Advanced Macroeconomics

I. Foundations of Dynamic Macroeconomic Modeling

   1. Introduction
   2. History of Macroeconomics
   3. Static General Equilibrium Models
   4. Saving and Investment in a Two-Period Model

II. Long-run Economic Growth

III. Short-run Fluctuations

IV. Applications

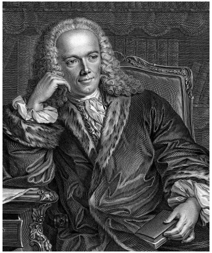
2. History of Macroeconomics

The Time Before Macroeconomics

- François QUESNAY (1694–1774): Tableau Economique, economy as circular flow
- Pre-KEYNESian period: partial equilibrium and aggregate analysis not distinguished (Adam SMITH, Karl MARX, Alfred MARSHALL)
- Begin of the Neoclassical Era around 1870: microeconomic optimization, no general equilibrium repercussions
- Léon WALRAS (1834-1910): General Equilibrium Theory, Formalization of the „invisible Hand“, no market imperfections
- Knut WICKSELL (1851-1926): Reformulation of the Quantity Theory (endogenous money stock, endogenous velocity of money)
- Irving FISHER (1867-1947): The Theory of Interest

Francois Quesnay: Tableau Economique

Francois QUESNAY (1694-1774)



(Wikipedia)

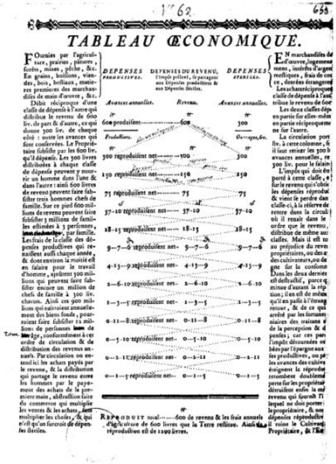


TABLEAU ŒCONOMIQUE.

DEPENSES PRODUCTIVES.	DEPENSES DU REVENU, l'Impôt prélevé, se partagent aux Dépenses productives & aux Dépenses stériles.	DEPENSES STERILES.
Avances annuelles.	Revenu.	Avances annuelles.
600 produisent	600	300
Productions.		Ouvrages, &c.
300 reproduisent net	300	300
150 reproduisent net	150	150
75 reproduisent net	75	75
37-10 reproduisent net	37-10	37-10
18-15 reproduisent net	18-15	18-15
9-7-6 reproduisent net	9-7-6	9-7-6
4-13-9 reproduisent net	4-13-9	4-13-9
2-6-10 reproduisent net	2-6-10	2-6-10
1-3-5 reproduisent net	1-3-5	1-3-5
0-11-8 reproduisent net	0-11-8	0-11-8
0-5-10 reproduisent net	0-5-10	0-5-10
0-2-11 reproduisent net	0-2-11	0-2-11
0-1-5 reproduisent net	0-1-5	0-1-5

REPRODUIT total 600 de revenu & les frais annuels d'agriculture de 600 livres que la Terre restitue. Ainsi la reproduction est de 1200 livres.

(1759)

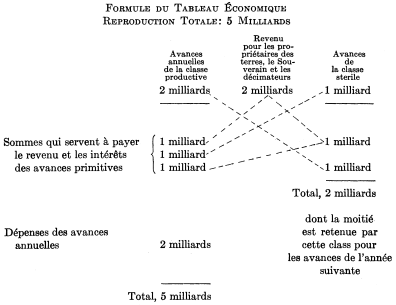
Tableau Economique (1766)

(Gilbert 1989)

- First complete theoretical model in the history of economic analysis
- The system of production and consumption is conceived as a circular process
  - The same goods can appear both among the products and among the means of production
  - Human consumption itself, apparently the final purpose of any productive activity, is determined by the previous production
- When the economy produces more than the minimum necessary to restore depleted reserves, a surplus results: Net product

Tableau Economique and Input-Output-Analysis

(Phillips 1955)

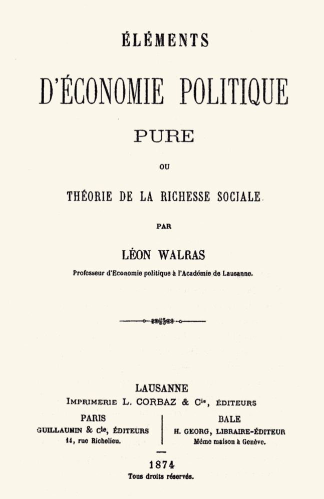


	Purchasing Industry			Total
Producing Industry	Farmers	Artisans	Proprietors	Production
Farmers	2	2	1	5
Artisans	1	0	1	2
Proprietors	2	0	0	2
Total Production	5	2	2	

Léon Walras: General Equilibrium Theory

Leon WALRAS (1834-1910)

(Wikipedia)



ÉLÉMENTS

D'ÉCONOMIE POLITIQUE

PURE

OU

THÉORIE DE LA RICHESSE SOCIALE

PAR

LÉON WALRAS

Professeur d'Economie politique à l'Académie de Lausanne.

LAUSANNE

IMPRIMERIE L. CORBAZ & Cie, ÉDITEURS

PARIS

GUILLAUMIN & Cie, ÉDITEURS

14, rue Richelieu.

BALE

H. GEORG, LIBRAIRE-ÉDITEUR

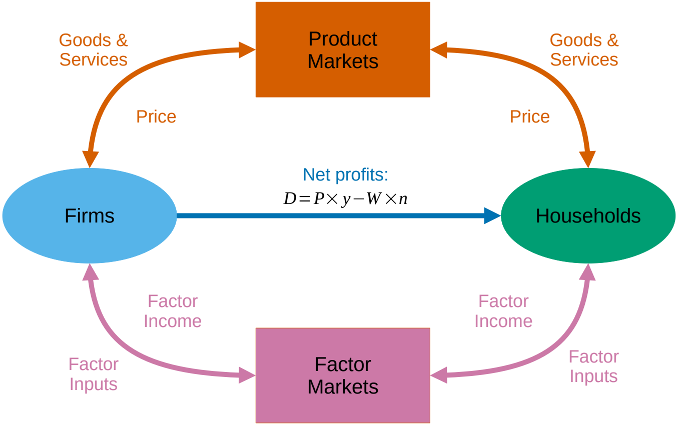
Même maison à Genève.

1874

Tous droits réservés.

(1874)

Walrasian Equilibrium: Circular Flow

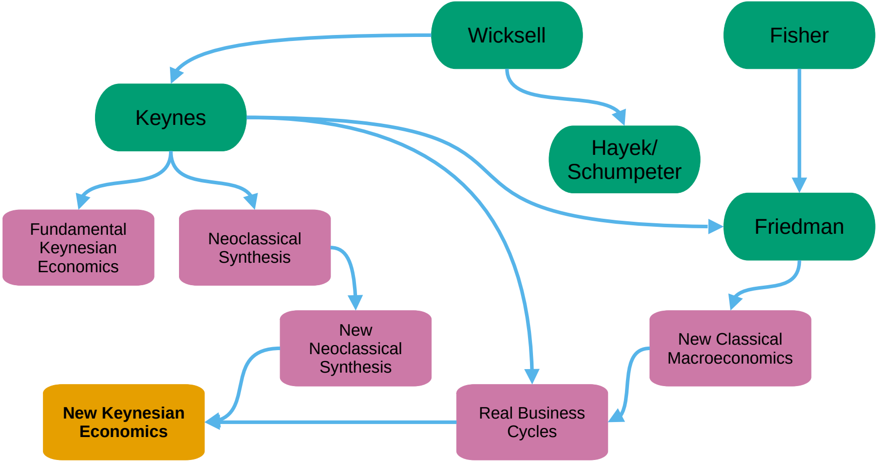


The Pre-KEYNESian Period

- Flexible prices
- Classical dichotomy of real and monetary sector: Monetary variables have no impact on real outcomes
- Classical quantity theory: $\overline{V} \times M = \overline{y} \times P$
- Monetary policy as technical issue until 1914 (gold standard)
- Business cycle theory only as informal reasoning

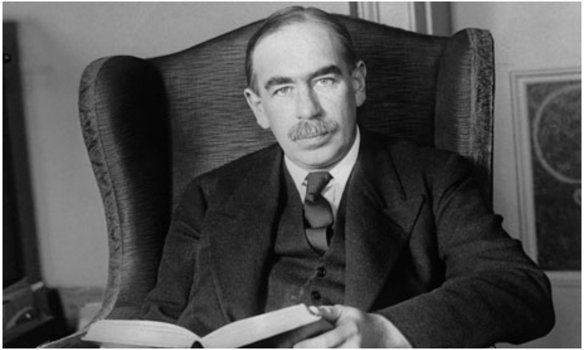
The Genealogy of Macroeconomics in the 20th Century

(Spahn 2016)

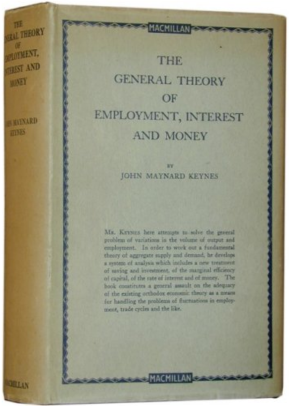


KEYNES' General Theory as a Milestone

John Maynard Keynes (1883-1946)



General Theory (1936)

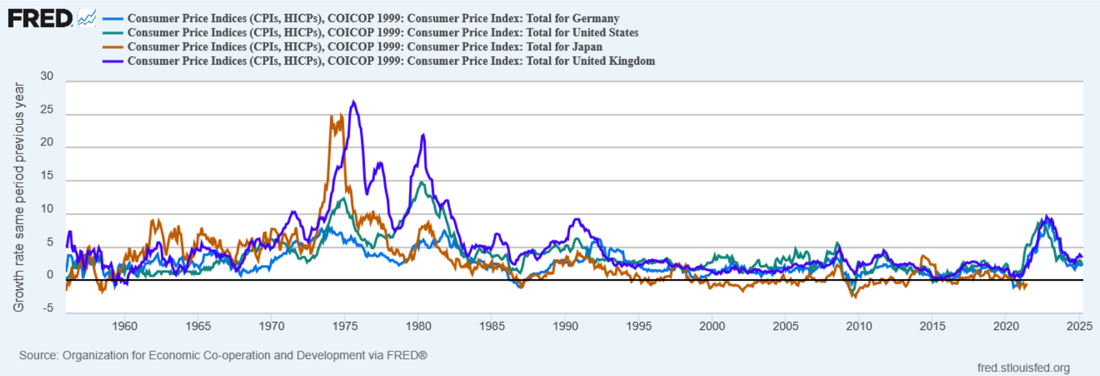


The KEYNESian Revolution

- Classical economics cannot explain persistent unemployment during the Great Depression of the 1930ies
- John Maynard KEYNES (1883-1946) as founder of macroeconomics: General Theory of Employment, Interest and Money (1936)
- General equilibrium analysis: simultaneous analysis of the key variables employment, income, interest rate and prices
- Equilibrium unemployment with rigid wages and prices
- John HICKS (1904-1989): IS-LM-Modell (1937)
- Large macroeconomic models for demand management

High Inflation in the 1970s

(FRED: CPALTT01∗M659N)



The Neoclassical Synthesis

- John R. HICKS (1904-1989), Paul A. SAMUELSON (1915-2009)
- IS-LM-Modell for short-run analysis with given prices and wages
- Classical dichotomy and quantity theory for the long-run (flexible prices)
- Don Patinkin (1922-1995): Adjustment from short to long run (Real balance effect)
- Phillips-curve: Trade-off between unemployment and inflation

Three Counter-Revolutions

- Three Counter-Revolutions since 1960:
  - Monetarism
  - New classical macroeconomics
  - Real business cycle theory

Monetarism

- BRUNNER (1968): Economic fluctuations are mainly caused by monetary shocks
- FRIEDMAN (1968): Expectations augmented Phillips curve: no trade-off between cyclical output growth (unemployment) and inflation
- In the long-run, expansionary monetary policy increases the inflation rate, while output, income and employment are only stimulated in the short run
- Effects of economic policy on aggregate dynamics is lagged and uncertain (long and variable lags)
- Monetary policy should stabilize the money growth rate (FRIEDMANs money supply rule).

New Classical Macroeconomics

- Robert E. LUCAS (born 1937), Thomas J. SARGENT (born 1943), Neil WALLACE (born 1939)
- Rational expectations: Individuals use all available information when forming expectations about future development
- Policy ineffectiveness: In an IS-LM model with rational expectations, systematic monetary policy has no effect on output and employment but only on price level and inflation rate
- Microfoundation and LUCAS-Critique: Simulation of economic policy should be based on microfounded models because coefficients in aggregate relationships depend on the policy regime and may change if policy is changed

Real Business Cycles Theory

- Finn KYDLAND (born 1943), Charles PLOSSER (born 1948), Edward PRESCOTT (born 1940)
- Foundation: neoclassical growth model
  - Flexible prices
  - The long-run productivity trend depends on exogenous technological progress
- Real shocks (productivity) explain short-run fluctuations
- Short-run fluctuations are efficient reactions to supply shocks
- Classical Dichotomy: Money is neutral

2. History of Macroeconomics

Market Imperfections

- Important market imperfections: rigid price adjustment, incomplete competition, asymmetric information
- In general, market equilibrium is not efficient in case of market imperfections. There is room for welfare enhancing economic policy.
- Market imperfections change the effects of economic shocks. Price rigidities, e.g., lead to real effects of monetary shocks.
- Market imperfections are a source of additional economic shocks. Asymmetric information is an example.

New Neoclassical Synthesis

(New Keynesian Macroeconomics)

- Consistent framework for classical and Keynesian approach
- Households, firms and governments interact on goods, labor and financial markets
- Individual behavior as model foundation (Utility maximization of households, profit maximization of firms) given market imperfections and strategic behavior
- Long run: flexible prices and wages
- Short run: flexible (classical approach) or rigid (Keynesian approach) prices and wages

Dynamic Stochastic General Equilibrium Models (DSGE-Models)

- The economy is always in equilibrium (equilibrium path from short to long run)
- Optimal decisions: Individuals take rational expectations based on available information
- Individuals are forward looking and maximze the present value of future expected welfare given recource constraints, initial endowments, technology and available information
- Individual decisions are coordinated on markets

2. History of Macroeconomics

The Trouble with Macroeconomics

(Paul Romer 2016)

"Lee Smolin begins The Trouble with Physics (Smolin 2007) by noting that his career spanned the only quarter-century in the history of physics when the field made no progress on its core problems. The trouble with macroeconomics is worse. I have observed more than three decades of intellectual regress."

Where Modern Macroeconomics Went Wrong

(Stiglitz 2018)

> *"Dynamic Stochastic General Equilibrium (DSGE) models, which have played such an important role in modern discussions of macroeconomics, in my judgement fail to serve the functions which a well-designed macroeconomic model should perform."*

After the Storm

(Christiano, Eichenbaum and Trabandt 2018)

- Financial frictions
- Zero lower bound and other non-linearities
- Heterogeneous agents

2. History of Macroeconomics

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