federal Reserve) should follow a strict rule of expanding the money supply at a steady rate.
- The rate of growth of money supply should be equal, for example, to the rate of growth of the real national output.
- Or it could be any number between 3 to 5% per year
- The most important thing is that the rule is fixed and economic agents could build stable price expectations
- This solution would eliminate the major cause of business cycles in monetarist view – discretionary changes in money supply by the Federal Reserve

Main arguments of Milton Friedman

- In general, strongly against (Keynesian and other) government interventionism
- Against discretionary policies
- Preferred fixed rules for policy – no room for mistaken actions of policy-makers
- Distrusted both in government officials' motives for good policies and abilities to implement efficient policies
- Government's role in the economy should be very limited (justice and defence, supplying money according to fixed rules etc.)
- Not only a theoretical economist – also an economic philosopher and a public intellectual writing extensively on the benefits of free market solutions in all spheres of life
  - Against compulsory military service, public schools, social welfare, social security, criminalization of drug use, criminalization of prostitution, public monopolies (e.g. post office), licensing of doctors, and many other government regulations
- Supported classical liberal or libertarian solutions in socio-economic life

Monetarism in 1980s

- Strict monetarism died out in 1980s
  - you can not control the money supply (financial innovations introduced by banking sector)
  - empirical studies suggested that money is able to exert a significant influence on real variables (growth, employment)
  - no basis in microeconomic theory (General Equilibrium)
- What survived from monetarism?
  - A view that inflation is caused mainly or largely by changes in money supply
  - An idea of independent monetary powers (e.g. politically independent central banks)

New Classical Macroeconomics (NCM) 1970s-1980s

- Attacked foundations of both Keynesianism and monetarism
- Robert Lucas (1937-) formulated classical or monetarist policy prescriptions in a macroeconomic model with GE foundations (1970s).
- Lucas won Nobel Prize in Economics in 1995
- The most influential macroeconomist of the last quarter of the 20th century
- Incorporated 'rational expectations hypothesis' into macroeconomics (Lucas revolution)

Lucas, RE and the New Classical School

- The concept of rational expectations (RE) was introduced by John Muth as early as in 1961
- Numerous interpretations of RE hypothesis
- **Weak version**: rational economic agents, while formulating expectations about the future value of a variable will make the most efficient use of all publicly available information about the factors that may influence this variable
- Agents will get information personally, but also will derive info from published forecasts and commentaries in the news media

Lucas, RE and the New Classical School

- **Strong version of RE**: agents expectations coincide with the true or objective expectations of those variables
- Example: inflation
- Essentialy the same as predictions of relevant (best available, accepted) economic theory
- RE is different from perfect foresight (underlying theory may not be true)
- This version was used by Lucas and New Classicals

Rational expectations, Keynes and monetarism

- Keynes assumed that agent form irrational expectations (animal spirits)
- If we replace Keynes's premise with RE hypothesis, then Keynes's conclusions and prescriptions do not follow
- RE present powerfull and devastating challenge to the traditional Keynsians
- RE is contrasted also with monetarists assumption of adaptive expectations (AE), where agents base there future expectations **only on past values** of the variables concerned.
- AE: Agents do not learn, repeatedly make similar mistakes

Criticisms against RE

1. Acquiring and processing information is costly (time, effort, money), so it is unlikely that they will use all information
2. How agents actually acquire knowledge of the 'correct' model of the economy?

    - Even economists display disagreement over this problem

3. Real world is characterized by fundamental uncertainty, where probability distribution is unknown and RE can not be formed (Post-Keynesian school)

Other (then RE) assumptions of New Classical Macroeconomics

2. All markets in the economy continuously clear (supply is equal to demand)
   - Implication: economy is continuously in short- and long-run equilibrium
   - Against both Keynes (there may be long-run disequilibrium) and monetarism (there may be short-run disequilibrium)

Other (then RE) assumptions of New Classical Macroeconomics

3. Aggregate supply hypothesis – individual suppliers of goods and services (incl. Labour) will change their supply only, if they belive that the real (non-nominal) price (like real wage) of their products changed

   They will not react to changes in nominal prices

Lucas's 'monetary surprise' model (1973)

- With those 3 assumptions Lucas formulated model based in General Equilibrium framework in which:

  both in the short and the long run, systematic (repeated, anticipated) monetary policy did not have any effect on real variables

- Different conclusion from both Keynes and monetarism
- Only unexpected (unanticipated) changes in money supply ('monetary surprise') can have real effects on income and unemployment.
- So, authorities can fund its monetary policy only on unanticipated changes

New Classical Macroeconomics on policy

- NCM proved a more general argument
- Thomas Sargent, Neil Wallace (1975, 1976)
- It is called Policy Ineffectiveness Proposition:
  - No systematic (anticipated) monetary policy has any **real** influence on the economy both in the short- and in the long run
  - Only unanticipated changes can influence real variables (in the short run)
  - If authorities adopt some publicly known rules in policy (e.g. fixed rate of monetary growth of 6% per year) then output or unemployment will be influenced only by policy errors or changes unanticipated by authorities.

New Classical Macroeconomics on policy

- This is no sensible policy at all
- Policy Ineffectivness Proposition (PIP) is directed against government interventionism in matters of stabilization of aggregate demand (especially Keynesian-like)
- Classical and Neo-classical in spirit
- Empirical evidence on PIP is mixed
- Does not concern fiscal policy, which clearly empirically **has** real effects

Real Business Cycle Theory (RBCT) - 1980s on

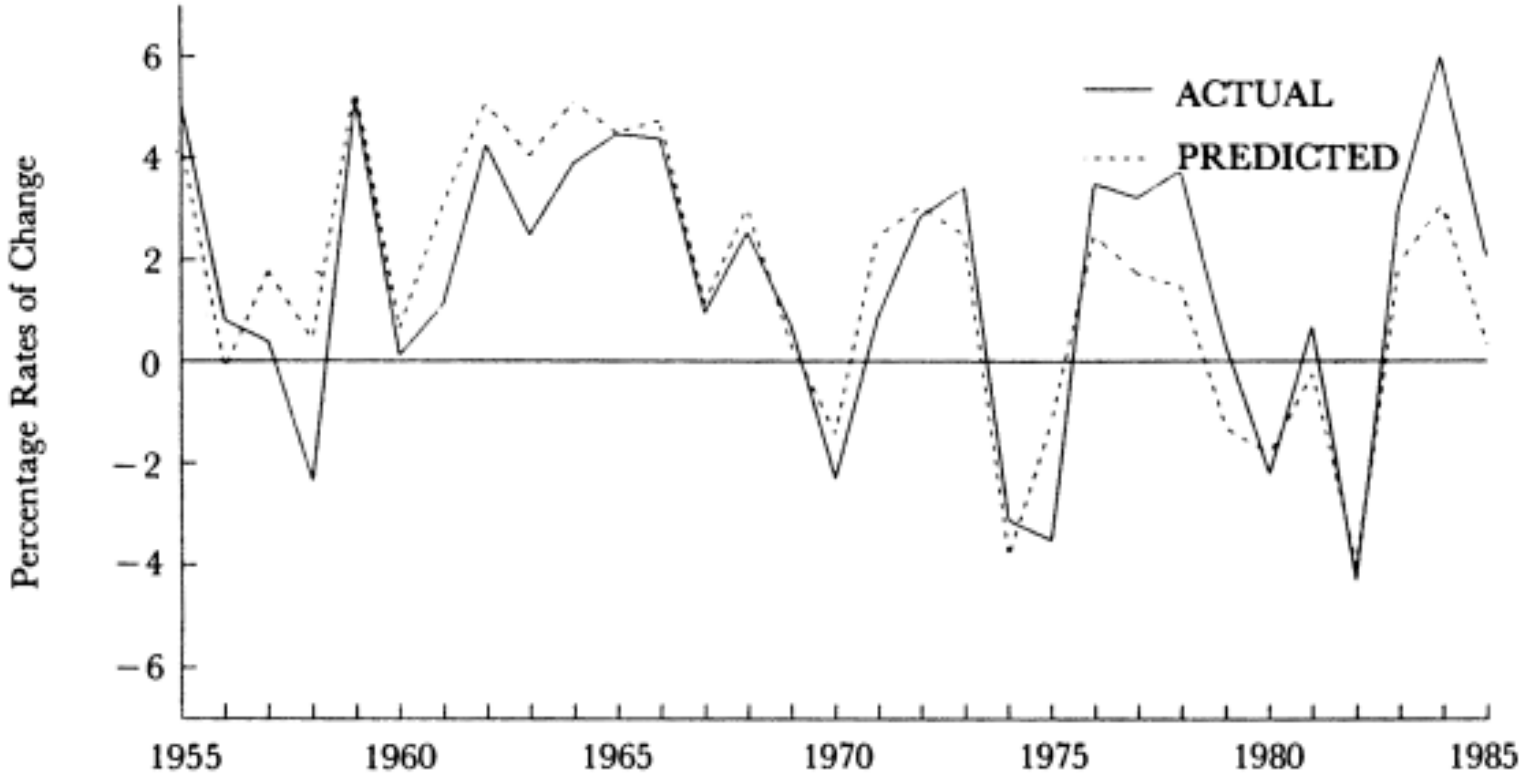
- Developed from New Classical Macroeconomics, which declined in mid-1980s
- Founders - Finn Kydland (b. 1943) and Edward Prescott (b. 1940)
- An approach in line with classical (and monetarist) policy prescriptions
- RBC theory holds that nominal variables, such as the money supply and the price level, do not influence real variables (national income, unemployment, etc.).
- Models are formulated in General Equilibrium framework

Real Business Cycle Theory (RBC)

- Main thesis:
  - Fluctuations in real factors (like unemployment rate) can only be explained by real changes in the economy (especially by large **random** fluctuations in the rate of technological progress).
- Examples of such shocks include:
  - innovations, bad weather, natural disasters, imported oil price increases, wars, labour unrests, strikes, stricter environmental and safety regulations, development of new products and thechniques of production, new management techniques etc.

Figure 2

Annual Growth Rate of Real Output



Policy implications of RBCT

- Since technological shocks in RBCT are random, they are unpredictable by government, and there is no role for government in fighting business cycles
- Economy is continuously adjusting in a optimal way to changing technology
- Both monetary and fiscal policies can not reduce fluctuations in technology and output; since those policies are costly they will only reduce welfare
- Radically anti-interventionist approach in macroeconomic policy – there is no role for government in stabilizing economy on the macro level

Criticisms of RBCT

- No evidence that depressions are caused by technological regress
- In RBCT models unemployment is absent or a result of voluntary choices of economic agents, who adjust to changing technology...
  - But it is hard to treat as such unemployment in times like the Great Depression or high unemployment in Europe in 1980s
- Evidence suggests that money is not neutral in the short run
- Empirical evidence in support of RBCT was found to be ‘too fragile to be belivable’

New Keynesian Macroeconomics (NKM), 1980s on

- In 1970s orthodox Keynesian model (neoclassical synthesis) came under attack from monetarism and New Classical Macroeconomics (NCM)
- In early 1980s, NCM won the battle of ideas, and Keynsian model became to be perceived as methodologically archaic, because:
  1. It was not formulated in GE framework
  2. It did not assume that markets are constantly cleared
  3. It did not subscribe to the assumption of rational expectations (rather used adaptive expectations)
- Keynesian economics seemed to be dead

New Keynesian Macroeconomics (NKM), 1980s on

- But in the mid-1980s, as R. Barro wrote: 'bad guys' have made a comeback
- There was a recovery, revival of Keynesian economics
- Several new Keynesian-like theories and models appeared and *New Keynesian Macroeconomics* as a school of macroeconomic thinking was established
- In late 1980s and 1990s (and to some extent even today) this school was engaged in a heated debate with New Classical Macro and Real Business Cycles School on the nature of business cycles and proper policies to fight them.

New Keynesian Macroeconomics (NKM), 1980s on

- NKM agreed with all 'old' Keynesian propositions:

  1. Unregulated market economy will exhibit involuntary unemployment equilibrium

  2. Business cycles are caused by aggregate demand fluctuations (investments for Keynes)

  3. 'money matters' – monetary policy can be effective in fighting depressions

  4. goverment intervention has the potential to improve macroeconomic stability

But NKM models are also very different from Keynesian economics of the 1960s

New Keynesian Macroeconomics (NKM), 1980s on

- This is because NKM share two premises of New Classical Macro:

1. Use microfoundations from GE theory
2. Assume rational expectations

With those assumptions NKM models provide different explanations of business cycles than NCM and RBCT and also offer drastically different economic policies

New Keynesian Macroeconomics – examples of models

- There are dozens of approaches in NKM to explain business cycles, that focus on different causes

1. Nominal wage rigidity
   - Wages do not change in a flexible way
   - Possible cause: Long-term wage contract that can not be changed immediately
   - In such a situation monetary policy can have real effects

Examples of NKM models

2. Nominal price rigidity
   - Process of changing prices is costly and therefore they are not changed always when demand or cost of production changes
   - Prices are not flexible because of ‘menu costs’ = costs of printing of new price lists and catalogues, time used in supervision and renegotiation of purchase and sales contracts with suppliers and customers etc.
   - This kind of rigidity is heavily made stronger in imperfectly competitive markets (because if we do not change prices, while other firms do, our sales will not fall to zero – we will not lose all profits)
   - New Keynesians have shown that such menu costs (even small) can produce large macroeconomic fluctuations

Examples of NKM models

3. Real price rigidities
   - Real (not nominal) prices do not change in a flexible way
   - Causes:
     1. Firms do not lower prices in face of falling demand, because price is also a signal of quality
     2. Unchanged prices discourage consumers from searching for a better deal (this works in case of repetitive purchases)

     And many other usually more complex causes

Examples of NKM models

4. Real wage rigidities
   - Real wages are not flexible, can not be easily lowered for example
   - Again many explanations for this kind of rigidity
     1. Efficiency wage models: if there is unemployment, it is not in a firm's interest to lower real wages, because employed workers put more effort into work (they are more productive) then they would in a state of full employment
     2. Insider-outsider models: why unemployed (outsiders) do not offer to work for lower wages than those paid to employed workers (insiders)?

        Because insiders can refuse to cooperate with and train new workers, as well as make their life at work thoroughly unplesant

Policy implications of NKM

- In models with sticky (rigidities) prices and wages, money is no longer neutral and monetary policy is theoretically effective
- But since NKM agree that some business cycles are irregular and unpredictable, new Keynesians are not enthusiastic supporters of government management of the economy characteristic for the ‘old’ Keynesians
- But still they see a need for activist government action (monetary and fiscal), especially in case of deep recessions
- They support limited discretionary actions of government (especially to offset or avoid serious macro-level problems)

Conclusions about the recent history of business cycles theories (BCT)

- Agreement that BCT should possess GE microfoundations
- Agreement on methods used to verify BCT (calibration, VAR modeling)
- Agreement that monetary policy can have systematic real effects in the short run (but not in the long run)
- Disagreement whether active government management of demand can help economy to adjust in the short-run.
- But, in early 1990s all those problems became suddenly less intresting for macroeconomists

Renaissance of economic growth research in the mid-1980s

- Economic growth was once at the heart of the economic science (classical economics period)
- Later economics became rather micro-oriented (marginal revolution, early neoclassical economics – up to 1930s)
- Since Keynes' *General Theory* (1936) to mid-1950s macroeconomists preoccupied rather with short-run distortions, than with long-run growth
- In the period 1939-56 growth theory dominated by Keynesian models of Roy Harrod and Evsey Domar

Renaissance of economic growth research in the mid-1980s/early 1990s

- In 1956-1970 neoclassical growth model of Robert Solow and Trevor Swan became central
- But neoclassical research program on growth ran into diminishing returns and in fact died in 1970-1985 period
- In general in the 20th century growth research has been a minor topic early 1990s
- There was a peak in interest in 1950s and later (1960s-1980s) declining interest/production
- But in early 1990s this trend reversed itself – huge explosion of production of papers on growth – less interest in business cycle problem
- This renaissance of interest in growth can be called a *revolution* in terms of significant change of focus in the profession

What explains this turn from analysis of business cycles to that of economic growth?

- New theoretical insights into the nature of economic growth (the so-called engogenous theories)
- Availability of a rich array of new macro data for a large number of countries (data on cross country growth since 1960s)
- Growing realization that many developing countries are not catching up (converging) with the levels of income per capita with rich OECD countries
- Results of empirical research (of R. Lucas among others) that suggest that business cycles are not so costly to societies and that increasing rate of growth is more important to long-term welfare of societies

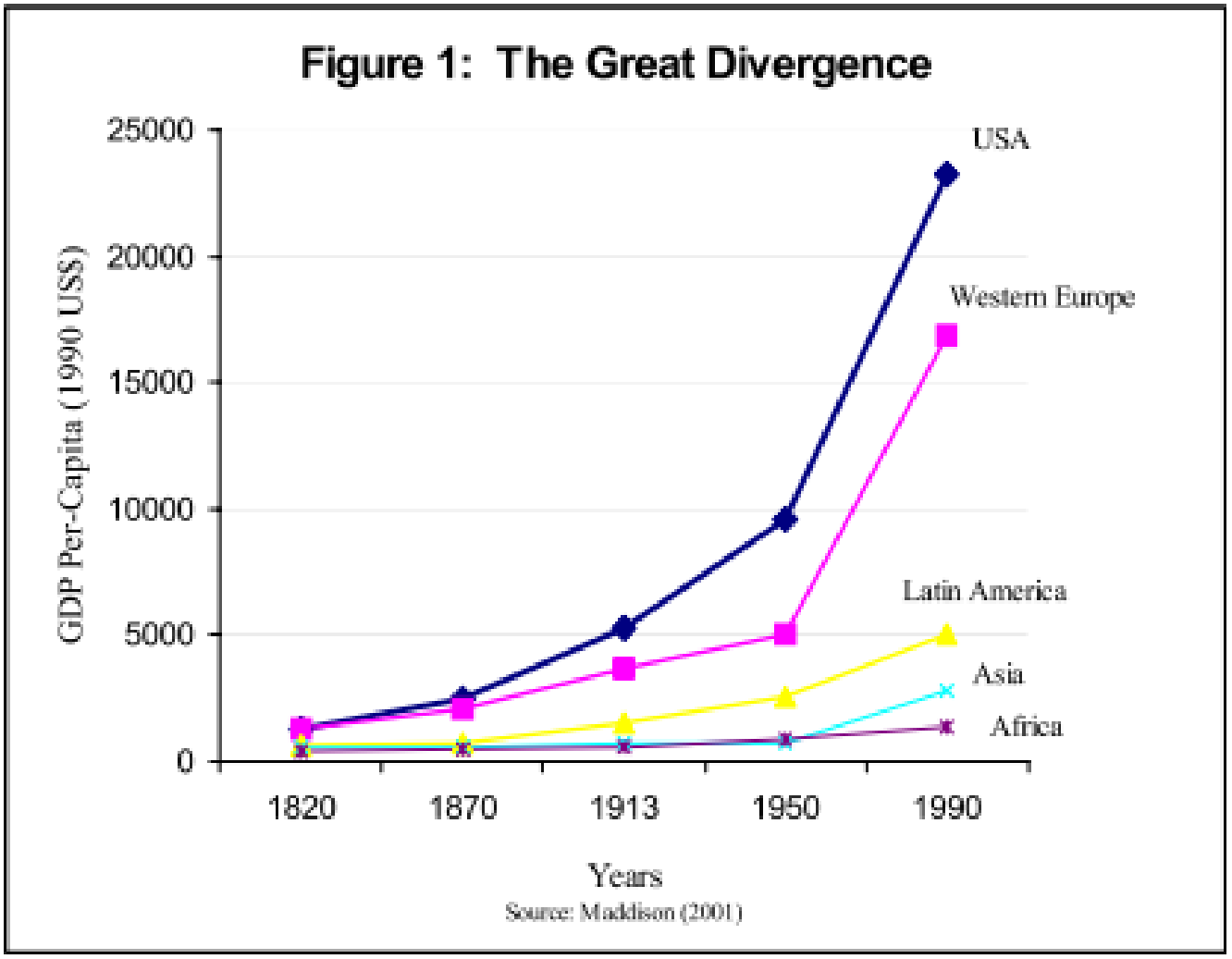
Why is economic growth so important?

- Cumulative impact of different growth rates on absolute living standards *per capita*

Period in years	Country A (g = 1%)	Country B (g = 2%)	Country C (g = 3%)	Country D (g = 4%)	Country E (g = 5%)
0	$1000	$1000	$1000	$1000	$1000
10	1100	1220	1340	1480	1630
20	1220	1490	1800	2190	2650
30	1350	1810	2430	3240	4320
40	1490	2210	3260	4800	7040
50	1640	2690	4380	7110	11470

- Small, but sustained, differences in growth rates lead to very significant differences in relative living standards

Growth is the single most powerful mechanism for generating long-term increases in income per capita as well as divergence in living standards if growth rates differ across countries



Harrod-Domar model - Keynesian account of growth

- Roy Harrod (1939), Evsey Domar (1946, 1947)
- Extended Keynes's static short-run theory to investigate long-run dynamics of capitalism
- Model assumes no technological progress
- Growth is a function of factors of production: K, L.
- Also assumes fixed factor proportions (constant K/L) and fixed capital-output ratio *v* = (K/Y)
- Savings S = s*Y
- Rate of growth = s/v

Harrod-Domar model - Keynesian account of growth

- Practical implication: growth depends on saving rate
- Extremely influential in development economics (1950s-1970s)
- Economists offered advice how to raise savings (to encourage growth)
- Many countries (e.g. India) followed such an advice
- But did not acheive sustained growth
- Assumptions of fixed K/Y and K/L are very unrealistic (also notice no technological progress)
- The model was rejected in theoretical research already in 1950s

Solow-Swan Neoclassical model of growth

- Abandons Harrod-Domar assumptions of fixed ratios of K/Y and K/L
- Introduces technological progress in exogenous form – growth of technology is not explained in the model
- $Y = A*F(K, L)$, A – level of technology
- Rate of per capita balanced (equilibrium) growth is equal to the rate of technological progress

Solow-Swan Neoclassical model of growth

- Predictions:
  - Savings rate has only temporary effect on the rate of per capita growth; an increase in savings rate will not influence long-run sustainable rate of growth
  - If countries are similar in parameters for consumers' preferences and technology, then poor countries will tend to grow faster than rich countries (there will be convergence in rates of growth)

The problem with Solow's growth model

- Technological progress is assumed to be exogenous – it is left unexplained
- But, the solution to the model is that rate of per capita long-run growth is precisely equal to the rate of technological progress
- So, the main source of growth is is fact not explained
- Major theoretical weakness of the model
- What are the causes for the growth of technology and therefore for economic growth?

Endogenous economic growth theories

- In the mid-1980s several economists sought to construct alternative to Solow models, which would explain technological progress
- Notable approaches:
  - Paul Romer (1986, 1987)
  - Robert Lucas (1988)
- In those models the concept of investments is broader – it includes not only physical capital but also expenditures on R&D and human capital

An example of endogenous growth (EG) model from innovation-based theory

- Several waves of engogenous growth models from mid-1980s until today
- First wave, mid-1980s, quite naive
- Second wave – innovation-based EG theory
- Y = F(K, L, A), since technology (A) is made endogenous
- Assumes intellectual capital, the source of technological progress (A), is distinct from both physical and human capital
- Intellectual capital grows by innovation, other forms by savings and education

An example of endogenous growth (EG) model from innovation-based theory, cont.

- P. Romer (1990) assumed that aggregate productivity is an increasing function of the degree of product variety.
- In this theory, innovation causes productivity growth by creating new, but not necessarily improved (same quality), varieties of products
- Technological progress results from deliberate actions taken by private agents who respond to market incentives – firms invest in R&D, search for new and economically valuable ideas to produce new products
- Technological knowledge is a non-rival input (ideas can be used by other firms at no additional cost), but is partially excludable (to some extent you can exclude others from using it without payment – e.g. by having patent laws.)

An example of endogenous growth (EG) model from innovation-based theory, cont.

- The long-run growth rate is completely determined by technology and preference parameters
- Prediction: an increase in the productivity in R&D (equivalent to a reduction in R&D costs) stimulates growth.
- Hence, an R&D subsidy can affect the long-run growth rate, i.e. policy is effective
- This is novel prediction with respect to Solow's model (government policy not modelled there)
- Other models operate through creation of quality-improving innovations
- Dozens new EGM appeared in 1990s and early in the 21st century – there are multiple approaches

EGMs vs Solow model

- EGMs challenge Solow growth model on both theoretical and economic policy gounds
- In Solow model technological change is exognous, while in EGMs it is endogenous
- Solow model argues that government policy does not have any effect on long-run rate of growth
- EGMs suggest that in specific settings governments can influence long-run growth by supporting the level of R&D activities in both private and public institutions.
- This prediction can be tested against evidence – but tests are so far inconclusive.

Short summary of the history of modern macroeconomics

- Keynes: capitalism is unstable, need for government intervention
- Neoclassical synthesis and monetarism: similar methodology, opposite conclusions
- Pluralism in business cycle research since late 1970s: New Classical Macro, Real Business Cycles Theory, New Keynesian Macro
- Turn to (endogenous) growth theory from early 1990s