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## Introductory Macroeconomics

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*Macroeconomics – Aggregate functions and macroeconomic equilibrium*

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Tutorials:

## **Foreword**

This document is the product of several years teaching introductory macroeconomics. This course was intended for first year students of the Bachelor in Economics at Université Clermont Auvergne. The text is mainly written in English. I would like to thank the students and lecturers who provided tutorials. They all contributed to improve the content. Errors and shortcomings are mine.

P. Combes Motel, November 2022

## **Objectives and content**

Macroeconomics is the branch of economics that studies economy-wide phenomena. It, therefore, looks beyond the study of individual behaviours and market structure which are the subjects of microeconomics. Macroeconomics focuses on aggregate indicators such as saving, consumption, investment, public expenses, international factors ultimately determinants of GDP, and related aggregate phenomena such as inflation and unemployment. The course aims at introducing how to model the relationships between those aggregate indicators. Modelling those relationships allows understanding how economic policy (monetary and fiscal policy) can have economy-wide effects.

We begin by studying consumption (Chapter 1) and investment (chapter 2) that are core elements of aggregate demand. Those functions pertain to the real economy. The last two chapters pave the road towards macroeconomic equilibrium modelling. Chapter 3 introduces financial markets while paying attention to the money demand and supply. This chapter provides basic concepts that are necessary to the understanding of monetary policy. Chapter 4 is dedicated to studying macroeconomic equilibrium taking the lenses of Keynes. Therefore, it introduces short-term macroeconomics and provides the (Keynesian) rationale of fiscal policy. Chapters 3 and 4 are necessary to understand more elaborated macroeconomic modelling such as the IS-LM (or Aggregate Supply – Aggregate Demand) framework.

## **Course outline**

**Introduction: Aims and Scope of Macroeconomics**

**First Part. Aggregate functions**

**Chapter 1. The consumption function**

**Chapter 2. The investment function**

**Second Part. Short-run macroeconomics**

**Chapter 3. Money demand and supply (introduction to monetary policy)**

**Chapter 4. Aggregate demand (introduction to the macroeconomic equilibrium and fiscal policy)**

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# **Introduction: Aims and Scope of Macroeconomics**

Outline :

- 1) Objectives of the course (paragr. 1. ) ;
- 2) Definitions to have a clearer picture of the respective domains of Macro and Microeconomics (paragr.2. p. 3) ;
- 3) Basic features of economic reasoning (paragr. 3. p. 15) ;
- 4) How to distinguish the main theoretical divide in macroeconomics: Classics and Keynesian approaches (paragr. 4. p. 21).

## **1. PRELIMINARIES**

The 1st year Bachelor's degree economics course introduces students to two essential disciplines: macroeconomics and microeconomics. This lecture introduces macroeconomics. It is entitled "Aggregate functions and macroeconomic equilibrium" because in macroeconomics we need to study aggregated behaviours that will ultimately determine the macroeconomic equilibrium.

At the end of this introductory macroeconomics course, students must be able:

- To understand and know several stylised facts or statistical regularities relating to household consumption, corporate investment, the behaviour of financial institutions such as the Central Bank, and fiscal policies.
- To understand the difference between the so-called supply and demand economics and the fundamental principles of economic policy (monetary and fiscal policy).
- The course intends to understand better the functioning of a market economy and the main economic policy implications of the Classical or Keynesian approaches.

The course consists of this introduction + 4 chapters that appears in two parts. The first one focuses two basic components of Aggregate Demand, namely, Consumption and Investment. The second part introduces macroeconomic policy e.g. monetary and fiscal policy. Macroeconomic policy itself is crucial to avoid macroeconomic instability and foster economic growth.

## 2. HOW TO DEFINE MACROECONOMICS?

Macroeconomics raise questions. Examples: What are the origins of economic growth? How to explain business cycles? What are the sources of unemployment, and what are the effects of economic policies on unemployment? All questions about international trade, etc.

- What are the determinants of long-term economic growth?
- How to explain business cycles?
- Why do economists care about inflation?
- What determines household consumption or business investment?
- What is the role of a Central Bank?
- Does a recovery in economic activity reduce unemployment?

At the origin of economics that dates back to the publication of Smith's book in 1776, the macro/micro distinction did not exist.<sup>1</sup> JMK's General Theory of Employment, Interest, and Money (GT) in 1936 founded modern macroeconomic analysis.<sup>2</sup> If JMK did not invent the word (Ragnar Frisch in 1933), he defined its contemporary contours. He explicitly stressed that thinking the supply and the demand "as a whole" has not been dealt with by economists (Box 1). Before the GT, there was no real unified thinking on the overall functioning of an economy: no unified or formalised employment theory, no satisfactory analysis of business cycles, etc. One novelty brought about by the GT is to use economic aggregates. The aim was to answer crucial issues such as mass unemployment that called the stability of the capitalist system into question (Box 2, Box 3). The GT allows connecting aggregates measured by the National Accounts (Definition 2).

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<sup>1</sup> Considering the economic thought prior to the TG, the macroeconomic reasoning is used by mercantilists, Physiocrats or K. Marx. The Classical economists of the 19th century also used a global approach to the economy where they considered the economy to be made up of social classes.

<sup>2</sup> Of course many collaborators of JMK were involved in the genesis of the GT. We have to pay a tribute to Piero Sraffa, Richard Kahn, Joan Robinson, or James Meade among many others.

### Box 1. JMK on "demand and supply as a whole"

"My [...] difference from the traditional theory concerns its apparent conviction that there is no necessity to work out a theory of the demand and supply of output *as a whole*. Will a fluctuation in investment, arising for the reasons just described, have any effect on the demand for output as a whole, and consequently on the scale of output and employment? What answer can the traditional theory make to this question? I believe that it makes no answer at all, never having given the matter a single thought; the theory of effective demand, that is the demand for output as a whole, having been entirely neglected for more than a hundred years."

(Keynes, 1937, p. 219)

### Box 2. On the divine origin of macroeconomics

"Having recently spent two years in Washington as an economic adviser at a time when the U.S. economy was struggling to pull out of a recession, I am reminded that the subfield of macroeconomics was born not as a science but more as a type of engineering. God put macroeconomists on earth not to propose and test elegant theories but to solve practical problems. The problems He gave us, moreover, were not modest in dimension. The problem that gave birth to our field-the Great Depression of the 1930s- was an economic downturn of unprecedented scale, including incomes so depressed and unemployment so widespread that it is no exaggeration to say that the viability of the capitalist system was called into question.

Source: (Mankiw, 2006)

### Box 3. The seminal role of the GT in macroeconomics

« Si la macro-économie est fille de la grande crise des années 1930, Keynes en est certainement la figure tutélaire et son livre, *La théorie générale de l'emploi, de l'intérêt et de la monnaie*, paru en 1936, la poutre maîtresse. Ce livre visait à élucider le phénomène de chômage de masse qui, à l'époque de la grande crise des années 1930, accablait les économies. Le désarroi régnait parmi les responsables politiques, sociaux et intellectuels, qui ne parvenaient pas à avoir de prise sur l'évolution des choses. Au sein de la communauté plus restreinte des économistes académiques, le sentiment prévalait que leur discipline ne disposait pas des outils adéquats pour comprendre la réalité qui les entourait et agir dessus. Sortir de cette crise était manifestement une affaire complexe, mais Keynes était convaincu qu'une déflation salariale ne pouvait qu'empirer les choses. Telle était pourtant la seule solution susceptible d'être dérivée de la théorie économique de l'époque. L'objectif poursuivi par Keynes en s'attelant à son livre était de faire sauter ce verrou théorique. A cet effet, il fallait, pensait-il, dépasser le cadre d'équilibre partiel, tel qu'Alfred Marshall, le fondateur de l'école de Cambridge, l'avait développé. **Si le chômage était, bien évidemment, un phénomène se manifestant dans le marché du travail, son origine devait être cherchée dans d'autres secteurs de l'économie, en particulier la finance. Il s'agissait dès lors d'étudier l'interdépendance entre les marchés, la piste suivie par Keynes étant d'attribuer le chômage à une insuffisance de la demande agrégée, une partie du revenu des agents fuyant le circuit de la dépense.** »

Source : (de Vroey and Malgrange, 2007)

## 2.1. Tentative definition

A prevalent division in Economics is Macro and Microeconomics. Macroeconomics: The object of interest is the entire economy. We care primarily about: Growth and Fluctuations, Fiscal and monetary policies, external accounts, inflation and exchange rates, or unemployment. The main goals of macroeconomic policy are growth in the standard of living, low unemployment, low inflation and external balance.

Macroeconomics is about constructing models of the aggregate economy and then using them to understand the effects of external shocks and economic policies.<sup>3</sup> Note that there is increasing attention paid to macroeconomics and the environment which is beyond the objectives of this lecture.

Macroeconomics describes and analyses the overall functioning and performance of the economy (Definition 2). The study of the economy as a whole does not mean an analysis of the multitude of markets (goods, securities, factors of production, etc.), which is instead part of the global microeconomic analysis, also known as general equilibrium, in the tradition of Léon Walras' work. On the contrary, macroeconomics reduces the number of markets studied. These are the goods market, labour market, financial market (see graphs in Annex p. 31 and the structure of macroeconomics textbooks). Exploring macroeconomics allows inferring policy implications. This course will introduce fiscal and monetary policies, the two essential ingredients of macroeconomic policy.

### 2.1.1 Aggregates and macroeconomic accounts

Macroeconomics studies the relationships between aggregates such as:

- GDP denoted by  $Y$  (Goods and Services - G&S market) as an indicator of economic activity;
- Aggregate consumption, which is an activity that leads to the destruction or transformation of the product; Final consumption  $C$  is when the product is destroyed to directly satisfy a need, whereas intermediate consumption is when the good is transformed to produce another good or service;
- Other aggregates are Investment  $I$  and public expenditure  $G$ ;
- Also, interest rates, monetary aggregates (financial markets)  $M$ .

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<sup>3</sup> According to Kaldor economic policy is the set of actions adopted to stabilize the economy, whether through fiscal policy, monetary policy, or any instrument that could influence income, production and employment. Its objectives are summarized by the so-called "magic square" formula: price stability, full employment, expansion and external balance (Kaldor, 1971).

- Other relevant macroeconomic variables are unemployment, labour force, level of employment (labour market). Not studied this year;

These aggregates are essential for defining and assessing economic policy, namely monetary and fiscal policy. Aggregates derive from national accounts whose definition may change over time. These conventions are the subject of work in national or international institutions. Examples. The system of National Accounts (SNA) has been elaborated under the auspices of the UN. One crucial feature is that it allows international comparisons of measures of economic activity. The European Central Bank (ECB) compiles monetary aggregates. The International Labour Office provides *aggregate* estimates on the labour market. The INSEE (National Institute of Statistics and Economic Studies) "collects, analyses and disseminates information on the French economy and society."

### 2.1.2 The long-run and the short-run

Macroeconomics often splits into two-time frameworks, i.e. the short run and the long run. Differences in LR /SR macroeconomics? LR macroeconomics consider at least 10 to 15 years' time horizons. In that respect, economic analysis focuses on the supply side of the economy as the primary determinant of GDP. But as JMK famously argued: "Long run is a misleading guide to current affairs. In the long run, we are all dead". SR macroeconomics put forth the demand side of the economy. The main difference between the SR and the LR comes from assumptions about the dynamics of **prices and quantities**. For Keynesians, prices are sticky in the short run so that firms make output adjustments while keeping prices constant (Box 4). But this is not the only way to define the time perspective. The LR also pertains to the time horizon needed for a producer to have flexibility over all relevant production decisions. SR: the amount of labour used by producers is variable, but the **quantity of capital and production processes are not** (i.e. taken as a given). LR: the amount of labour, capital, and production technologies can change.

### 2.1.3 Macroeconomic functions

Definition 1. Macroeconomic reasoning involves developing macroeconomic functions and combining them with accounting relationships to build models of how the economy works.

An example of an accounting relationship (also called **identities**) is the one that defines GDP as being the sum of final demands:  $GDP \equiv C + I + G + X - M$ . This equality is valid at all times. The identity is denoted here by the  $\equiv$  symbol. Another example is  $Y^d \equiv C + S$  that says that HHs disposable income  $Y^d$  is split into consumption  $C$  and saving  $S$ . The identity is true since HHs cannot do something else with their disposable income. Those identities are the core of macroeconomic accounting. The Table of Integrated Economic Accounts is a prominent example (Table 4 p. 36 and Table 3 p. 34).

Then we have **equations**. The main difference with identities is that they are not always true. They are the subject of theoretical discussions and controversies. In addition to Definition 1, equations fall into two categories:

**Behavioural equations or behavioural functions** (also called macroeconomic functions). Chapter 1 and 2 will be devoted to studying two behavioural functions: HHs consumption  $C(Y^d)$  and firms' investment. They will be called aggregate consumption function and aggregate investment function. They are "functions" because they tell us how HHs **would** behave accordingly with some underlying theory. Several variables shape their behaviour. The selection of variables is related to the economic theory. For instance  $C(Y^d)$  is a Keynesian consumption function that differs from the proposition made by Neoclassical economists. Hence, behavioural equations are not valid all the time for many reasons. They are simplified representations of behaviours, or behaviours can change over time.

**Equilibrium equations** (Box 9). Equilibrium means a position toward which the economy tends to move. Economic equilibrium is a situation where individuals' expectations correspond to the exogenous data of the economy as predicted by behavioural functions. Equilibrium equations must exist if everybody satisfies its expectations (as described in the behavioural equations) simultaneously. On the other hand, if the achievements do not correspond to expectations, there is an imbalance or

disequilibrium. It can happen when agents cannot behave as described by behavioural equations. This disequilibrium induces changes in behaviours. The following equation  $Y = C(Y^d) + I + G + X - M(Y)$  that resembles  $GDP := C + I + G + X - M$  is an equilibrium condition because it involves determining a peculiar value of  $Y$  that enables having the equality between GDP and the sum of final demands.

When discussing equilibrium conditions, one introduces distinguishing between *ex-ante* and *ex-post* quantities. Gunnar Myrdal raised this distinction. *Ex-ante* (a priori) quantities are based on expectations; *ex-post* quantities are based on actual or observed quantities (a posteriori). Macroeconomic accounting allows measuring *ex-post* variables. There may be an *ex-ante* disequilibrium, but there will always be an *ex-post* balance, i.e. an accounting equilibrium. Economic agents can make errors *ex-ante*. For example, *ex-ante* (expected) investment can differ from *ex-post* (observed) investment. One reason why there is a discrepancy between *ex-ante* and *ex-post* investment is that economic agents make errors. Those errors arise from price rigidities or stickiness. According to Myrdal, economic fluctuations are the consequences of those discrepancies.

### Definition 1. Macroeconomics

Macroeconomics is the branch of economics that studies economy-wide phenomena. It, therefore, looks beyond the study of individual behaviours and market structure, which microeconomics deal with. Macroeconomics focuses on aggregate indicators such as saving, consumption, investment, public expenses, national income and international factors ultimately determining GDP, and related aggregate phenomena such as inflation and unemployment.

Source: Own elaboration

"Macroeconomics. The big picture: analysing economy-wide phenomena such as GROWTH, INFLATION and UNEMPLOYMENT. Contrast with MICROECONOMICS, the study of the behavior of individual markets, workers, households and FIRMS. Although economists generally separate themselves into distinct macro and micro camps, macroeconomic phenomena are the product of all the microeconomic activity in an economy. The precise relationship between macro and micro is not particularly well understood, which has often made it difficult for a GOVERNMENT to deliver well-run MACROECONOMIC POLICY"

Macroeconomic Policy. Top-down policy by GOVERNMENT and CENTRAL BANKS, usually intended to maximise GROWTH while keeping down INFLATION and UNEMPLOYMENT. The main instruments of macroeconomic policy are changes in the rate of INTEREST and MONEY SUPPLY, known as MONETARY POLICY, and changes in TAXATION and PUBLIC SPENDING, known as FISCAL POLICY. The fact that unemployment and inflation often rise sharply, and that growth often slows or GDP falls, may be evidence of poorly executed macro-economic policy. However, BUSINESS CYCLES may simply be an unavoidable fact of economic life that macroeconomic policy, however well conducted, can never be sure of conquering."

Source: The Economist, <http://www.economist.com/economics-a-to-z/m#node-21529449> accessed 10 Jan. 17.

La macroéconomie permet d'étudier le fonctionnement d'ensemble de l'économie. L'objet de la macro-économie inclut donc l'activité globale mesurée par des agrégats comme le PIB, la consommation, l'épargne ou au travers d'indicateurs du niveau de chômage, des taux d'intérêt, les taux de change, l'inflation, le niveau des salaires, la balance des paiements. Un raisonnement macroéconomique repose sur l'utilisation des agrégats. **Le raisonnement macroéconomique consiste à élaborer des fonctions macroéconomiques et à les combiner à des relations comptables afin de construire des modèles du fonctionnement de l'économie.** La démarche utilisée est rarement normative, elle plutôt positive et vise surtout à donner des implications en termes de politique économique.

D'après : (Guerrien and Gun, 2012)

### Definition 2. Aggregate variables

"An aggregate is a composite value measuring the result of economic activity. The main aggregate is GDP."

Source: Insee, Définitions et méthodes

"Monetary aggregates are compiled by Central Banks on the basis of surveys of monetary and financial institutions; they measure the amount of money circulating in an economy, and usually presented as end-of-month national currency stock series."

Source: OECD Glossary of terms.

Aggregate Demand: "The total of the components of spending in the economy, added to get  $GDP = C + I + G + X - M$ . It is the total amount of demand for (or expenditure on) goods and services produced in the economy."

Source: CORE <https://core-econ.org/the-economy/book/text/50-02-glossary.html#glossary-supply-side-aggregate-economy> accessed 10 Dec. 18.

#### Box 4. Sticky prices in the short-run

"For studying short-run issues, such as year-to-year fluctuations in real GDP and unemployment, the assumption of price flexibility is less plausible. Over short periods, many prices in the economy are fixed at predetermined levels. Therefore, most macroeconomists believe that price stickiness is a better assumption for studying the short-run behavior of the economy."

Source: (Mankiw, 2010a, p. 13)

## 2.2. The economy as a merry-go-round

Equilibrium conditions often involve the view according to which the economy is circular (Figure 5, Figure 6).<sup>4</sup> They rely on the interactions between different aggregated actors that are "institutional sectors":

- Households. Their main activity is (final) consumption of goods and services. They can also have a productive activity in small businesses. According to the INSEE, households are "Individuals or groups of individuals considered in terms of their function as consumers or, where applicable, as entrepreneurs producing market goods or financial and non-financial market services."

The household sector includes all unincorporated enterprises<sup>5</sup> that produce for both the market and their own final uses and household activities that perform mainly for their own final uses (SNA definition). Among the households involved in production are the self-employed who own both labour and capital (craftsmen and craftswomen, self-employed doctors, farmers) and independent entrepreneurs who own all the capital used for production (e.g. small traders). From a legal point of view, it isn't easy to make a difference between the business and the HH's assets. The purchase or construction of a house is considered an investment.

- Les entreprises (firms i.e. non financial corporations) : sont tous les agents dont l'activité principale est la production de biens ou de services vendus sur un marché.

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<sup>4</sup> They are labelled as "eco circ" equations by (Haavelmo, 2012).

<sup>5</sup> According to the OECD Glossary of terms: "An unincorporated enterprise is a producer unit which is not incorporated as a legal entity separate from the owner (household, government or foreign resident); the fixed and other assets used in unincorporated enterprises do not belong to the enterprises but to their owners, the enterprises as such cannot engage in transactions with other economic units nor can they enter into contractual relationships with other units nor incur liabilities on their own behalf; in addition, their owners are personally liable, without limit, for any debts or obligations incurred in the course of production." Source: <https://stats.oecd.org/glossary/detail.asp?ID=2800> acceded January 10, 2022.

- Les sociétés financières (financial corporations) : les banques commerciales et les institutions de crédit sont des intermédiaires financiers qui créent la monnaie. Les compagnies d'assurances et les mutuelles sont également des sociétés financières.

The non-financial and financial corporations sectors include (i) all government and privately-owned corporations and quasi-corporations that produce goods and services principally for sale on the market but may have activities that produce goods and services for their own final uses and other non-market uses and (ii) all private non-profit institutions serving corporations and quasi-corporations (SNA definition).

- The general government produces goods on a non-market basis to the community and the HHs and redistributes income and wealth.

The general government sector includes all central, state or local government units performing other non-market activities, all social security funds, all non-profit institutions controlled and financed by government units and all unincorporated government enterprises producing mainly other non-market goods and services (SNA definition).

- Non-profit institutions serving Households. They include only private non-profit institutions that produce mainly non-market goods and services to households (SNA definition). NPISHs are non-governmental social institutions. They depend on voluntary contributions in cash or in-kind from HHs or the government. They are trade unions, political parties, associations, charities, religious societies, etc.
- The Rest of the World (RoW).

Ces agents interagissent entre eux sur 3 marchés : le marché des facteurs de production, les marchés financiers, et les marchés de B&S Figure 6.

### 2.3. Micro and Macroeconomics ("The Big and the Small Picture")

(Mankiw and Taylor, 2011, chap. 41). Economics is a multilevel subject: the "Big and the Small Picture" (Rodrigo, 2011). The micro and macro insights are mutually beneficial in all academic fields. Economics are not an exception. In biology, we have molecular biology, cell biology, and evolutionary biology; Human and physical geography, etc.

#### 2.3.1 Comparing Micro and Macro

Look at Table 1.

Macro: studies the overall functioning of the economy. The media widely report on employment, GDP, or inflation, that impact the electoral cycle. Some studies show that the economic situation summarised by inflation, unemployment and economic growth influenced electoral outcomes (Snowdon, Vane and Wynarczyk, 1997, p. 1). Scale: a

country or group of countries. Particular actors: "institutional sectors" that implement economic policies (a State, a CB). Macroeconomics also deals with international issues, mainly through the coordination of economic policies.

Micro: focuses on S / D interactions in different markets. Scale: a market or interactions of several markets that can go as far as the study of general equilibrium (Walras). See S1 lecture (Markets, supply and demand; General equilibrium). Actors are consumers, producers, and a "social planner", a hypothetical economic agent representing the general interest (normative approach). The social planner does not exist in Macroeconomics.

**Table 1. Comparing micro and macroeconomics**

	Microeconomics	Macroeconomics
Object	Study individual behaviours that are in most cases related to optimising behaviours (max utility, max profits, etc.) and how economic agents interact in specific markets	Study the economy-wide processes. Rely on aggregate measures that can be explained by macroeconomic function, i.e. consumption function, investment function, money demand, etc.
Scope	One market (partial equilibrium) or many interdependent markets (general equilibrium)	One country or many, i.e. monetary or economic unions
Objectives	Study resource allocations. Role of relative prices	Study how the aggregate level of activity as measured by GDP is determined. Other aspects are also the subject of macroeconomic analysis: general level of prices, employment, external balances.
Agents	Representative agents like consumers of firms	Institutional sectors such as households (HHs), corporations, or governments. Governments are in charge of implementing economic policies.
International dimension	Yes, in so far as markets are not circumscribed to national boundaries. Example: the oil market.	Yes, since national economies are interdependent
Approach	Microeconomics is normative in many respects. A normative statement is prescriptive: it claims how the world ought to be. Often implies a comparison with an ideal case which is the optimum. Example of a normative statement: the government should raise the minimum wage	Macroeconomics is positive most of the time since the main objective is to explain how macroeconomic phenomena occurred. A positive statement is descriptive: it claims how the world is. The main expectation is to draw policy implications. Example of a positive statement: Minimum-wage laws cause unemployment.
Example of research questions	How does rent control affect housing in NY city, or how do compulsory school attendance affect workers' earnings?	What is the effect of government borrowing? How to explain the changes in unemployment rates over time? How to promote better living standards in developing countries?

Source: Own elaboration. Examples borrowed from Mankiw and Taylor.

### 2.3.2 Micro and Macroeconomics are complementary

Look at Box 5.

Simplistic idea: the behavior of aggregate variables can begin with the study of individual behaviours then aggregated in a kind of bottom-up approach. It is a false view because it is not doable. It is impossible to put into practice because many individuals and markets make up the concrete world. It is too complex to sum up all singular aspects. Macroeconomics provides a simplified framework. Macroeconomists assume only one composite good instead of adding all goods and services supplied and demanded throughout the economy. Hence the aggregate supply and aggregate demand, aggregate consumption and saving. Both insights have distinct methodologies and research questions.

If macroeconomics were a simple aggregation of individual behaviours, it would not be that attractive. The aggregate is more than the sum of individual units. It is possible that what happens at the macro level differs from how economic agents would react to some stimulus at the microeconomic level. Group behaviour is different from individual behaviour. There are agglomeration or aggregation effects.

But macroeconomic behaviours can be given microeconomic foundations. For example, one can rely on a microeconomic approach to study household aggregate consumption as advocated by neoclassical economists. In a Keynesian approach, these microeconomic foundations are absent. Some economists do not use these microeconomic foundations because they are controversial, as recently highlighted in Keen's book (Keen, 2014). But some believe that the two approaches are complementary (Box 5).

### Box 5. Complementarities and differences between micro and macroeconomics

"Microeconomics and macroeconomics are closely intertwined. Because changes in the overall economy arise from decisions of millions of individuals, it is impossible to understand macroeconomic developments without considering the associated microeconomic decisions. For example, a macroeconomist might study the effect of federal income tax cut on the overall production of goods and services. But to analyse this issue, he or she must consider how the tax cut affects the decisions of households about how much to spend on goods and services [...]"

Despite the inherent link between microeconomics and macroeconomics, the two fields are distinct. Because they address different questions, each field has its own set of models, which are often taught in different places [...] Many subjects are studied at various levels. Consider biology, for example. Molecular biologists study the chemical compounds that make up living things. Cellular biologists study cells, which are made up of many chemical compounds and, at the same time, are themselves the building blocks of living organisms. Evolutionary biologists study the many varieties of animals and plants and how species change over the centuries."

« Microéconomie et macroéconomie sont fortement liées. Comme les changements dans l'économie globale proviennent des décisions de millions d'individus, il est possible de comprendre les développements macroéconomiques sans considérer les décisions microéconomiques impliquées. Par exemple, un microéconomiste pourrait étudier les effets de la diminution de l'impôt sur le revenu sur le niveau global de production de biens et de services dans une économie. Pour analyser cette question, il doit considérer comment la réduction de la taxe affecte les décisions des ménages concernant le montant à dépenser en biens et services.

Malgré le lien inhérent entre microéconomie et macroéconomie, les deux champs sont distincts. En économie comme en biologie, il semble naturel de démarrer la construction sur la base de la plus petite unité. Or faire de la sorte n'est ni nécessairement ni toujours la meilleure façon de procéder. La biologie évolutionniste est, dans un certain sens, construite sur la biologie moléculaire, puisque les espèces sont faites de molécules. Or la biologie moléculaire et la biologie évolutionniste sont des champs séparés, chacune ayant ses propres questions et ses propres méthodes. De manière similaire, parce que la microéconomie et la macroéconomie traitent de questions différentes, elles adoptent parfois des approches très différentes et sont souvent enseignées dans des cours séparés. »

Source : (Mankiw and Taylor, 2011, p. 41)

### 3. THINK LIKE AN ECONOMIST

Economics is the only discipline where two people can share the same Nobel Prize through telling opposite things (cf. para 4. p. 21) Example: Gunnar Myrdal and Friedrich Hayek in 1974. Though there are different opinions, Economics is a scientific discipline. The research method characterises a scientific field. What does it consist of? It is a method of investigation that proposes and develops theories that apply to the functioning of what surrounds us. This paragraph aims to understand how (macro)economists set up a scientific approach. The main problem is how to link economic theory and reality.

We might think that the starting point is reality. Of course, we ask ourselves questions about the evolution of unemployment, the differences in living standards between countries, etc., but the natural starting point is the development of theories. These theories lead to implications for the appropriate measures to solve the underlying problem. But the essential starting point is the underlying theory: the economic reasoning behind a phenomenon.

Theories are necessarily simplifying and therefore resort to abstraction. They stem from simplifying hypotheses or assumptions. It is the case in economics but also in other scientific disciplines.<sup>6</sup>

#### 3.1. On Economic Modelling

##### Definition 3

The economic theory proposes the modelling of reality. It links different variables in a cause-and-effect relationship. The model simplifies reality and ignores details (Definition 3). It is not realistic; it tells a story ("everything goes as if"), but its conclusions give an acceptable representation of reality; the story told must be plausible (Box 6). Economics is not the only academic field that uses models: road maps, a model of human anatomy

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<sup>6</sup> Cf. the example of the physicist and the cannonball given by Mankiw (Mankiw and Taylor, 2011, p. 32). « Si vous demandez à un physicien combien de temps il faudrait à un boulet de canon pour tomber du haut de la Tour de Pise, il répondra probablement à la question en faisant l'hypothèse que le boulet tombe dans le vide. Bien sûr cette hypothèse est fautive. En réalité, le bâtiment est entouré d'air qui exerce une friction sur le boulet qui tombe et il le ralentit. Toutefois, le physicien signalera avec justesse que la friction sur le boulet de canon est si faible au regard de son poids que son effet est négligeable. Faire l'hypothèse que le boulet de canon tombe dans le vide simplifie grandement le problème sans affecter la réponse de manière substantielle. »

used in high school biology class, a model aeroplane, model teeth at the dentist's office, etc. One familiar model in microeconomics is the price-quantity diagram with supply and demand curves. Macroeconomists use the income-expenses flows diagram or the circular flow diagram representing how goods, services, and money move through the economy between prominent actors such as the HHs, the firms and the Government (Figure 5 and Figure 6).

Cause and effect relationships are often represented with equations. Those relationships are of three kinds: behavioural relationships, equilibrium conditions and identities (cf. para 2.1. ). Those equations are themselves made of variables and parameters.

**Variables.** A variable is a quantity, a representation of a phenomenon (for example, consumption), which as its name indicates VARIES (overtime, space). We will therefore use symbols,  $C$  for example, to represent this quantity, this AGGREGATE (see lesson S1).  $C$  can thus take different VALUES according to the period ( $C = 100$  in 2000 and  $C = 200$  in 2010). It is, therefore, necessary to make a distinction between the variable  $C$ , which designates the quantity, and the value it can take. Below, we make a crucial distinction between exogenous and endogenous variables. Variables measure economic outcomes (read Ouliaris below). They need accounting methods. In macroeconomics, accounting methods date back to WWII. See as examples the integrated economic accounts in Table 4.

Parameters do not vary; they are constant terms. Ex: price-elasticities, propensities to consume.

### Definition 3. Think like an economist

« Les modèles sont des théories ou des représentations simplifiées qui montrent les relations essentielles entre les variables économiques. Les variables exogènes sont extérieures au modèle tandis que les variables endogènes sont celles qui sont expliquées par le modèle. Le modèle indique comment les variables exogènes influencent les variables endogènes. Souvent les modèles sont exprimés sous la forme d'une fonction d'une ou de plusieurs variables. »

[...] "Assumptions simplify the complex world, make it easier to understand. Example: To study international trade, assume two countries and two goods. Unrealistic, but simple to learn and gives useful insights about the real world [...] A model is a highly simplified representation of a more complicated reality. Economists use models to study economic issues."

Source : (Mankiw, 2010b, p. 9)

"An economic model is a simplified description of reality, designed to yield hypotheses about economic behavior that can be tested. An important feature of an economic model is that it is necessarily subjective in design because there are no objective measures of economic outcomes. Different economists will make different judgments about what is needed to explain their interpretations of reality.

Source: (Ouliaris, 2011)

### Box 6. Should an economic model be realistic? The answer is NO

"Much as a map that has a scale of 1:1 is not suitable for putting in the trouser pocket, a model that approximates reality as close as possible is untractable due to its too high complexity. The analyst's task is to construct a model that is as simple as possible, but that reflects all important aspects of the problem by appropriate assumptions. What is considered to be 'important' depends on the questions the model is designed to answer."

Source: (Endres, 2011, p. 329)

## 3.2. Exogenous and endogenous Variables

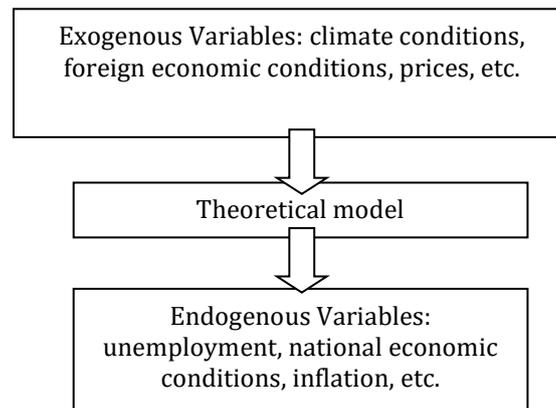
Un modèle repose sur une ou plusieurs relations de cause à effets, représentées par des équations. Ces relations sont l'expression d'une théorie. Les équations d'un modèle comportent deux catégories de variables. Il s'agit des variables endogènes auxquelles on s'intéresse (celles qui sont au cœur de la question) et des variables exogènes jugées pertinentes par la théorie. Dans la relation de cause à effet, la cause est représentée par une ou plusieurs variables exogènes et l'effet par les variables endogènes. Le modèle prédit les effets des variables exogènes sur les variables endogènes Figure 1. Comme dans toute autre discipline, sciences sociales, de la nature ou autres, le but de la discipline macro-économique est d'expliquer en termes économiques les variables **endogènes**. L'activité économique, le chômage, la croissance, etc. sont endogènes *i.e.* explicables par l'analyse économique.

Les autres variables, celles que la discipline ne tente pas d'expliquer mais considère comme des données ou ne relevant pas de l'économie, sont **exogènes**. Exemple :

l'environnement naturel (meteorological hazards, natural resources), l'environnement économique (for France, the level of activity in the United States, oil prices, etc.), l'environnement politique (fiscal and monetary policies), l'environnement technologique (technical progress, quantity and quality of labour).

A model can be simple when its purpose is to explain a behaviour (consumption, investment). The model becomes more complex when its objective is to explain the overall functioning of the economy. Par exemple le modèle de prévision à court terme de l'OFCE considère différentes catégories de variables exogènes. Ce modèle comporte 300 variables exogènes réparties en 6 grands groupes : (i) v exogènes de politique budgétaire et fiscale (100) qui permettent de décrire le comportement des administrations publiques, (ii) v exogènes de politique monétaire (taux de change, taux d'intérêt - 4 variables), (iii) v exogènes de l'environnement extérieur modélisé par demande mondiale, prix du pétrole, des concurrents l'importation et à l'exportation (4 variables), (iv) variables démographiques pour prévoir le chômage (12 variables), (v) certaines caractéristiques du marché du travail (productivité tendancielle et durée du travail 10 variables), (vi) exogènes qui permettent de caler les comportement sont les plus nombreuses (160 variables).

**Figure 1. Variables and theoretical models: how to explain economic phenomena?**



Adapted from (Mankiw, 2010a, p. 8)

### 3.3. Trials and errors or Why do economists need data?

Theories are not fixed, are not established truths, are not set in stone, are not irrefutable. They are open for inspection, citizens and scientists can question them. This questioning can improve theories or develop alternatives (Figure 2). There are several

possible explanations for the level of household consumption or business investment (chap. 1 et 2) :

$C = C(\text{wealth})$  avec la richesse totale définie comme la somme actualisée des tous les revenus futurs des ménages ;

$C = C(\text{disposable income})$

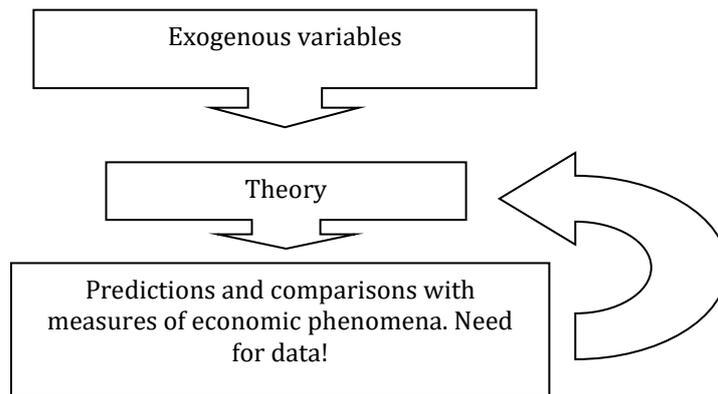
Si une politique de soutien du revenu ne donne pas les résultats escomptés sur le niveau de consommation, alors nécessité de remettre en question la théorie.

No economic model is a perfect description of reality. Reasons: a model is a simplification of reality; it relies on statistical measures that can also be subject to measurement errors; relies on theoretical hypotheses which are questionable. Remember there is no objective measure of economic outcomes (Definition 3). Economic models are updated with new information and are corrected to better fit actual data. Like in any other science, there is a Trial and error process (Figure 2) that needs data collection.

The challenge of economic models forces economists and policymakers to strengthen their views about how an economy works. Scientific debate is always lively and pushes economists to question the determinants of economic behaviours and how market mechanisms work. One of the main difficulties is that individuals learn from what they are doing and change their behaviour. They evolve, so do behavioural equations and economic models.

A distinctive feature of modern economics is the increasing availability of quantitative information at the micro or the macro level. For example, it is now possible to monitor the world's forest cover using satellite imagery. Big data opens new fields of investigation regarding the behavior of economic agents.

**Figure 2. Variables and theoretical models: how to test the relevance of economic models?**



Source: Own elaboration

## 4. “MR KEYNES AND THE CLASSICS”<sup>7</sup>

Debates in macroeconomics oppose two currents of thought—Classical vs Keynesian.

Smith founded the science of economics, JMK macroeconomics. How did the discipline evolve between 1776 and 1936? The field evolved with the Marginalist revolution in the second half of the 19th century (Walras, Menger, Jevons trio). Marginalists renewed the foundations of value without calling into question the essential mechanisms of the market economy:<sup>8</sup> markets in equilibrium, the role of prices to adjust S to D, crises = temporary due to the time needed to adjust prices. Analysing individual markets is sufficient to understand the aggregate output, employment or unemployment. There are several schools of thought whose analysis is part of the history of thought but which structure the debates around economic policy. Hence some indications on the Classical school and the Neo-classical stream.

### 4.1. The Classics

The classical school constitutes what is called political economy. It developed from the 18th century to the middle of the 19th century. The main authors are:

- Adam Smith (1723-1790, *An Inquiry into the Nature and Causes of the Wealth of Nations* (Smith, 1776b);
- David Ricardo (1772-1823, *Des principes de l'économie politique et de l'impôt - Principles of Political Economy and Taxation*, (Ricardo, 1821). Ricardo's comparative advantage;
- Followers such as J.S. Mill (Mill, 1854); J.B. Say (1767-1832, *A treatise on political economy; or the production distribution and consumption of wealth -*

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<sup>7</sup> I borrow the title to Hicks (Hicks, 1937).

<sup>8</sup> La théorie de la valeur concerne l'origine de la valeur des biens / services. Classiques : est liée au coût des facteurs de production impliqués dans l'élaboration du B/S. Les Classiques ramènent la valeur à un dénominateur : le travail. D'où la théorie de la valeur travail (labor theory of value). Néoclassiques, mettent l'accent sur l'utilité et la rareté du bien, ce qui permet de résoudre le paradoxe de la valeur. S'il s'agit d'une révolution (marginaliste), ne remet pas en cause la vision d'ensemble de la discipline ; les classiques ne s'opposent que partiellement aux néoclassiques.

*Traité d'économie politique* (Say 1803, 1972). He makes popular the law of the outlets that is a core concept of supply-side economics.

An economy is a complex machine; self-interest drives the behaviour of individuals. Interdependent egoistic individuals could result in chaos. Smith underlined on the contrary that a spontaneous social order arose from this competition. Adam Smith invented the Invisible hand metaphor about unintended consequences of human decisions (Definition 4, Definition 7). The spontaneous order is the best outcome. The market economy allows individuals to realise exchanges that are beneficial for the seller and the purchaser. Each obtains sthg that is more useful to him than the commodity s/he had beforehand. The affirmation of the classical school accompanies the development of the market economy and the decline of State intervention, in the name of "laissez-faire, laissez-passer". It prevails in the early 19th century.

A sense of crisis appeared in this school of thought as early as the 1860s. A homogeneous opposition does not emerge, but rather the classical mainstream meets several challenges. This period characterises itself by criticism motivated by great worker poverty. In particular, these critics lead to the development of Marxist analysis that predicts the end of the political economy. The "marginalist revolution" carries renewal in the 2nd half of the 19th century with the neoclassical stream.

Remark.

Smith used the invisible hand (without capital letters) sparsely. Interestingly, the first occurrence of the metaphor was quoted as the invisible hand of Jupiter. It refers to catastrophic natural events that were unexplained and attributed to deleterious influences of divinities Definition 7. The invisible hand undergoes several critics. They question the benefits derived from a market economy.

#### Definition 4. The invisible hand - 1

"Somewhat more than two centuries ago, Adam Smith delivered at this University a set of lectures, later written down in his monumental work, *The Wealth of Nations*, which perhaps had more influence on the development of our discipline than any other work in the history of the subject. And among the ideas presented there, perhaps none has held such sway, not only over professional economics, but also over all those who concerned about how best to organise society to promote the General Welfare than his concept of the invisible hand: this, in spite of the fact that he explicitly used the term only once in *The Wealth of Nations*.

Smith argued not only that individuals were led in the pursuit of their self-interest by an invisible hand to pursue the Nation's interest, but also that this pursuit of self-interest was a far more reliable way to ensure that the Public Interest would be served than any alternative- -surely better than relying on some government leader, as well-intentioned as that leader might be."

Source: (Stiglitz, 1991)

#### 4.2. Neoclassical economists

The neoclassical school develops from 3 places. In England with W. S. Jevons (1835-1882), in Switzerland with L. Walras (1834-1910) and in Austria with C. Menger (1840-1921). They introduced the reasoning at the margins into the analysis: we speak of the Marginalist / Marginal revolution. It is no longer a question of demonstrating the superiority of the market economy. Instead, it shows that crises are not the rule and that general equilibrium prevails. Marginalists emphasise price formation. Mathematics enters economic analysis. A. Marshall (*Principles of Political Economy*, 1890), A.C. Pigou at the beginning of the 20th century are prominent representatives. Marshall is the inventor of a partial equilibrium reasoning model that is the price-quantity diagram. Marginalists became popular because they renewed the theory of value and solved paradoxes such as the paradox of value (Definition 5).

### Definition 5. Thinking at the margin

"What does it mean to think at the margin? It means to think about your next step forward. The word "marginal" means "additional." The first glass of lemonade on a hot day quenches your thirst, but the next glass, maybe not so much. If you think at the margin, you are thinking about what the next or additional action means for you.

How many additional tomatoes can you get by taking better care of your garden? If an hour extra work weeding means you will get 12 more tomatoes, then one additional hour of work results in 12 additional tomatoes. Economists sometimes summarise that by saying your **marginal product of labor** is 12. That just means you can get 12 more tomatoes for one additional hour of work.

On the flip side of that, you could equally well say that the **marginal cost** of a producing one additional tomato is 5 additional minutes (1/12th of an hour) of your labor. Every new tomato costs you another five minutes of weeding. As another example, if one additional Facebook friend costs you an additional 10 minutes of attention, then the marginal cost is 10 minutes of your time per new Facebook friend.

A bus that is half-empty can take on more riders with zero or very little extra cost--perhaps just a few cents more for wear and tear and the cost of gas to haul an extra 150 pounds. Economists would say the **marginal cost** of an additional rider is nearly zero. But, if buses are always running packed with lines left standing, then the marginal cost of additional riders would be the entire cost of adding another bus. It is very common to have to compare different marginal costs for different scenarios in order to decide which alternative to pursue." [...]

Adam Smith struggled with what came to be called the paradox of "value in use" versus "value in exchange." Water is necessary to existence and of enormous value in use; diamonds are frivolous and clearly not essential. But the price of diamonds--their value in exchange--is far higher than that of water. What perplexed Smith is now rationally explained in the first chapters of every college freshman's introductory economics text. Smith had failed to distinguish between "total" utility and "marginal" utility. The elaboration of this insight transformed economics in the late nineteenth century, and the fruits of the marginalist revolution continue to set the basic framework for contemporary microeconomics.

Source: <http://www.econlib.org/library/Topics/College/margins.html> acceded on January, 23<sup>rd</sup> 2017.

### 4.3. Keynesian economics

These first two schools are those identified by JMK as constituting "the classical school". The consistency of the Classical school only becomes perceptible after the publication of the General Theory, especially to counter Keynesian arguments. The English classics of the 19th century and the neoclassical economists since the "marginalist revolution" (WS. Jevons, L. Walras, and C. Menger) in the 2nd half of the 19th century belong to the "Classics." JMK also includes his contemporaries such as A. Marshall and A. C. Pigou. For JMK, classicism in economics covers the period 1776-1936 and conveys the following message: we must trust the ability of market mechanisms to reach full employment.

According to JMK, market mechanisms are unsuccessful in solving the Great Depression. He convinced economists of the need to steer the economy out of the crisis. JMK advocates a change in addressing economic problems: if the crisis affects the labour market, economic policy measures must not only target this market. There is a need to

look at the interactions of the labour market with other parts of the economy: the B&S market, financial markets, etc. For instance, poor aggregate demand weakens labour demand. The object of macroeconomics is born = academic innovation. It gained importance under the impetus of Scandinavian economists (K. Wicksell 1851-1926) but especially British ones (J.M. Keynes and his followers)

JMK theorises the idea of steering the economy, especially when the market does not allow the aggregate supply to adjust the aggregate demand. The GT links three stylised markets: labour, goods and services, finance & money (Figure 6). This idea quickly became operational with the development of national accounts. They present the economy as a whole articulated into a few significant macroeconomic flows, which can be measured and linked in theoretically coherent and exhaustive accounting tables (Table 4).

#### Box 7. Of the necessity of disputes

"Both teachers and learners go to sleep at their post, as soon as there is no enemy in the field [...] But much more of the meaning even of these [truths] would have been understood, and what was understood would have been far more deeply impressed on the mind, if the man had been accustomed to hear it argued pro and con by people who did understand it. The fatal tendency of mankind to leave off thinking about a thing when it is no longer doubtful, is the cause of half their errors. A contemporary author has well spoken of 'the deep slumber of a decided opinion'."

« Dès qu'il n'y a plus d'ennemi en vue, maîtres et disciples s'endorment à leur poste. [...] on aurait bien mieux compris la signification de ces vérités, et ce qui en aurait été compris aurait fait sur l'esprit une impression bien plus profonde, si l'on avait eu l'habitude d'entendre des gens qui la comprenaient effectivement discuter le pour et le contre. La tendance fatale de l'espèce humaine à laisser de côté une chose dès qu'il n'y a plus de raison d'en douter est la cause de la moitié de ses erreurs. Un auteur contemporain a bien décrit 'le profond sommeil d'une opinion arrêtée'. »

Source : (Mill, 1990, p. 34) Chapter II. Of the Liberty of Thought and Discussion

#### 4.4. Main differences between the Classics and the Keynesians

Table 2 below and Table 6 p. 40. The classical/Keynesian divide operates in several places. This lecture offers the opportunity to look at differences about behaviours (consumption and investment) and policies.

##### 4.4.1 How to coordinate individual decisions?

Adjustment by prices or quantities. Macroeconomics seeks to determine the equilibrium (supply/demand equals) in a few markets (see Figure 6 p. 33) and studies the

fluctuations of aggregates over time. According to the Classics, prices are flexible, and crises are transitory phenomena.

In the 19th century, there was a widespread belief that economic crises were temporary because price changes absorbed imbalances between supply and demand. The main characteristic of these crises: their regularity, but a common assumption: the cycles are "in balance", an expression due to Ragnar Frisch (image of the rocking horse). The idea is that economies evolve from one balance (supply = demand) to another. Economies are subject to random shocks; cycles occur because they reflect the rational behaviour of economic agents that adapt to the new situation and whose behaviour brings economies back into balance. Hence the belief that crises are short-lived.

In the Keynesian view, imbalances are resolved by adjusting quantities, as these evolve more quickly than prices, which are rigid in the short term or "sticky". Underemployment is pervasive; full-employment is of rare occurrence.

#### 4.4.2 Supply-side and demand-side Economics

If we adhere to the principles of the generalised barter economy defended by Say, the political implication is to focus on the Aggregate Supply. Policies inspired by Classical economists are "supply policies" that aim to improve supply conditions (labour and capital) and promote market mechanisms, not to support demand and not to hinder price movements. It is a "Say-style" economy criticised by Thomas R. Malthus, who believes that demand must exist before supply, an idea that JMK will take up.

The divide between supply and demand-side economics implies both streams propose different behavioural functions. Macroeconomics suggests representing the economy that takes up the major accounting equilibria. It adds "behavioural functions" that are cause-and-effect relationships between aggregates. Classical and Keynesian economists make different assumptions about behaviour and interactions.

### Definition 6. Supply-side economics and policies

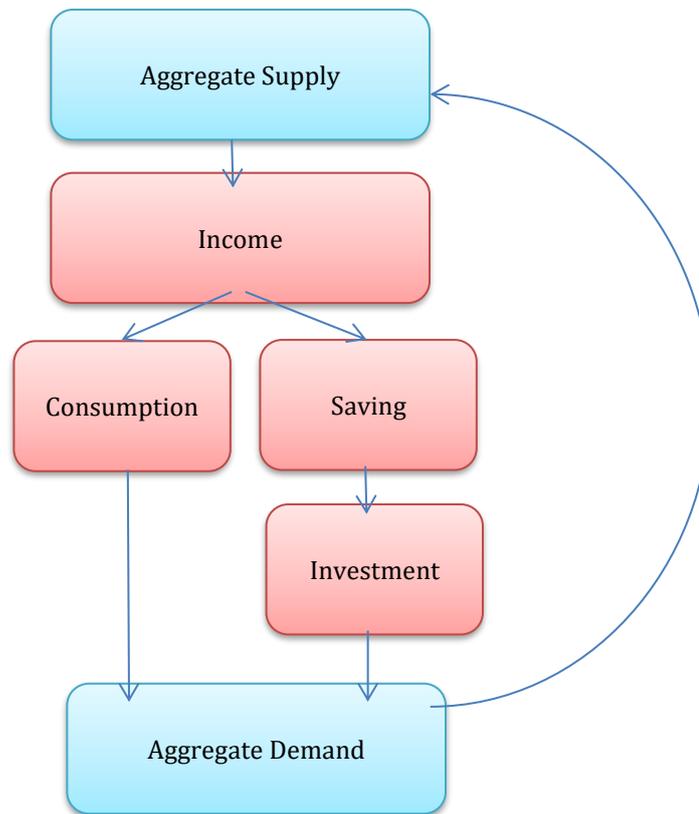
"A set of economic policies designed to improve the functioning of the economy by increasing productivity and international competitiveness, and by reducing profits after taxes and costs of production. Policies include cutting taxes on profits, tightening conditions for the receipt of unemployment benefits, changing legislation to make it easier to fire workers, and the reform of competition policy to reduce monopoly power."

Source: CORE, <https://core-econ.org/the-economy/book/text/50-02-glossary.html#glossary-supply-side-aggregate-economy> accessed 10 Dec. 18.

"The supply side of an economy is responsible for mobilising resources to supply goods and services, entailing as a crucial part the supply of labour and capital. The supply-side thus contributes to determining the economy's potential growth path and the real income of its citizens."

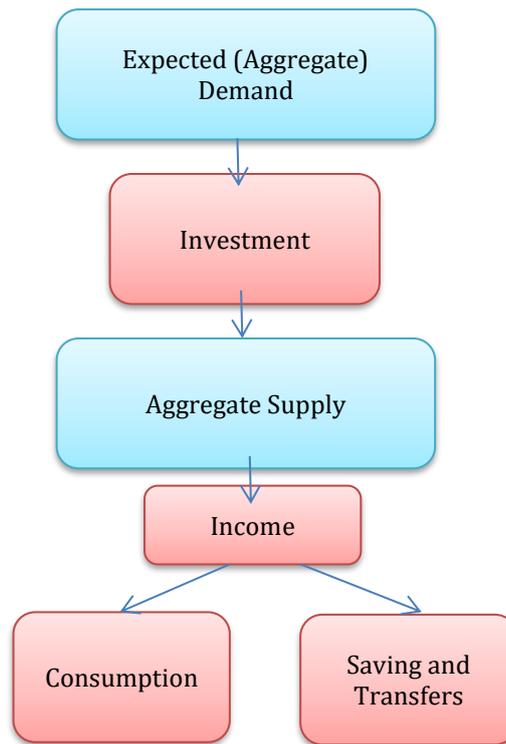
Source: Trichet, 2004 *Supply-side economics and monetary policy* Speech by Jean-Claude Trichet, President of the European Central Bank, at the Institut der Deutschen Wirtschaft, Köln, 22 June 2004. Available at [https://www.ecb.europa.eu/press/key/date/2004/html/sp040622\\_1.en.html](https://www.ecb.europa.eu/press/key/date/2004/html/sp040622_1.en.html) Accessed 10 Dec. 18.

Figure 3. A schematic representation of supply-side economics



Source: Own elaboration. In red, behavioural functions. In blue, aggregate supply or demand.

**Figure 4. A schematic representation of demand-side economics**



Source: Own elaboration. In red, behavioural functions. In blue, aggregate supply or demand.

#### 4.4.3 Money and Finance

Neoclassical economists advocate the dichotomy between the real sphere and the monetary one. The real economic sphere is concerned with producing goods and services. Relative prices matter. Monetary sphere is the part of the economy that deals with buying and selling on the financial markets. Nominal or absolute prices are the most important. According to neoclassical economists, the two spheres are independent. See chapter 3.

#### 4.4.4 Policy implications

Economic policy. (Snowdon, Vane and Wynarczyk, 1997, p. 2) The macroeconomic theory provides an ordered set of ideas about how the economy functions. As such, it is a descriptive model. These ideas are the basis for the design and implementation of economic policies. Pb: no consensus on the accurate model of the economy => no consensus on the role and practice of economic policy. The Keynesian consensus was dominant until the 1970s. Since then, it has been challenged and broken up. Weakness and lack of credibility of macroeconomic analysis? No: controversies enrich the intellectual debate => all parties gain from the confrontation of ideas. JS Mill advocated the need for discussions.

Keynesian consensus is a term coined by the British historian Paul Addison. This consensus covered the post-war period and prevailed until Margaret Thatcher in 1979. Consensus is on social and economic policies, including the Welfare state, free health services, educational reform, mixed economy and government regulation and Keynesian macroeconomics that consisted in the fine-tuning of the economy thanks to fiscal and monetary policy.

Evolution of cleavage over time (Box 8).

**Box 8. Macroeconomics: A tale of two schools of thought.**

"Two basic views of macroeconomic behaviour have persisted even as conceptual innovations and the application of more powerful analytic and empirical techniques have brought significant changes in macroeconomics.

One view and school of thought, associated with Keynes, Keynesians and new Keynesians, is that the private economy is subject to coordination failures that can produce excessive levels of unemployment and excessive fluctuations in real activity. The other view, attributed to classical economists, and espoused by monetarists and equilibrium business cycle theorists, is that the private economy reaches as good an equilibrium as is possible given government policy.

Any two-fold division of a complex, large and developing field of study is inevitably a caricature, which cannot do justice to the subtleties of the views of different individuals at a moment of time, the intricacies of the development of the field over time, and the remarkable range of research topics that fall under the heading of macroeconomics. For instance, although the protagonists in the sixties were Keynesians and monetarists, and in the eighties are new Keynesians and equilibrium business cycle theorists, there is a clear sense in which the views of Milton Friedman or Karl Brunner and Allan Meltzer are closer to those of Keynesians than those of equilibrium business cycle theorists.' Nonetheless, the caricature captures the essence of macroeconomic controversies and provides a useful organising framework within which to attempt a survey of a field that is too large for such an enterprise."

Source: (Fischer, 1988, p. 294)

**Table 2. Stumbling blocks between Classics and Keynesians**

	Classics	Keynesians
Coordination of individual behaviours	Essential ingredient: the market economy. In a market economy, decisions are decentralised. Private individuals own production factors, and firms supply goods and services based on demand. The market economy allows individuals to realise exchanges that are beneficial for both parties. The market economy is the best way of coordinating individual decisions. Parable of the "invisible hand" stated by A. Smith: refers to the result of exchanges between individuals, what will later be termed (late 19th century) the general equilibrium of markets. Main proposition: "laissez-faire, laissez-passer".	JMK believes it is possible to harmonise interests but does not believe in the invisible hand. The market mechanisms do not ensure the coincidence between the individual interests and the social optimum. There are coordination failures because rigid prices do not adjust supply to demand. Prices do not act as a signal. JMK does not dismiss markets and prices but proposes (i) to compensate for market failures through stabilisation policies and (ii) to regulate markets without impeding the freedom of individuals to spend.
Supply and Demand	Supply-side economics (Figure 3). What determines the level of activity in an economy is the supply-side conditions and, in particular, the availability of factors of production (labour, capital). Applies price theory to the functioning of the economy as a whole and in particular to aggregates. At the aggregate level, the functioning of the labour and capital markets are the starting points of the analysis. This characteristic stems from the "law of the outlets" set forth by J. B. Say at the beginning of the 19th century. A contemporary illustration of this approach is the Laffer curve which stigmatises the disincentive effects of state intervention on the determinants of supply, namely labour and investment (capital).	Logic of demand (Figure 4). Keynesian macroeconomics = macroeconomics associated with the price rigidity hypothesis. JMK rejects Say's law. The level of national production and employment depends on the state of demand (actual demand); it does not depend on the functioning of the factor markets. JMK underlines the critical role of business expectations and the "sanguine temperament and constructive impulses" of businessmen, particularly in investment decisions.
Money	Money is a "facilitator" of trade. It is neutral. The monetarists, one of whose prominent representatives is Friedman, are the modern representatives of the classical approach to financial markets and money. Monetarists claim the superiority of monetary policies vs the ineffectiveness of fiscal policy.	JMK challenges the neutrality of money. Money is demanded for its own sake because of a specific motive: speculation

Source: Own elaboration

## 5. INTRODUCTION - APPENDIX

### Box 9. On the concept of equilibrium

« Le concept technique d'équilibre économique permet de donner un sens précis à la notion intuitive d'ordre économique complet. 'Equilibre' signifie simplement que les anticipations sont correctes. On dit qu'une économie est en équilibre si et seulement si les conséquences qui découleront des actions entreprises par les participants pour réaliser leurs projets individuels sont conformes à leurs anticipations. Bien sûr, les projets individuels dont dépendent ces résultats escomptés sont fondés sur des anticipations ; le concept d'équilibre contient donc l'idée d'une boucle, d'une circularité. L'économie est en équilibre si et seulement si les anticipations sont telles qu'elles suscitent des projets – ou stratégies – individuels aboutissant à des résultats qui 'valident', ou 'confirment' ces anticipations »

Source : (Phelps, 1990, p. 67)

### Definition 7. The Invisible Hand - 2

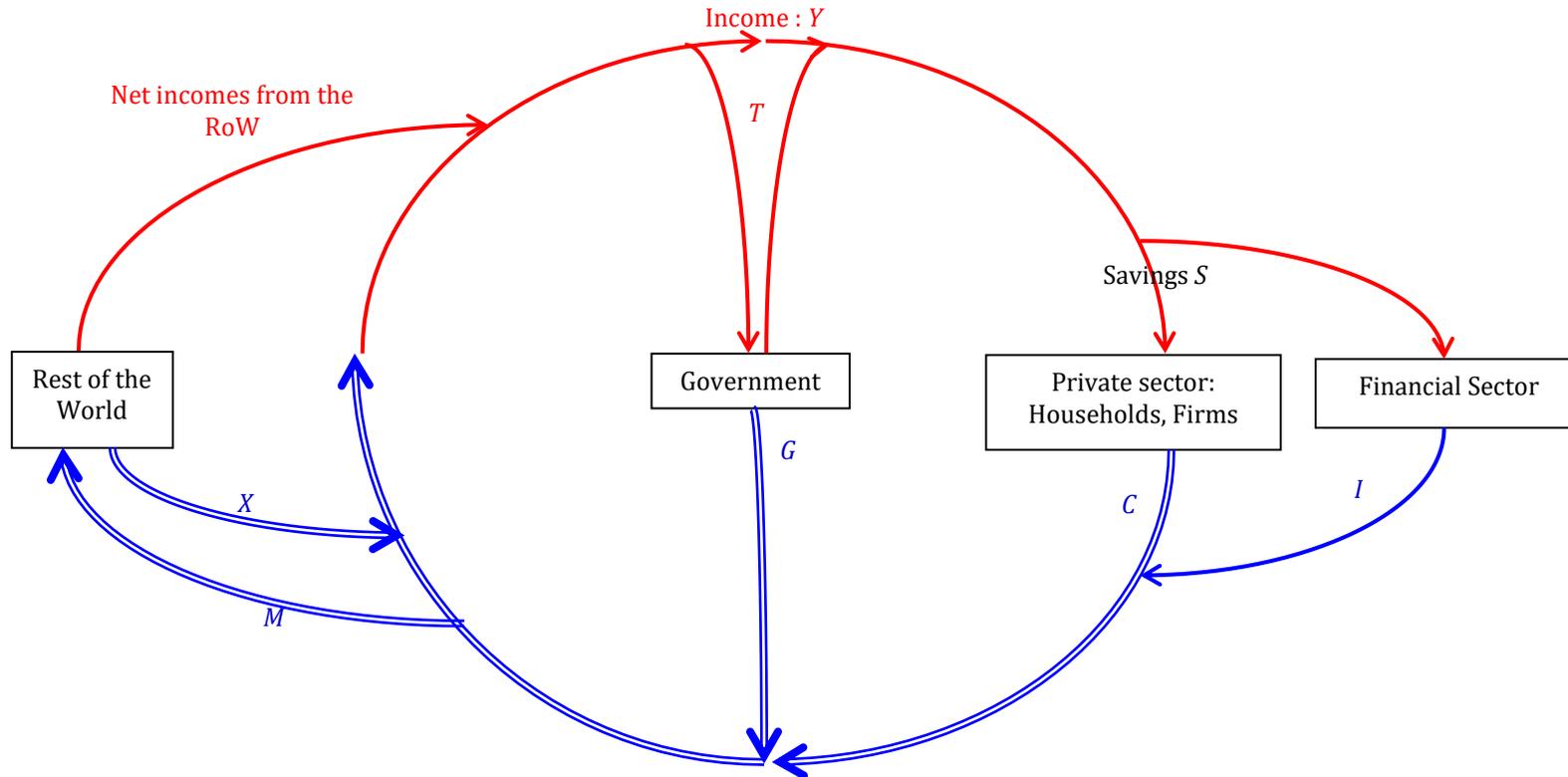
"In *The Wealth of Nations*, published in 1776, Smith, widely considered the father of economics, emphasised the economy's self-regulating nature—that agents independently seeking their own gain may produce the best overall result for society as well."

Source: (Ouliaris, 2011)

"One notes first that this [...] 'invisible hand of Jupiter,' (or of any of the major classical gods) [is] not of the Christian Deity, as in the *Moral Sentiments* and the *Wealth of Nations*. More importantly, the function of the divine invisible hand, in this transposition, appears to be exactly reversed. [...] the regular 'orderly course of things' by which 'fire burns and water refreshes' is capriciously stopped, thwarted, and disturbed so as to satisfy the god's 'favour' or 'anger.' In the two books, on the contrary, the Deity acts to preserve and develop the purposes of 'Nature' when they are disturbed by men - the only other 'designing power' which, in Smith's description (the 'savage' here, but obviously men at any time) can disturb them. In both the *Moral Sentiments* and the *Wealth of Nations*, the invisible hand intervenes 'to advance the interest of the society' when it is threatened or injured by the intentions of individuals motivated by their own very narrow aims in satisfying their own 'self-love.' (While self-love at its worst takes the form of 'men's natural selfishness and rapacity,' it should be remembered that for Smith' self-love may frequently be a virtuous motive of action.').

Source: (Macfie, 1971)

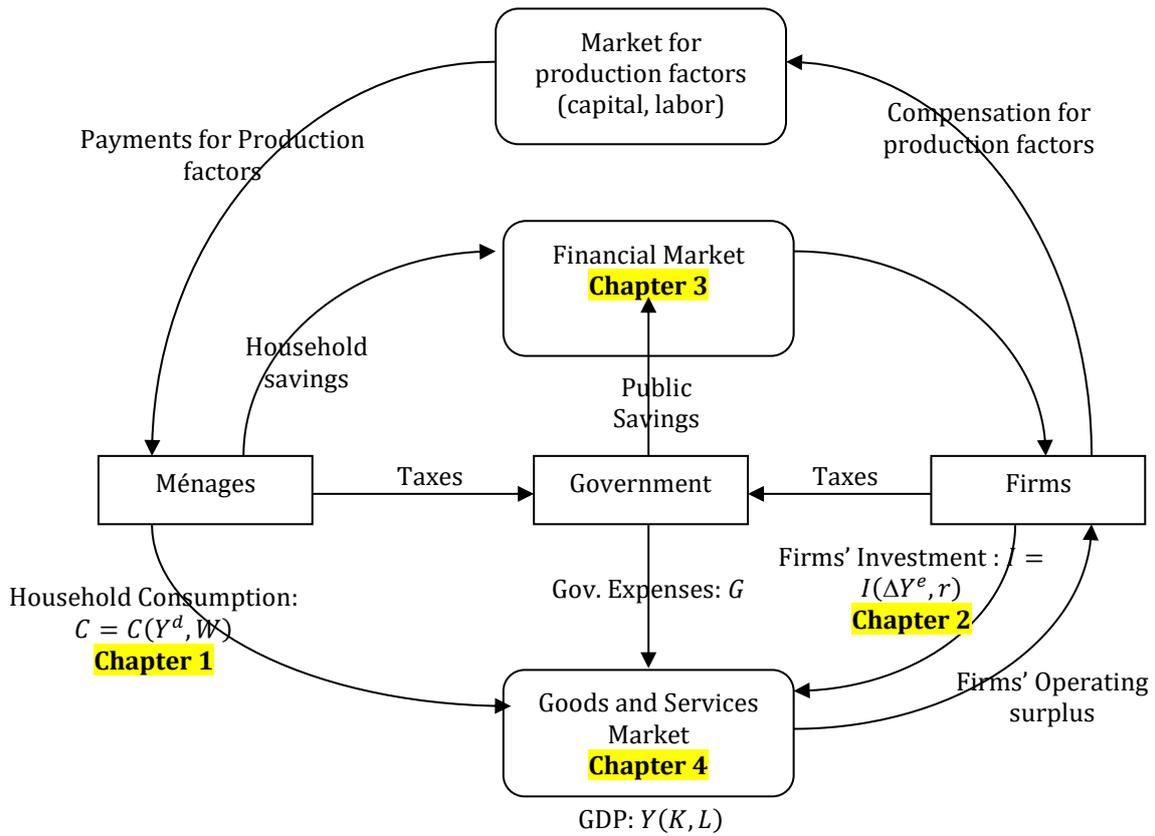
Figure 5. A model of the economy: the income-expenses flows diagram



Domestic Demand:  $C + I + G$ . In blue: Elements of Demand

$C$ : Final Consumption (HH),  $I$ : Investment,  $G$ : Gov Expenses,  $M$ : Imports,  $X$ : Exports,  $T$ : Net transfers to the Government, RoW: Rest of the World. This diagram puts emphasis on the economy as being a merry-go-round.

Figure 6. A model of the economy : circular flow diagram



Horizontal reading: economic agents

Vertical reading: markets

The RoW is not represented here. This diagram presents the organisation of the economy while putting emphasis on markets and agents

Table 3. The Table of Economic Integrated Accounts for the national economy, France, Insee, 2018

Uses		National economy	National economy		Resources
<b>Production account</b>				<b>Production account</b>	
P1	Output		4 164,1	P1	Output
P2	Intermediate consumption	2 073,2		P2	Intermediate consumption
D21N	Taxes less subsidies on products		262,2	D21N	Taxes less subsidies on products
<b>B1g/GDP</b>	<b>Value added - Gross Domestic Product (GDP)</b>	<b>2 353,1</b>			
	<b>total</b>	<b>4 426,3</b>	<b>4 426,3</b>		
<b>Generation of income account</b>				<b>Generation of income account</b>	
D1	Compensation of employees	1 231,9	2 353,1	<b>B1g/GDP</b>	<b>Value Added - Gross domestic product (GDP)</b>
D2	Taxes on production and imports	393,0			
D3	Subsidies	-70,7			
<b>B2g</b>	<b>Operating surplus, gross</b>	<b>677,5</b>			
<b>B3g</b>	<b>Mixed income, gross</b>	<b>121,3</b>			
	<b>total</b>	<b>2 353,1</b>	<b>2 353,1</b>		
<b>Allocation of primary income account</b>				<b>Allocation of primary income account</b>	
			1 251,9	D1	Compensation of employees
			388,4	D2	Taxes on production and imports
			-62,8	D3	Subsidies
			677,5	<b>B2g</b>	<b>Operating surplus, gross</b>
			121,3	<b>B3g</b>	<b>Mixed income, gross</b>

D4	Property income	515,8
<b>B5g/GNI</b>	<b>Blance of primary income</b>	<b>2 406,1</b>
	<b>total</b>	<b>2 921,8</b>
<b>Secondary distribution of income account</b>		
D5	Current taxes on income, wealth, etc	308,1
D61	Social contributions and benefits	480,2
D62	Social benefits other than social transfers in kind	507,4
D7	Other current transfers	748,6
<b>B6g/GDI</b>	<b>Disposable income, gross</b>	<b>2 357,6</b>
	<b>total</b>	<b>4 401,9</b>
<b>Use of disposable income account</b>		
P3	Final consumption expenditure	1 819,4
<b>B8g</b>	<b>Saving, gross</b>	<b>538,3</b>
	<b>total</b>	<b>2 357,6</b>
<b>Changes in assets</b>		<b>National economy</b>
<b>Capital account</b>		

545,4	D4	Property income
2 921,8		
	<b>Secondary distribution of income account</b>	
2 406,1	<b>B5g/GNI</b>	<b>Gross national income</b>
312,8	D5	Current taxes on income, wealth, etc
473,3	D61	Social contributions and benefits
504,9	D62	Social benefits other than social transfers in kind
704,9	D7	Other current transfers
4 401,9		
	<b>Use of disposable income account</b>	
2 357,6	<b>B6g/GDI</b>	<b>Disposable income, gross</b>
	P3	Final consumption expenditure
2 357,6		
National economy		<b>Changes in liabilities</b>
	<b>Capital account</b>	

D9r	Capital transfers, receivable	
D9p	Capital transfers, payable	
P51g	Gross fixed capital formation	537,9
P52	Changes in inventories	13,3
P53	Acquisitions less disposals of valuables	0,7
NP	Acquisitions less disposals of non-produced assets	
<b>B9NF</b>	<b>Net lending (+)/net borrowing (-)</b>	<b>-12,2</b>
	<b>total</b>	<b>539,7</b>

<b>538,3</b>	<b>B8g</b>	<b>National saving, gross</b>
<b>81,9</b>	D9r	Capital transfers, receivable
<b>-80,4</b>	D9p	Capital transfers, payable
	P51g	Gross fixed capital formation
	P52	Changes in inventories
	P53	Acquisitions less disposals of valuables
	NP	Acquisitions less disposals of non-produced assets
<b>539,7</b>		

Source: Insee National accounts - Base 2010. In red, balances that are first calculated in Uses (on the left) and then reported in Resources (on the right). Available at: <https://www.insee.fr/en/statistiques/4132168?sommaire=4132171> Figures in Billion €.

**Table 4. Integrated economic accounts**

In red: the balancing item that brings each account to a balance. For example, the balancing item of the Production account is the Value added. All balancing items are reported on the uses' side of the account and taken forward to the next account as the first entry on the resources' side.

**The production account**

Uses	Resources
Intermediate consumption	Output
<b>Value added</b>	

**The generation of income account**

Uses	Resources
Compensation of employees Taxes on production and imports Subsidies (-)	<b>Value added</b>
<i>Operating surplus, net</i>	
<i>Mixed income, net</i>	

**The allocation of primary income account**

Uses	Resources
Property income	<i>Operating surplus, net</i>
<b>Balance of primary incomes</b>	<i>Mixed income, net</i>
	Compensation of employees
	Taxes on production and imports
	Subsidies (-)
	Property income

**The secondary distribution of income account**

Uses	Resources
Current transfers	<b>Balance of primary incomes</b>
Current taxes on income, wealth, etc.	Current transfers
Net social contributions	Current taxes on income, wealth, etc.
Social benefits other than social transfers in kind	Net social contributions
Other current transfers	Social benefits other than social transfers in kind
<b>Disposable income</b>	Other current transfers

**The redistribution of income in kind account**

Uses	Resources
Social transfers in kind	<b>Disposable income</b>
<i>Adjusted disposable income</i>	Social transfers in kind

**The use of disposable income account**

Uses	Resources
Final consumption expenditure	Disposable income
Adjustment for the change in pension entitlements	Adjustment for the change in pension entitlements
<b>Saving</b>	

**The use of adjusted disposable income account**

Uses	Resources
Actual final consumption	Adjusted disposable income
Adjustment for the change in pension entitlements	Adjustment for the change in pension entitlements
Saving	

**The capital account**

Changes in assets	Changes in liabilities and net worth
Gross fixed capital formation	Saving
Consumption of fixed capital (-)	Capital transfers, receivable (+)
Changes in inventories	Capital transfers payable (-)
Acquisitions less disposals of valuables	Changes in net worth due to saving and capital transfers
Acquisitions less disposals of non-produced assets	
<b>Net lending (+) / net borrowing (-)</b>	

Source: System of national Accounts 2008 (European Communities *et al.*, 2009). Available on line <http://unstats.un.org/unsd/nationalaccount/sna2008.asp>

## 5.1. In French

**Table 5. Comparing micro and macroeconomics**

	Microéconomie	Macroéconomie
Objet	Etude des comportements individuels qui découlent le plus souvent de comportements optimisants.	Etude du fonctionnement global de l'économie. Le raisonnement utilise des agrégats qui sont ensuite reliés par des fonctions de comportement macroéconomiques
Echelle	Un (équilibre partiel) ou plusieurs marchés en interactions (équilibre général)	Un pays ou un ensemble de pays (unions économiques, monétaires, etc.)
Objectif	Etude de l'allocation des ressources opérée par les prix relatifs	Détermination du niveau global de l'activité, des prix (inflation), de l'emploi, etc.
Acteurs particuliers	Les individus (producteurs, consommateurs) souvent représentés par un agent représentatif	Les administrations parfois publiques qui mettent en œuvre les politiques globales.
Dimension internationale	Oui : marchés dépassent les frontières nationales. Exemple : marché du pétrole	Oui : Marchés nationaux et économies nationales sont interdépendants
Démarche	Est le plus souvent normative : décrit plutôt ce qui devrait être, étant données les hypothèses faites sur les comportements, la nature de la concurrence. On compare de ce fait un optimum avec l'équilibre	Est souvent positive : décrit plutôt ce qui est. On cherche plutôt à expliquer des phénomènes tels que le chômage, l'inflation et à proposer des mesures de politique économique

**Table 6. Stumbling blocks**

	Approche classique	Approche keynésienne
Comment sont coordonnées les décisions individuelles ?	Les économies fonctionnent grâce aux échanges et notamment aux <b>échanges marchands</b> . Echange marchand est le meilleur mode de coordination des décisions individuelles qui assure l'équilibre économique. Parole de la « <b>main invisible</b> » énoncé par A. Smith : désigne le résultat des échanges entre les individus, ce qu'on appellera plus tard (fin 19 <sup>ème</sup> siècle) l'équilibre général des marchés	<b>Défauts de coordination</b> . JMK pense qu'il est possible d'harmoniser les intérêts, mais ne croit pas à la main invisible. Pas de main invisible permettant la coïncidence entre la recherche des intérêts individuels et l'optimum social. La convergence des intérêts ne réside pas dans le calcul prudent mais dans l'action confiante. Il existe des <b>défauts de coordination</b> dans la mesure où les prix rigides ne permettent pas d'ajuster l'offre à la demande : ne jouent pas le rôle de signal. JMK ne récuse pas les marchés et les prix, mais propose (i) de suppléer aux défaillances de ceux-ci par des politiques de stabilisation et (ii) de réguler les marchés sans entraver la liberté de dépenser des individus
Offre / Demande	<b>Logique de l'offre</b> (Figure 3) : <i>supply side economics</i> . Ce qui détermine le niveau d'activité dans une économie, ce sont <b>les conditions de l'offre</b> et notamment la disponibilité des facteurs de production (travail, capital). Applique la <b>théorie des prix</b> au fonctionnement d'ensemble de l'économie et notamment aux agrégats. Au niveau agrégé, le fonctionnement du marché du travail et du capital sont les points de départ de l'analyse. Caractéristique qui découle d'un principe fondateur qui est la « <b>loi des débouchés</b> » ( <i>law of the outlets</i> ) énoncée par J.B. Say au début du 19 <sup>ème</sup> siècle (Say, 1972). Illustration contemporaine de cette approche : la courbe de Laffer qui stigmatise les effets désincitatifs de l'intervention de l'Etat sur les déterminants de l'offre, à savoir le travail et l'investissement (le capital)	<b>Logique de la demande</b> (Figure 4). Prix varient peu : hypothèse des <b>prix rigides</b> à CT. Macro-économie keynésienne = macro-économie associée à l'hypothèse de rigidité des prix. JMK rejette la loi de Say. Niveau de la production nationale et de l'emploi dépend de l'état de la demande ( <i>demande effective</i> ) ; ne dépend pas du fonctionnement des marchés des facteurs de production (cf. chapitre 4). Rôle important des anticipations des entreprises et du tempérament « sanguin » (sanguine temperament and constructive impulses) des entrepreneurs notamment dans les décisions d'investir (chapitre 2).
Rôle de la monnaie	Introduit la théorie quantitative de la monnaie (cf. Chapitre 3). Dans cette approche, la monnaie est un « facilitateur » des échanges. Elle est neutre. Les monétaristes dont un des principaux représentants est M. Friedman sont les représentants modernes de l'approche classique des marchés financiers et de la monnaie. Actualisent la théorie classique de la monnaie ; ils s'efforcent de montrer la supériorité des politiques monétaires et l'inefficacité de la politique budgétaire.	JMK challenges the neutrality of money. Money is demanded for its own sake because of a specific motive: speculation
Décisions de consommation	Théorie du revenu permanent ; Hypothèse du cycle de vie (chapitre 1)	Loi psychologique fondamentale (chapitre 1)

Source : own elaboration

# **First Part. Aggregate functions**

## **Chapter 1. The consumption function**

Two ways of thinking about household consumption:

- Micro approach. Decision maker: a representative consumer who maximizes her utility under a budget constraint. Main outcome: demand functions (marshallian and hicksian) where demanded quantities depend on relative prices, income and preferences as expressed by a utility index. Learn about it in a microeconomics course taught next year;
- Macro approach (studied here). It studies HH consumption defined as an aggregate variable i.e. the sum of all consumption expenses made by HHs. Main source of statistical information: macroeconomic accounting.

HH consumption is the main aggregate to be taken into consideration when GDP is defined as the sum of final demands:  $GDP \equiv C + I + G + X - M$ .  $C$  refers to the goods and services purchased by consumers (private households);  $I$  consists of fixed investment and of inventory investment. Fixed investment is the purchase of capital goods: nonresidential and residential investment, construction and equipment investment, private and public investment. Inventory investment or inventory changes comprises unsold goods minus goods sold from inventories includes corporations' investment;  $G$  refers to the purchases of (consumer) goods and services by all kinds of national governments.

Goods and services produced by the national economy have two main uses:

- Fulfill immediate needs. They are either market goods and services or “collective” goods that are freely provided or almost free of charge provided by entities such as the government and private non-profit bodies;
- Fulfill future needs. They are invested in capital formation which allows producing goods in the future.

Consumption and investment are the 2 main elements of Aggregate Demand (AD). Analyzing the demand side of the national economy consists in searching for the determinants of (aggregate) consumption and investment. Therefore, the main question of the chapter is to study the main determinants of aggregate consumption with a particular attention paid to HH consumption.

## 1. DEFINITIONS ET INDICATORS

The quotation below shows that precisely defining and measuring concepts is crucial for scientific thinking: LK states that knowledge is weak and unsatisfactory if we cannot measure and express what we are talking about with numbers (Box 10).

### Box 10. On measurement and knowledge

I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of Science, whatever the matter may be."

« Quand vous pouvez mesurer ce dont vous parlez et l'exprimer par des nombres, vous connaissez quelque chose au sujet ; si vous ne pouvez pas le mesurer, ni l'exprimer par des nombres, votre connaissance est bien maigre et insatisfaisante ; c'est peut-être un début de connaissance, mais vos réflexions ne vous ont guère fait progresser sur la voie de la science. »

Lord Kelvin (1824-1907) *Electrical Units of Measurement* 1883

### 1.1. Which indicators?

Back to macroeconomic accounting. Only three institutional sectors (IS), namely the Central government, Nonprofit institutions serving HHs (NPISH) and HHs can have a Final consumption. All sectors can have intermediary consumption.

#### 1.1.1 Final household consumption expenditure or Actual final consumption of households

We focus here on HHs but show linkages with other IS. National accounts provide two HHs aggregate final consumption measures: Final consumption expenditure or Actual final consumption of HHs. The latter concept is broader, reducing the former to one of its components (Definition 8). In this chapter, we will instead use the former since HHs directly bear it; the latter includes "socialized" consumption since HHs indirectly pay for it through taxes. Socialized expenditures are funded by the general government or non-profit institutions serving households (NPISHs). Stylized facts below: Figure 7, Figure 8, Figure 9, Table 7.

##### 1.1.1.1 Relative importance and composition in France

Figure 7: Almost 25% of HHs actual consumption was socialized in 2015 (21.6 % in 2009 on Figure 8); 17.6% as a percentage of GDP. Those shares show an upward trend. These figures mean that about one quarter (in % of actual final consumption) and one-

fifth of HHs consumption (in % of GDP) is not directly borne by HHs. Types of goods and services. This socialized consumption covers various goods: education, health, housing, social action (Table 7). Health: HHs only pay one-quarter of all health expenditures. It has increased over time due to better access to health services. It has been stabilized now since the 1990s with the introduction of cost-cutting measures. Housing: one-quarter of tenants' rent is paid by the community. HHs, government and NPISHs almost equally bear social services. They cover expenditures on home helps for dependency, the care of young children and accommodation for the disabled. Education: more than 90% of the consumption is paid for by the community.

### 1.1.1.2 Comparison with EU

Countries are distinguished by the composition of household consumption according to whether they directly or indirectly bear it. In 2012, French actual final consumption was higher than the European average; late comers in the EU have a lower socialized consumption wto actual final consumption. It is the case whenever a comparison is on the total amount (Figure 8) or the per capita basis (Figure 9). The share of socialized consumption is as follows: (individual consumption expenditures of the GG + individual consumption expenditures of NPISH) / actual final consumption of HHs

Remark: pre-engaged expenditures (Definition 8). Almost 30% of HH consumption expenditures are pre-engaged. The share is higher for single-headed HHs. Housing expenditures are the most important (25% of gross disposable income).

### Definition 8. Different measures of aggregate consumption

Final household consumption expenditure / Dépenses de consommation finale des ménages :

“Final household consumption expenditure consists of expenditure incurred by resident household on goods or services that are used for the satisfaction of needs or wants. The corresponding products are not stored, but are considered as consumed at the time of their purchase, even if they are durable goods (cars, household electrical appliances, furniture, etc.).

Final household consumption expenditure includes the share of expenses on health, education and housing remaining to be paid by them, after possible reimbursements. It also includes imputed rents, which households that own their residence implicitly pay to themselves.”

Actual final consumption of households / Consommation finale effective:

“Actual final consumption of households includes all goods and services acquired by resident households, for the satisfaction of their needs and wants, and that these acquisitions made, or not, object of an expense of their part.

Actual final consumption of households thus includes, besides goods and services acquired by their own final household consumption expenditure, goods and services which, having been the object of actual individual consumption expenses of general government or NPISHs, give rise to social transfers in kind receivable towards households.”

Pre-engaged expenditure / Dépenses pré-engagées :

“Total consumption of households realized within the framework of a contract which it difficult to renegotiate in a short-term.

They are defined as follows:

- Expenditure connected to the accommodation (including, in the case of the national accounts, the imputed rents), as well as those relative to the water, to the gas, to the electricity and to the other fuels used in houses;

- Services of telecommunications;

- Expenses of canteen;

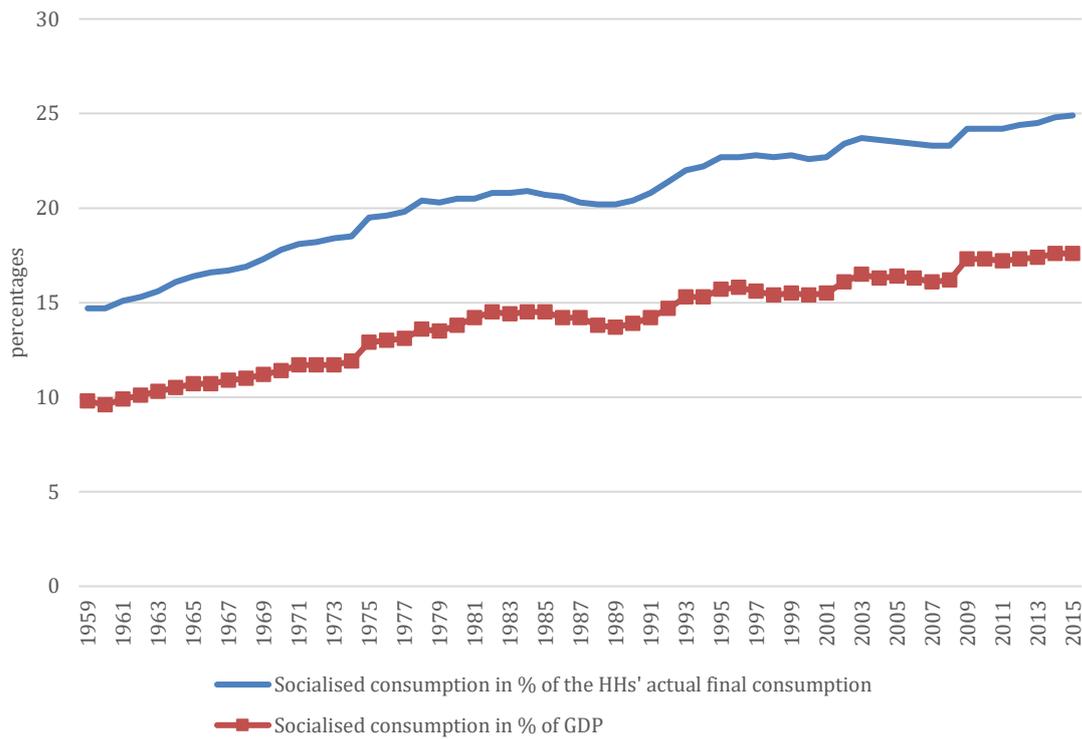
- Services of television (television royalty, subscriptions to pay channels);

- Insurances (except life insurance);

- Financial services (including, in the case of the national accounts, the services of financial intermediation indirectly measured).

Source: Insee. Definitions, Method and Quality <https://www.insee.fr/en/information/2107769>  
Acceded 11 janv. 17

**Figure 7. Evolution of socialized consumption in France, 1959-2015**



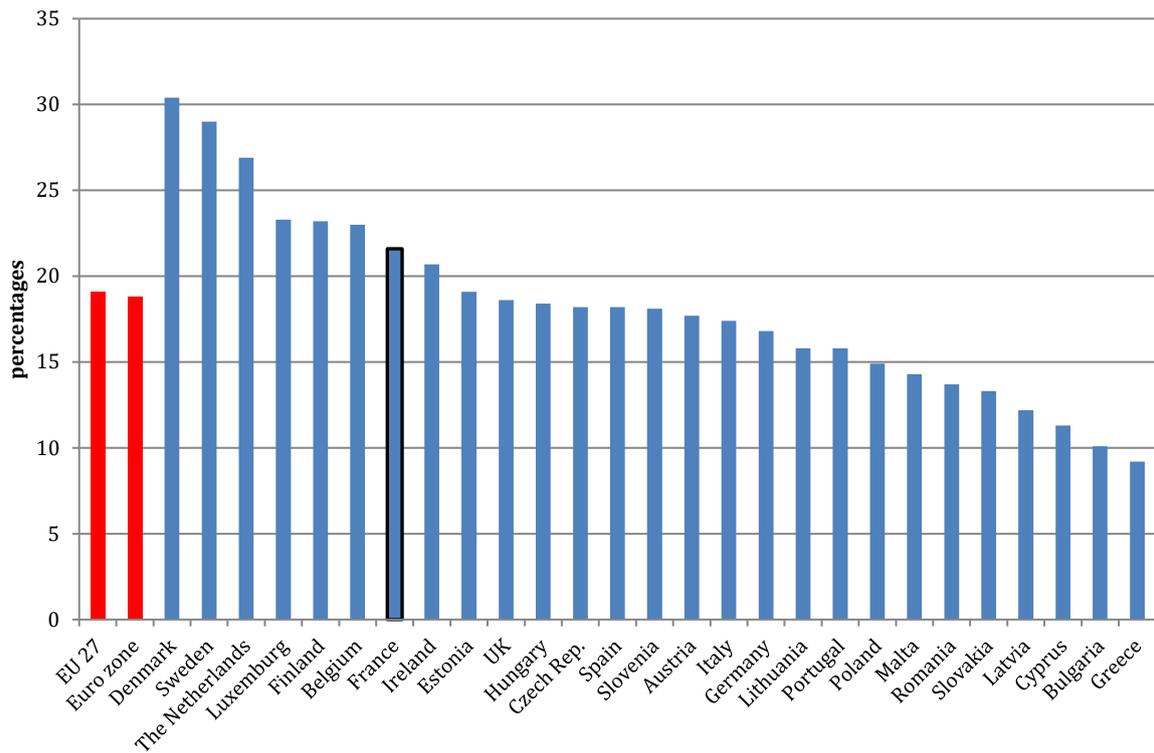
Source: Insee, National Accounts – base 2010. Socialized consumption is the sum of the individual final consumption expenditures of the Central Govt and the NPISHs.

**Table 7. Individualized consumption expenditures by types of goods and services in France**

	Years	1959	2015
<b>Health</b>			
Consumption borne by public administrations		54,0	73,8
Consumption borne by HHs		46,0	26,2
<b>Housing</b>			
Consumption borne by public administrations		8,4	22,7
Consumption borne by HHs		91,6	77,3
<b>Social action</b>			
Consumption borne by NPISHs		40,6	28,6
Consumption borne by public administrations		22,7	39,7
Consumption borne by HHs		36,6	31,7

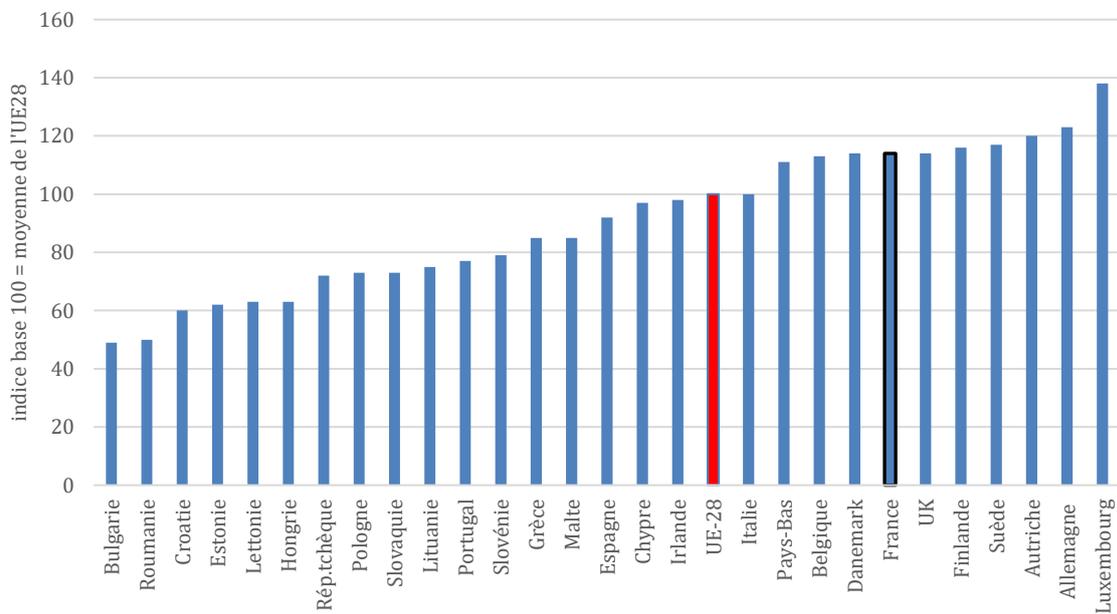
Source: Insee, National Accounts – base 2010. The table reads as follows: in 2015, public administrations paid 74% of households' health consumption, while households paid 26%.

**Figure 8. Share of socialised consumption in actual consumption in 2009, in the European Union**



Source: Insee, <https://www.insee.fr/en/statistiques/1281182> acceded 12 Dec. 18.

**Figure 9. Actual consumption per capita in France compared to EU countries in 2012**



Source: Insee, <https://www.insee.fr/en/statistiques/1283835> acceded 12 Dec. 18

### 1.1.2 Measurement units

The main focus is on the evolution of HHs final consumption expenditure. It is not appropriate to use the current € because the measure is influenced by the general price level (in value terms) or by the size of the population. Instead, relative indicators are used:

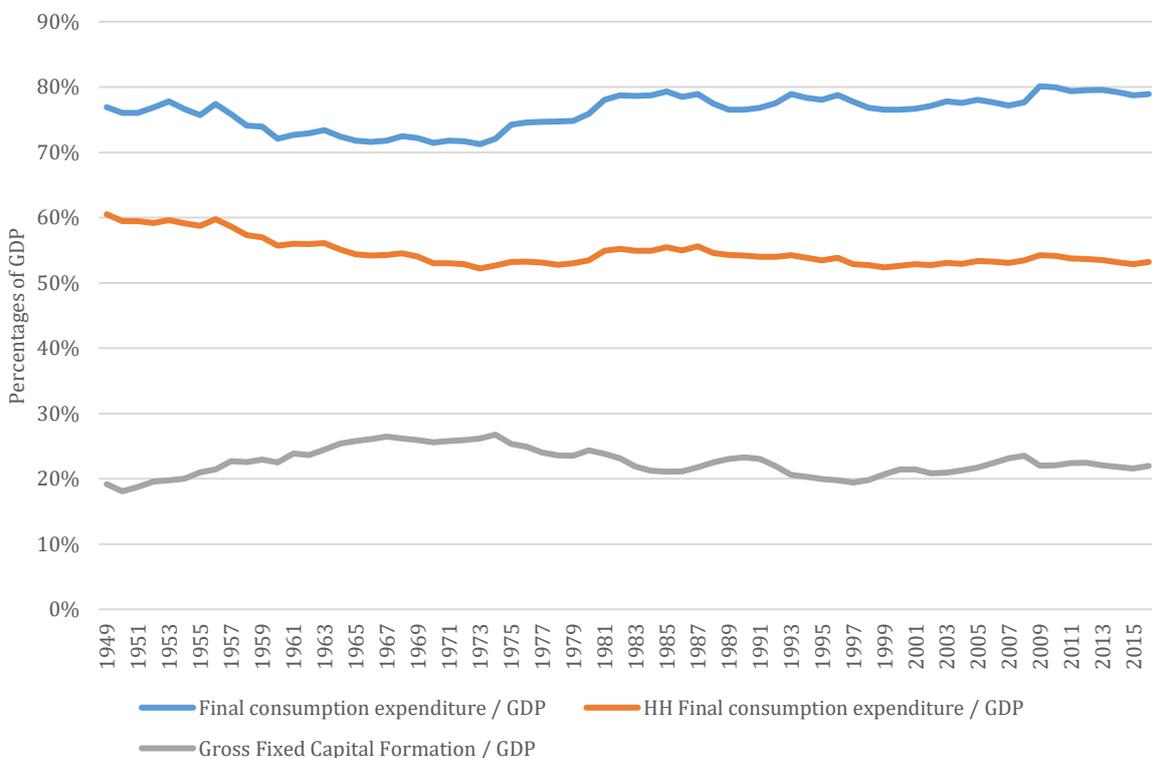
- Consumption Expenditure relative to an income aggregate: GDP or household disposable income (Figure 10). These indicators are interesting because they eliminate the price effect; they are often used in international comparisons.

- Consumption Expenditure relative to population: eliminates the population size effect.

Note: ratios calculated using aggregates at current prices

Regardless of the indicator and country, HHs consumption is relatively important. The proportion of households' consumption expenditure represents between 80 and 88% of their disposable income and between 54 and 57% of GDP. In addition, CF is the most stable component of GDP.

**Figure 10. Consumption and investment in France, 1949-2016**



Source: National Accounts, 2010 base, Insee.

## 1.2. Overview

Two related questions: (i) What are the determinants of the  $C$  level? (ii) What are the determinants of income sharing between consumption and savings?

The objective of the macroeconomic analysis of consumption: to establish a consumption "function" that consists in identifying the exogenous variables that explain household consumption expenditure (endogenous variable). 2 different approaches:

The Keynesian approach founds the conception of consumption (and savings) adopted by the national accounts. More sensitive to the role of disposable income and household consumption on economic activity. Saving is a renunciation of consumption. At the national economy level, it is a leakage, i.e. a "collective vice" responsible for the weakness of demand and, therefore, unemployment. Savings may reflect a preference for liquidity, the importance of which depends on the level of interest rates. Basically:  $C = f(Y^d)$ .

Through savings decisions, the neoclassical approach departs on a tradeoff between current and future consumption. It builds upon microeconomic reasoning that achieves a consumption function that depends on wealth. Savings is a desire for deferred consumption; it is a future consumption. It must be encouraged because it determines investments. Hoarding, i.e. holding idle cash, is unnecessary because it is an unproductive allocation of savings. It is furthermore seen as irrational because it is not rewarded. Basically:  $C = f(W)$ .

Recent developments bring Keynesian and neoclassical analyses closer together. The central question in the economic analysis of aggregate consumption therefore remains. How far is HHs consumption expenditure sensitive to fluctuations in current income?

**Table 8. Consumption, saving and hoarding according to the Keynesians and the Classics**

	Keynesian approach	Classical approach
Aggregate consumption function	$C = f(Y^d)$	$C = f(W)$
Is saving desirable at the aggregate level?	No: is leakage from the circular economy	Yes: it is future consumption. Saving allows financing investment
Is hoarding a good thing?	Expresses the liquidity preference, which depends on the rate of interest	No: is not rewarded

Source: own elaboration. Note that hoarding is saving in the form of money. For JMK the rate of interest is the reward for parting with liquidity.  $C$  is HHs consumption expenditure;  $Y^d$  is HHs disposable income;  $W$  is HHs wealth.

## 2. CONSUMPTION AND DISPOSABLE INCOME

We adopt the Keynesian approach, where HH aggregate consumption depends on HH disposable income. We, therefore, start by seeking how to define and measure income.

### 2.1. Household disposable income

There exist different definitions of income. We use the definition from macroeconomic accounting, namely the disposable income. It is denoted by  $Y^d$ . It is the income derived from factors of production, i.e. labour and capital, which gives the primary income denoted by  $Y$ . The compensation of employees provides labour income. The compensation of employees is made of wages and salaries. A wage is compensation calculated from the nb of hours worked. A salary is associated with compensation paid on an annual/monthly basis. Capital income is derived from property income.

- In 1960, almost no redistribution, primary income was not significantly different from gross disposable income (Table 9);
- Compensation of employees. Represent more than 70% of primary income in 2020;
- Net property incomes. Peaks in 2000. Better access of HHs to financial markets and the diversification of financial products. Counterpart: increase in the HHs' debt. 2020 = anomaly?
- Transfers between HHs and the government, denoted by  $T$ . Are increasing in the LR. Main component: taxes on income and wealth and social contributions paid and received (net). Note the importance of redistribution through the social security system. Social contributions paid by HHs amounted to 465.0 billion € while they received (social benefits) 477.3 billion €. The “gilets Jaunes” crisis shows that this redistribution is not efficient. 2020: increase in social benefits (received) and decrease in social contributions (paid);

Application: how to use the table of economic integrated accounts to reconstruct the disposable income of HHs? See Table 14 in the Appendix for the year 2015 and summarized below.

**Definition 9. Disposable income of households**

“Income resulting from the distribution of added value, the distribution of income from property and redistribution operations.”

Disposable income allows measuring HHS’ resources which are constituted of two main elements:

1) primary income. “Primary income corresponds to the income directly related to participation of households in the production process. The majority of the primary income of households consists of the remuneration of employees, which includes wages and social contributions. This income also includes the income from property resulting from the loan or rental of financial assets or land (interest, dividends, land income, etc.)”

2) net transfers. Taxes and social contributions are part of transfers that go to the Government. Social benefits are transfers made to HHS. Nets transfers are the sum of taxes and social contributions minus social benefits. Since the former are greater than the latter net transfers are positive.

Total tax burden: The total tax burden is the effective taxes and social contributions collected by general government and European institutions.

Actual Social Contributions (CS effectives): A set of payments that individuals and their employers make to social security administrations and private pension schemes. They are broken down into contributions payable by employers, contributions payable by employees, and contributions payable by self-employed workers and persons without a job

Social benefits (prestations sociales): Transfers, in cash or in kind, to households and intended to lighten the financial burden represented for such households by protection against a certain number of risks or needs (related to illness, old age, housing, etc.). They are made within the framework of social insurance through public or private schemes organised collectively or outside of such schemes within the framework of social assistance by units of general government or NPISH (non-profit institutions serving households).

Source : Insee, <https://www.insee.fr/en/metadonnees/definition/c1633>

**Table 9. From primary income to gross disposable income of households, 1960 – 2014, % of primary income**

	1960	1970	1980	1990	2000	2010	2015	2020
Primary income (billion €)	33.7	92.0	339.0	751.6	1 062.2	1 444.5	1 537.8	1 612.8
<b>Gross primary income</b>	<b>100.0</b>							
Gross operating surplus and gross mixed income	32.6	27.1	20.6	20.2	20.3	19.4	19.3	20.1
Compensation of employees	62.5	68.1	73.9	71.6	71.4	72.9	72.7	72.9
Capital earnings	4.9	4.8	5.5	8.2	8.3	7.7	5.2	4.6
<b>- Net transfers</b>	<b>-5.4</b>	<b>-8.7</b>	<b>-11.6</b>	<b>-11.8</b>	<b>-13.7</b>	<b>-11.0</b>	<b>-13.5</b>	<b>-7.3</b>
Current taxes on income and wealth	-4.5	-5.5	-6.9	-7.5	-12.4	-12.0	-14.3	-14.9
Net social contributions	-16.9	-21.4	-27.5	-30.4	-27.2	-28.2	-30.2	-27.9
Social benefits other than transfers in kind	15.7	18.5	22.3	25.2	25.9	29.0	31.1	35.3
Other transfers	0.3	-0.3	0.5	0.9	0.1	0.1	-0.1	0.1
<b>= Gross disposable income</b>	<b>94.6</b>	<b>91.3</b>	<b>88.4</b>	<b>88.2</b>	<b>86.3</b>	<b>89.0</b>	<b>86.5</b>	<b>92.7</b>
Gross disposable income (billion €)	31.9	84.0	299.7	662.9	917.0	1 285.4	1 330.8	1 494.7

Source: Insee, Tableaux de l'économie française Edition 2016. Available at :

<https://www.insee.fr/fr/statistiques/1906681?sommaire=1906743#graphique-T16F054G1> acceded 19

Dec. 18, updated for the years 2015 and 2020 (National Accounts – Table of Integrated Economic Accounts) acceded  
<https://www.insee.fr/en/statistiques/5355161?sommaire=5355165&q=tableau+%C3%A9conomique+d%27ensemble>

**Table 10. From HHs primary income to HHs disposable income, France, 2015, billion current €**

Operations and Balances	Uses (-)	Resources (+)	% of primary income	Account
Value added		351.4	22.9%	Generation of income
Compensation of employees	42.7		2.8%	
Taxes on production and import	19.5		1.3%	
Subsidies	-7.1		0.5%	
Compensation of employees		1 160.9	75.5%	Allocation of property income
Property incomes	17.9	98.5	5.2%	
<b>Primary income <i>Y</i></b>		<b>1 537.8</b>	<b>100.0%</b>	
Current taxes on income and wealth	219.3		14.3%	Secondary distribution of income
Social contributions and benefits	464.7		30.2%	
Social benefits other than transfers in kind		477.9	31.1%	
Other transfers (net)	66.6	65.7	0.1%	
<b>Total net transfers to the Government <i>T</i></b>	<b>207.0</b>		<b>13.5%</b>	
<b>Disposable income <i>Y<sup>d</sup></i></b>		<b>1 330.8</b>	<b>86.5%</b>	

Source: Insee, National Accounts – base 2010. % of primary incomes are absolute values. How to calculate the net transfers to the Government? Answer:  $T = 219,3 + 464,7 - 477,9 + (66,6 - 65,7) = 207,0$ . How to calculate the transfers in % (absolute values)? Answer:  $T = 14,3 + 30,2 - 31,1 + 0,1 = 13,5 \cong 207,0/1537,8$ .

## 2.2. The psychological fundamental law

First way to explain household consumption. The link between consumption and income was formalized by JMK through the "fundamental psychological law". The link between consumption and income is first exposed in literary form: the Keynesian consumption model is initially not very formalized. JMK formulates three conjectures within the FPL.

1st para : states that (disposable) income is the main determinant of consumption. Contrary to the Classics, posits that the influence of the interest rate on consumption is "unimportant".

2<sup>nd</sup> para : on the Marginal Propensity to Consume (MPC) ;

3<sup>rd</sup> para : on the Average Propensity to consume or to save.

**Box 11. The fundamental psychological law**

“Granted, then, that the propensity to consume is a fairly stable function so that, as a rule, the amount of aggregate consumption mainly depends on the amount of aggregate income (both measured in terms of wage-units), changes in the propensity itself being treated as a secondary influence, what is the normal shape of this function?

The fundamental psychological law, upon which we are entitled to depend with great confidence both *a priori* from our knowledge of human nature and from the detailed facts of experience, is that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income. That is to say, if  $C_w$  is the amount of consumption and  $Y_w$  is income (both measured in wage-units)  $\Delta C_w$  has the same sign as  $\Delta Y_w$  but is smaller in amount, i.e.  $dC_w/dY_w$  is positive and less than unity. [...]

But, apart from short-period changes in the level of income, it is also obvious that a higher absolute level of income will tend, as a rule, to widen the gap between income and consumption. For the satisfaction of the immediate primary needs of a man and his family is usually a stronger motive than the motives towards accumulation, which only acquire effective sway when a margin of comfort has been attained. These reasons will lead, as a rule, to a greater proportion of income being saved as real income increases.”

Source : (Keynes, 1936b) Chapter 8 The propensity to consume I. The objective factors.

2.2.1 Marginal and average propensity to consume (MPC and APC)

The first Conjecture states that income is the main driver of consumption. The second one gives additional details on how income affect consumption expenditures. The main concept introduced here is the Marginal propensity to consume (MPC). The main idea is that when the income increases, consumption expenditures increase, but by a lower amount.

Formally:

Consumption increase along with the disposable income:  $\Delta Y^d > 0$  implies  $\Delta C > 0$  and  $\Delta Y^d < 0$  implies  $\Delta C < 0$ .

The increase in consumption is lower than the increase in income :  $0 < \Delta C < \Delta Y^d$  ;  $\Delta Y^d > 0$  et  $0 > \Delta C > \Delta Y^d$  ;  $\Delta Y^d < 0$ .

Consequence:

The ratio of changes in consumption and disposable income is between 0 and 1:  $0 < \frac{\Delta C}{\Delta Y^d} < 1$

Corollary:

$$S = Y^d - C. \text{ Therefore } \Delta S = \Delta Y^d - \Delta C, \text{ then } \frac{\Delta S}{\Delta Y^d} = 1 - \frac{\Delta C}{\Delta Y^d}$$

The 3rd conjecture is related to the average propensity to consume / to save. When income increases, the gap between income and consumption is widened. Means that the ratio of consumption over income is decreasing :  $C/Y^d$  decreases when  $Y^d$  increases.

Notations:

Average propensity to consume is  $\frac{C}{Y^d}$ ; then  $\frac{C}{Y^d} = \frac{Y^d - S}{Y^d} = 1 - \frac{S}{Y^d}$  with  $\frac{C}{Y^d} \equiv \bar{c}$  and  $\bar{s} \equiv \frac{S}{Y^d}$  ;

**Definition 10. Marginal propensity to consume (MPC)**

“The marginal propensity to consume (MPC) is the amount by which consumption changes when disposable income increases by one dollar. The MPC is between zero and one: an extra dollar of income increases consumption, but by less than one dollar. Thus, if households obtain an extra dollar of income, they save a portion of it. For example, if the MPC is 0.7, then households spend 70 cents of each additional dollar of disposable income on consumer goods and services and save 30 cents.”

Source: (Mankiw, 2010a, p. 62)

**Definition 11. Average propensity to consume (APC) and average propensity to save (APS)**

The average propensity to consume is the ratio of consumption to disposable income. It is denoted by APC or  $\bar{c}$ . JMK assumes that the APC falls as income rises. Put differently, high-income households spend a lower proportion of disposable income than households with lower incomes.

The average propensity to save is the ratio of saving to disposable income. It is denoted by APS or  $\bar{s}$ . JMK assumes that the APS increases as income rises

2.2.2 How to justify the PFL ?

Fundamental psychological law justified according to JMK by arguments based on common sense and introspection. It is based on intuition: it is not empirically nor theoretically justified. It is not a law corroborated by facts, is an hypothesis of household behavior that establishes a hierarchy of needs according to their urgency (Maslow pyramid of needs). Low-income households have no alternative but to spend their income on the necessary goods and services: the MPC changes according to income category. High-income households have more choices and show relative satiety. Less pressing needs for households that are encouraged to spend a smaller fraction of their income on consumption expenditure.

Decision to consume, i.e. to split disposable income between consumption and savings, depends only on the decreasing satisfaction from consumption; the specific benefits of saving are not taken into account or, at best, are neglected. Savings is a residue which is consistent with the conception of savings in the National Accounts. Savings are what

remains of disposable income after taking into account final consumption expenditures. Cf. paragraph 2.4. The saving function page 58.

Dissenting views on savings.

Important question raised by the PFL. (Villieu, 2010, p. 8). Should consumption be boosted and therefore investment and/or savings penalized? Or should we wish for an increase in savings that makes it possible to finance future consumption but above all to finance investments? Higher investments mean improved growth prospects.

This question has been at the heart of economic analysis since the 18th century and is still at the heart of the political debate. Savings is what makes it possible to finance the accumulation of means of production: savings = a moral and useful act for society. A guiding idea of Adam Smith's *Wealth of Nations*, which will be taken up by classical and neoclassical economists. However, there are a few dissenting voices in classical thought: that of T. R. Malthus or J. C. B. Sismondi, who are concerned about excess savings. In the end, the role of savings is ambiguous: useful for the medium and long term, but destabilizing in the short term.

This divergence was taken up again in the 1930s by JMK in the wake of the "Great Depression" and by J. A. Schumpeter. They both believed that ageing capitalism was threatened by sclerosis: habit for savings, disappearance of investment opportunities. Saving weakens opportunities by reducing consumption, can lead to a fall rather than an increase in investment, can lead to persistent underemployment: « higher absolute level of income will tend, as a rule, to widen the gap between income and consumption » (Box 11).

Consumption, considered a vice, becomes a factor of social well-being. JMK's vision of savings comes from his interpretation of Bernard Mandeville's *Fable of the Bees* published in English in 1714 (*The Fable of the Bees: or, Private Vices, Publick Benefits*) and in French in the middle of the 18th century (Mandeville and Betrand, 1750). According to Mandeville: "private vices do the public good" For JMK, it is the paradox of thrift, according to which when you try to save in times of crisis, it reduces consumption and aggregate demand. Indeed, the decline in anticipated demand reduces income and therefore savings

at the aggregate level. This paradox is case of a composition fallacy (see definition in the Glossary of terms and concepts ENT).

**Definition 12. The paradox of thrift**

“[...] as people attempt to save more, the result is both a decline in output and unchanged saving. This surprising pair of results is known as the paradox of saving (or the paradox of thrift).”

Source: (Blanchard and Johnson, 2012, p. 59)

“if everyone tries to save more in bad times, aggregate demand will fall, lowering total savings, because of the decrease in consumption and economic growth”

Source: Skidelsky, 2013. <https://www.project-syndicate.org/commentary/robert-skidelsky-explains-why-post-2008-economic-policy-has-so-often-missed-the-mark>

**2.3. The Keynesian consumption function**

PFL is a literary statement of Keynesian consumption theory. What mathematical and graphic statement should be given? PFL expressed with a behavioural function. Economists call this functions a behavioral function which is different from an accounting relationship which true by its very nature. A behavioral equation like the following indicate that the equation captures some aspect of behavior. In this case it is HH behavior:

$$C = C(Y^d)$$

However, such a function can lead to several mathematical representations. Indeed, 3 consumption functions are commonly presented and used (Figure 11 ; Table 11):

Linear:

$$C = cY^d$$

With  $0 < c < 1$ .  $MPC = APC$  and both are constant.

Affine :

$$C = cY^d + C_0$$

With  $0 < c < 1$  and  $C_0$  is the autonomous consumption;  $APC = c + \frac{C_0}{Y^d} > MPC$ ; APC is a decreasing function of income and MPC is constant. See graphical representation and numerical examples on Figure 12.

Concave:

$$C = f(Y^d) + C_0$$

With  $f'$  being the MPC that is comprised between 0 and 1 and  $C_0$  is the autonomous consumption;

In all cases, consumption increases with disposable income, but less than one for one. A lower value of  $C_0$  in the affine case will shift the entire line down. In the last 2 cases, there is a particular value of the income denoted by  $Y_r^d$  for which the consumption equals the disposable income: intersection of the graph and the first bisecting line. For this particular value, the savings are zero

So there is an outlet problem as income increases. In this sense, JMK's conception of the evolution of countries' wealth is pessimistic: capitalist economies threatened by the specter of stagnation caused by insufficient consumption, which means that savings are too high.

**Table 11. Main properties of Keynesian consumption functions**

	Linear	Affine	Concave
Marginal propensity to consume	Constant	Constant	Decreasing wto disposable income
Average propensity to consume	Is equal to the marginal propensity to consume	Decreasing wto disposable income	Decreasing wto disposable income

**Figure 11. Three interpretations of the PFL**

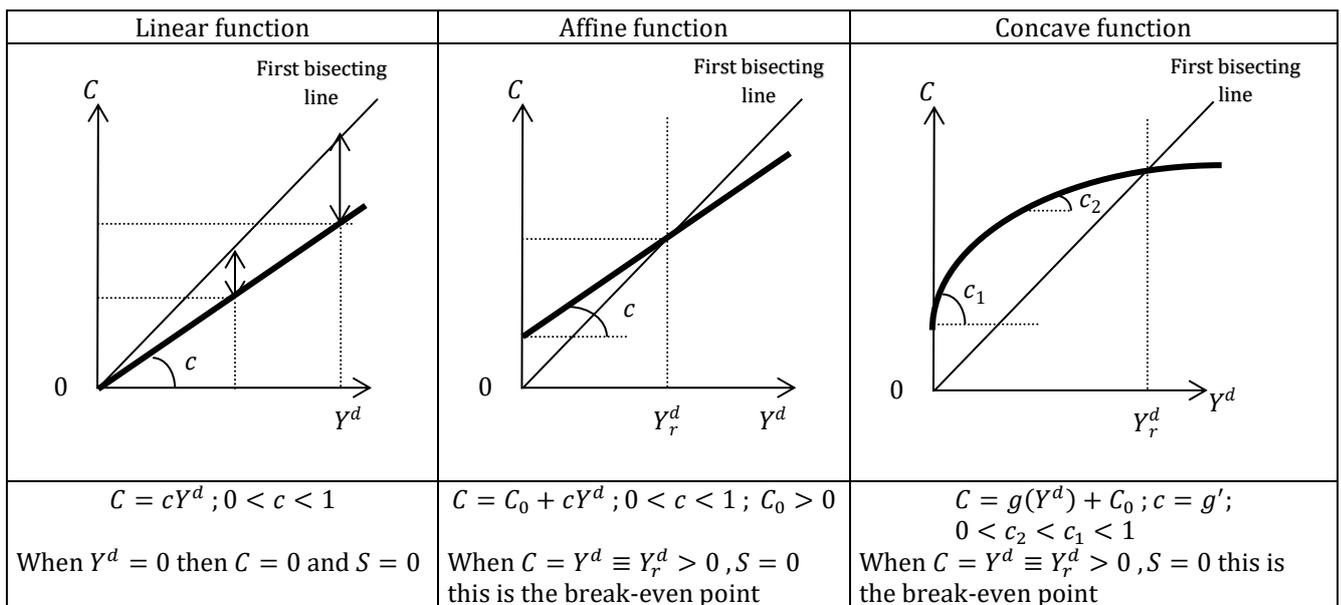
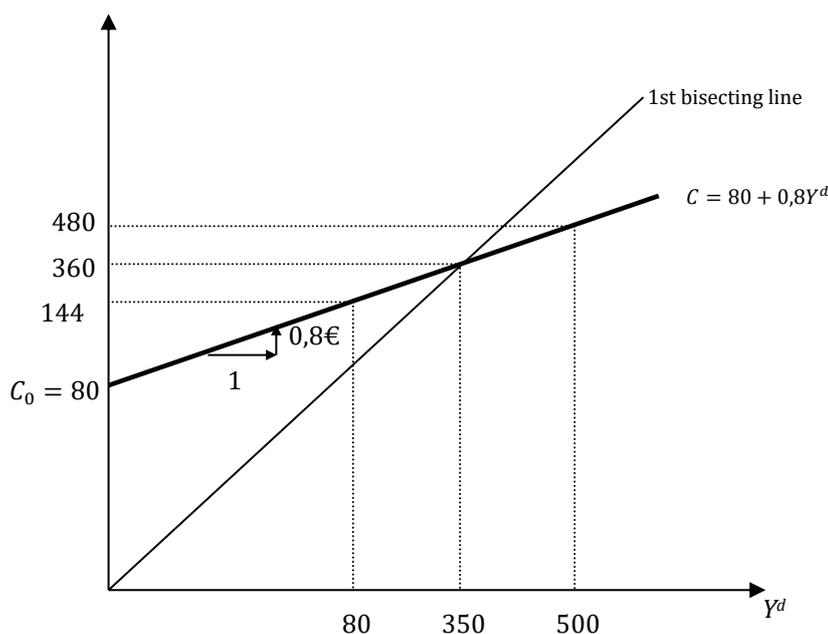


Figure 12. Focus on the affine consumption function



The MPC is the slope of the consumption, while the APC is the slope of the line drawn from the origin up to a point on the consumption function. Numerical examples:  $\bar{c}_1 = \frac{144}{80} = 1.80$  and  $\bar{c}_3 = \frac{480}{500} = 0.96$ : the APC decreases as the income increases.

## 2.4. The saving function

In accordance with the fundamental psychological law according to which savings are residual, they depend on the characteristics of the consumption function (Box 12). Figure 13 below illustrates the sequential nature of the consumption and savings decision in the Keynesian analysis. First, the MPC determines the income split between consumption and savings; second, the interest rate determines the composition of savings. A major difference with neoclassical analysis is that the interest rate determines the composition but not the level of savings.

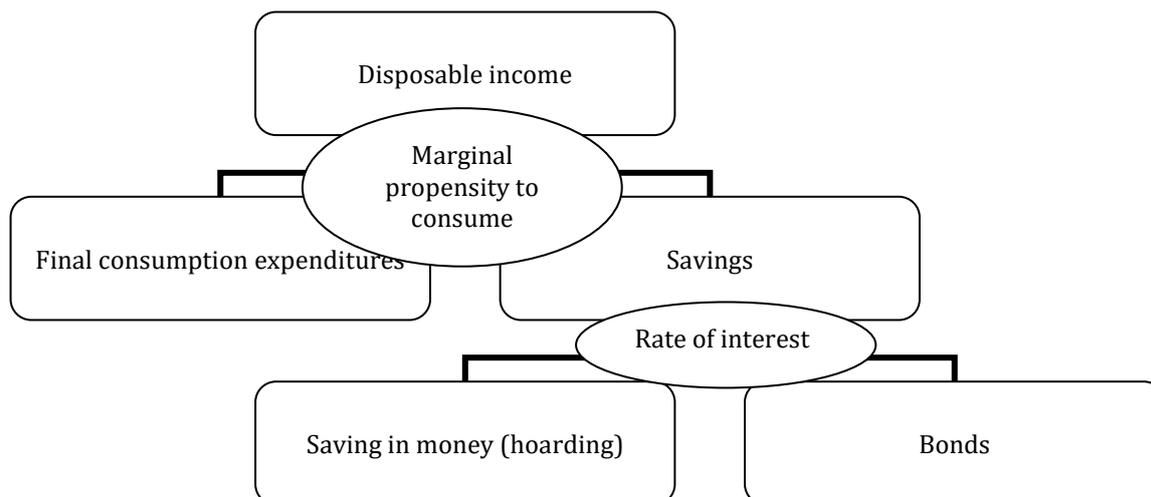
### Box 12. Saving in the General Theory

“Amidst the welter of divergent usages of terms, it is agreeable to discover one fixed point. So far as I know, everyone is agreed that *saving* means the excess of income over expenditure on consumption. Thus any doubts about the meaning of saving must arise from doubts about the meaning either of *income* or of *consumption*.”

« Dans le flot d'acceptions divergentes des mots, il est agréable de découvrir un point fixe. Autant que nous sachions, personne ne conteste que *l'épargne* soit l'excès du revenu sur la dépense pour la consommation. Les seules hésitations possibles au sujet de la signification du mot épargne sont donc celles qui ont pour origine soit le sens du mot *revenu* soit le sens du mot *consommation*. »

Source : (Keynes, 1936b) Chapitre 6 : the definition of income, saving and investment

Figure 13. The use of disposable income according to the Keynesian view



Source: own elaboration.

### 2.4.1 Functional forms of the saving function

On peut déduire des 3 interprétations graphiques possibles de la consommation, les fonctions d'épargne correspondantes en utilisant l'égalité  $S \equiv Y^d - C$ . L'épargne est mesurée par l'écart (positif ou négatif) entre la première bissectrice et la fonction de consommation.

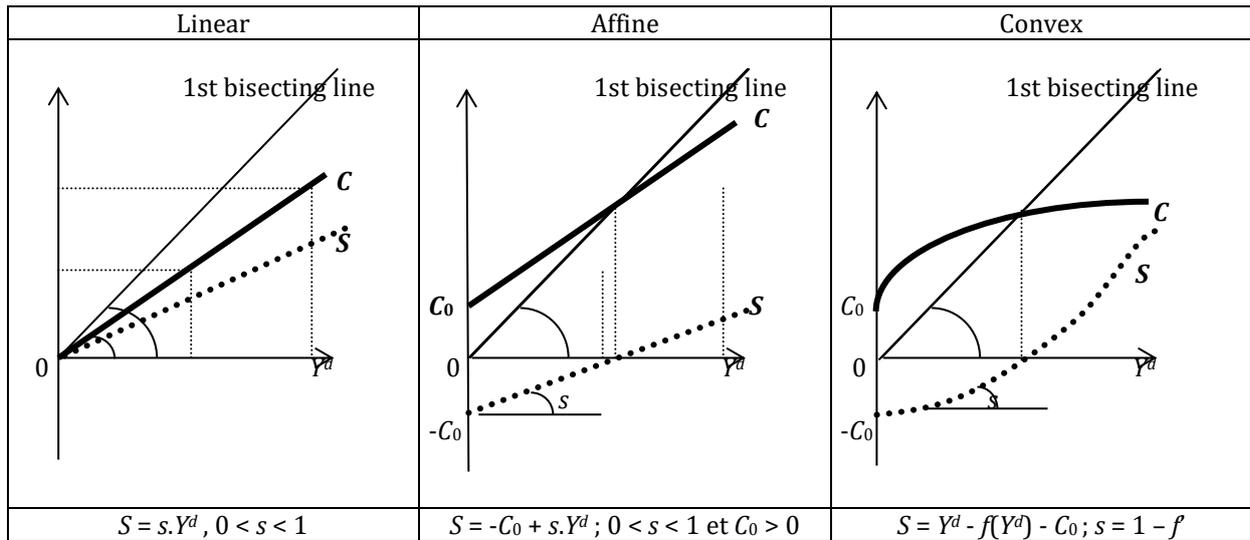
$C = c.Y^d$  ;  $0 < c < 1 \Leftrightarrow S = (1-c). Y^d = s. Y^d$  ;  $0 < s < 1$ . L'épargne augmente proportionnellement au revenu ; n'est pas négative

$C = C_0 + c. Y^d$  ;  $0 < c < 1$  et  $C_0 > 0 \Leftrightarrow S = (1-c). Y^d - C_0 = s. Y^d - C_0$  ;  $0 < s < 1$ . L'épargne, d'abord négative, augmente proportionnellement avec le revenu, mais dans une proportion moindre.

$C = f(Y^d) + C_0$  ;  $S = (Y^d - f(Y^d)) - C_0$  ;  $s = 1-f'$  compris entre 0 et 1 et  $s' > 0$  i.e.  $s$  croissante en  $Y^d$ . L'épargne augmente avec le revenu, mais moins que proportionnellement.

Dans les 2 derniers cas, il existe un seuil de rupture dans le revenu  $Y^{dr}$  où l'intégralité du revenu est consommée et l'épargne nulle. Marque le passage de la désépargne à l'épargne. Au niveau individuel, la désépargne correspond soit à un prélèvement sur le patrimoine existant, soit à un emprunt. Au plan collectif, la nation peut désépargner en vendant des devises ou en empruntant à l'étranger. L'épargne n'est constituée qu'à partir d'un certain niveau de confort.

Figure 14. Saving functions



### 2.4.2 Saving motives

JMK tried to find reasons that could influence the marginal propensity to save. Also wanted to underline that the MPC does change in the short term. Two categories of reasons mentioned. Subjective motives that depend on the preferences of individuals. Objective reasons related to the economic environment of individuals.

#### 2.4.2.1 Subjective factors

Keynes (1936) identified eight saving motives. Hint: give emphasis on the first two ones.

Uncertainty (“precaution”) or precautionary motive / La précaution. We build up savings to cover unforeseen situations (illness, unemployment, accidents, etc.). Type of savings that are emphasized in times of crisis;

Foreseen changes in income in relation to anticipated needs (“foresight”) or life cycle motive / La prévoyance. Savings are built because we foresee increased future expenditures (childcare, old age, home purchase). These savings depend on how the education and pension systems are financed => consumption smoothing. Put forward in the neoclassical analysis (LCH) para. 3.3. p. 76;

To provide a large inheritance (“ostentation”) or pride / « L’orgueil ». On constitue une épargne pour léguer une fortune à ses descendants... afin qu’ils s’en souviennent.

To carry out speculative or business projects (“enterprise”) « L’initiative ». On constitue une épargne afin de réaliser des motifs spéculatifs. JMK : “To secure a masse de manoeuvre to carry out speculative or business projects” and therefore not increasing debt.

Other motives are:

Time preference (“calculation”);

To enjoy “gradually increasing expenditure” (“improvement”);

To enjoy a “sense of independence” (“independence”);

Out of preference for frugality (“miserliness;” “avarice”).

Motifs de l'épargne repris dans débats ultérieurs sur la fonction de consommation. Pour JMK force de ces motifs varie beaucoup dans l'espace. Selon JMK motifs de l'épargne influencés par les institutions par exemple un système de redistribution du revenu (assurance retraite, assurance maladie, assurance chômage, allocations familiales), de l'éducation, des conventions sociales, et même peut être influencée par l'appartenance religieuse. La propension marginale à consommer est spécifique à chaque société et historiquement déterminée. Ainsi, des pays ayant des niveaux de vie relativement proches peuvent être très différents du point de vue de leur comportement d'épargne et de consommation.

#### 2.4.2.2 *Objective factors*

Parmi les motifs objectifs de l'épargne, liés à l'environnement économique, on trouve :

Expected future incomes. L'anticipation des revenus futurs. Suivant l'évolution attendue de ses revenus, l'épargne que l'on constitue est plus ou moins forte. Si l'on anticipe une élévation de ses revenus, on peut être moins incité à faire un effort d'épargne que ceux dont l'espérance des revenus futurs est moindre. Idée qui rejoint l'analyse néoclassique ;

Wealth effects. Variations dans la valeur nominale du patrimoine (effet richesse). Le comportement d'épargne peut être affecté dans le cas où le patrimoine est affecté par des plus (capital gains) ou moins-values (capital losses) latentes *i.e.* non encore réalisées. La consommation des ménages peut être par exemple stimulée (et donc leur épargne découragée) lorsque leur patrimoine financier bénéficie de l'augmentation des cours de la Bourse, lorsque leur patrimoine immobilier bénéficie d'une flambée des prix de l'immobilier.

Interest rate. Les variations du taux d'intérêt. Le taux d'intérêt est le taux de rendement de la transformation d'un € de revenu présent en revenu futur. L'effet sur l'épargne est généralement ambigu.

Tax Policy (politique fiscale). En particulier, l'importance relative de la fiscalité des revenus du travail et du capital peut influencer les décisions d'épargne. La CSG qui pèse sur l'ensemble des revenus, les impôts sur les plus-values immobilières ou boursières, les droits de succession influencent l'épargne.

For JMK, the first two reasons are of secondary importance in the short term because individuals incorrectly anticipate their future income or the pessimism of some is offset by the optimism of others. The impact of capital gains or losses on assets concerns only a small fraction of the population and is therefore diluted. Changes in interest rates have little influence on savings decisions. The role of the interest rate is more likely to be considered on the investment side (an increase in the interest rate reduces investment, which is an element of demand and therefore income) and on the distribution of savings between hoarding and financial assets. Tax policy can influence even in the short term savings but is not the responsibility of individuals.

Box 13 shows the typical simplification work that allows elaborating a parsimonious theoretical statement. It consists mainly in eliminating all secondary influences from the main mechanism at work in the economic phenomenon that is scrutinized.

**Box 13. JMK changes in income are the main drivers of changes in consumption**

“Since, therefore, the main background of subjective and social incentives changes slowly, whilst the short-period influence of changes in the rate of interest and the other objective factors is often of secondary importance, we are left with the conclusion that short-period changes in consumption largely depend on changes in the rate at which income (measured in wage-units) is being earned and not on changes in the propensity to consume out of a given income.”

Source: (Keynes, 1936b), Chapter 9 The propensity to consume II the subjective factors.

## 2.5. The consumption puzzle

This paragraph is on testing the relevance of the Keynesian consumption function. JMK conjectures are related to the MPC and the APC.

Two predictions are worth to be scrutinized: 1) MPC is stable at least in the short run. It is important to assess this because of policy implications. Multiplier effects of stabilization policies depend crucially on this assumption; 2) APC decreases when income is increasing. Note that JMK does not give clear indications on APC and the “true” functional form of the aggregate consumption function. The Keynesian consumption can be assessed in two ways:

On time series data => evolution of the link between income and consumption over time;

On cross-sectional data series => evolution of the link between income and consumption over different income categories (income percentiles or income quintiles)

What type of study is legitimate? As early as the 1950s, there were inconsistencies between Keynesian theory and the facts.

**Definition 13. Income quintile and quartiles**

“A quintile is a statistical value of a data set that represents 20% of a given population, so the first quintile represents the lowest fifth of the data (1% to 20%); the second quintile represents the second fifth (21% to 40%) and so on.

Quintiles are used to create cut-off points for a given population; a government-sponsored socio-economic study may use quintiles to determine the maximum wealth a family could possess in order to belong to the lowest quintile of society. This cut-off point can then be used as a prerequisite for a family to receive a special government subsidy aimed to help society's less fortunate.”

Source: Investopedia. Available at <https://www.investopedia.com/terms/q/quintile.asp> acceded 18 Dec. 18.

“If a distribution of wages, incomes, turnover, etc. is arranged, the quartiles are the values which divide the distribution into four equal parts. Thus, for a distribution of wages :

the first quartile (generally written Q1) is the wage below which 25% of the wages are situated ;

the second quartile is the wage below which 50% of the wages are situated. This is the median ;

the third quartile (generally written Q3) is the wage below which 75 % of the wages are situated.

In an equivalent manner, the first quartile is the wage above which 75% of the wages are situated ; the second quartile is the wage above which 50% of the wages are situated, and the third quartile is the wage above which 25% of the wages are situated.”

Source: INSEE, Home>Definitions, methods and quality>Definitions>Quartiles acceded March 9<sup>th</sup>, 2020

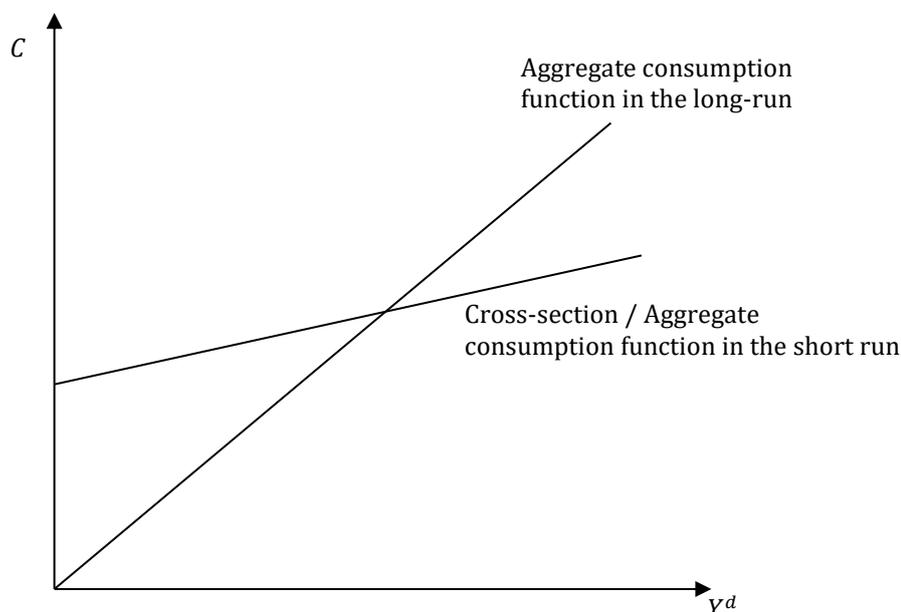
2.5.1 Time analysis of the propensity to consume

Question: Establish a relationship between C's expenditures and disposable income over time. Main results: consumption function in the LR exists and is stable; on the other hand, in the SR, the consumption function is unstable, contrary to what JMK claims. In addition, depending on the type of analysis, evidence shows that in the LR, the C function is a linear one, over shorter periods, the C function is an affine one.

On US data (1869-1938), Simon Kuznets (Kuznets, 1946) finds that the APC is constant and equal to the MPC (0.86). The consumption function is a linear one which is partly consistent with the FPL. Kuznets shows that in the long run, the (average) propensity to save does not increase, which invalidates the Keynesian proposal of a decreasing APC along with income. In addition, discrepancies between LR and SR calculations. In the LR, the MPC is larger than the MPC in the SR which is unexpected by the PFL.

From a technical point of view, when the adjustment is made on rather short periods, estimated parameters become sensitive to the choice of the period. If one observation is dropped out, this it substantially changes the results.<sup>9</sup> In addition, estimated consumption functions perform badly for prediction purposes. (Villieu, 2010, p. 20).

**Figure 15. The Kuznets' consumption puzzle**



In the LR, the APC is constant, while in the short run it is decreasing. In addition, cross-sectional data are consistent with an affine consumption function. As a consequence the MPC in the SR is lower than in the LR.

Source: own elaboration

### 2.5.2 Cross section propensity to consume

Question: Establish a relationship between C and income of HHs in a given year; households are classified by income groups. The consumption function obtained is the average relationship between C and income. Data are from survey data on family budgets at a given period.

<sup>9</sup> D'un point de vue technique, la C et le RDB comportent une racine unitaire qui s'interprète de la manière suivante. Si la série macroéconomique subit un choc (négatif ou positif), celui-ci a des effets permanents (on parle alors d'hystérèse). Cela a pour conséquence que la valeur de départ affecte la valeur future ou bien encore que la moyenne de la variable est affectée de manière définitive. En fait, il faudrait estimer la variation de la consommation en fonction de celle du revenu mais cette spécification ne correspond pas à la fonction keynésienne. En bref, l'ajustement de la fonction de consommation sur séries chronologiques est impossible sauf si la nature de la consommation et du revenu change, c'est-à-dire deviennent des variables stationnaires. Voir (Redoules and Roucher, 2011; Faure, Soual and Kerdrain, 2012)

Results indicate an increasing APS i.e. a decreasing APC (Table 12): rich households consume proportionally less than the poor. Policy implication: redistribution of income to the poorest households increases the overall propensity to consume, thus increasing Keynesian-inspired policies to support consumption and employment

But there is still a theoretical problem: how to justify the change in the consumption function according to the way it is estimated, depending on whether we consider time series and cross-sections? The following developments show how economists have tried to reconcile the Keynesian foundation of the consumer function with empirical data.

**Table 12. Gross disposable income, consumption expenditure and savings of ordinary households in 2011 by quintile, in 2011**

**Panel a**

<i>Average annual amount per household in 2011 in euros</i>		Q1	Q2	Q3	Q4	Q5	All HHs
<b>Gross disposable income</b>	<b>B6g</b>	21 919	31 406	39 822	50 424	82 846	45 283
<b>Consumption expenditures</b>	<b>P31</b>	21 258	29 571	35 113	43 665	58 134	37 548
<b>Gross savings</b>	<b>B8g</b>	661	1 835	4 709	6 759	24 712	7 735
<b>Saving rate (%)</b>		3,01%	5,84%	11,83%	13,40%	29,83%	17,08%

Source : Insee, National Accounts, - Base 2010 HHs are ordinary households resident in mainland France. Insee <https://insee.fr/fr/statistiques/3148891?sommaire=2832834> acceded 13 Dec. 18

**Panel b**

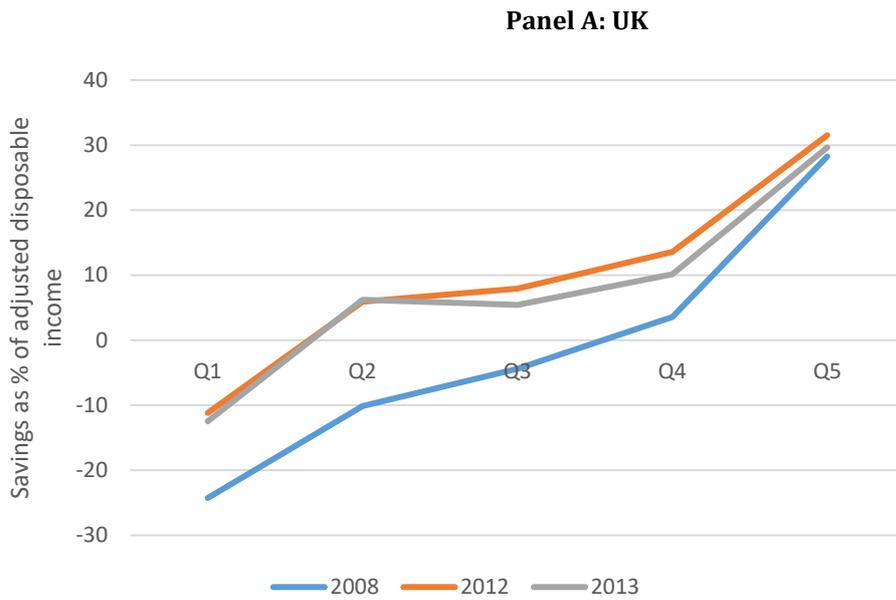
	Q1	Q2	Q3	Q4	Q5	Ensemble
Revenu disponible moyen après transferts par UC (en euros)	15 137	20 753	25 373	31 983	53 370	29 264
Dépenses pré-engagées moyennes par UC (en euros)	5 180	6 820	8 010	9 400	12 110	8 290
Revenu arbitrage moyen par UC (en euros)	9 957	13 933	17 363	22 583	41 260	20 974
Dépenses pré-engagées (en % du revenu après transferts)	35	33	31	29	23	28
Logement	26	24	24	23	18	22
<i>dont : loyers (réels ou imputés)</i>	18	17	18	17	13	16
<i>autres frais liés (eau, gaz, électricité, etc.)</i>	8	7	6	6	5	6
Télécommunications	4	3	3	2	2	3
Assurances et services financiers	5	5	4	4	3	4

Champ : ménages ordinaires résidant en France ; revenu calculé, hors services d'intermédiation financière (Sifim).

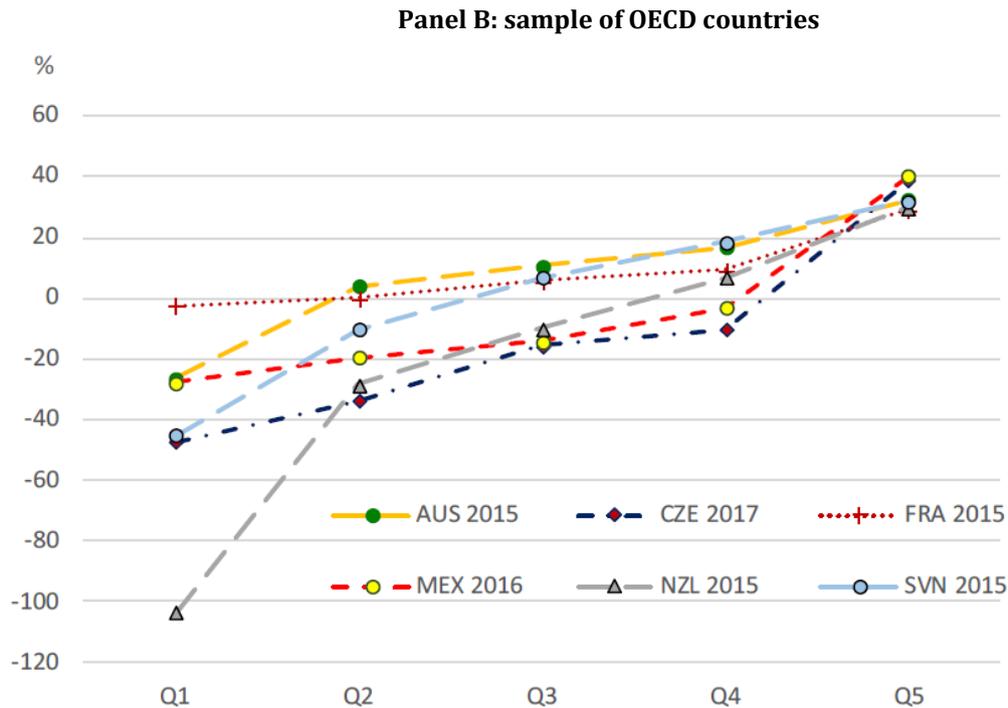
Source : Insee, comptes nationaux base 2010, enquêtes SRCV 2012, ERFIS 2011, Budget de famille 2010 et calculs des auteurs.

Source: Insee, L'économie française - Comptes et dossiers. Édition 2017. Available at : <https://www.insee.fr/fr/statistiques/2894028?sommaire=2894036> acceded 18 Dec. 18

Figure 16. Saving rates by equivalised disposable income quintile



Source: UK statistics, Office of National Statistics. Accessed <https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/articles/thedistributionofhouseholdincomeconsumptionandsavingsanoecdstudy/2015-11-30> as of March 15, 2021.



Source: OECD. Accessed December 14, 2021 <https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=SDD/DOC%282021%291&docLanguage=En>  
 AUS: Australia ; CZE : Czech Republic ; FRA : France ; MEX : Mexico ; NZL : New Zealand ; SVN : Slovenia.

### 2.5.3 Amendments brought to the Keynesian consumption function

Many amendments have been made to the K framework. Several are presented here. They notably introduce pieces of psychology. Leibenstein explains consumption behaviors using the idea of “nonfunctional” demand: demand and consumption of goods not due to factors other than the qualities inherent in the commodity (Box 14). It makes a distinction between the bandwagon (you increase your demand, because your community increases its demand), the snob (decreases your demand because your community increases his own) and the Veblen effect (conspicuous consumption, you increase your consumption because your bear a higher price).

James Duesenberry (Duesenberry, 1949) Relative income hypothesis. It builds on the idea that people care about social status. Implication for the consumption function? Consumption of HHs does not depend on the absolute income, but on the relative income (Definition 14). This idea was disregarded for a long while, but regained interest with the so-called Easterlin or Happiness-income paradox (Easterlin, 1974; Easterlin *et al.*, 2010). Individual happiness that is a proxy for subjective well-being, increases with income. But, average well-being tends to be rather stable even in a context of rapid economic growth. Main explanation: relative status is an important determinant of happiness. This is a Duesenberry-type explanation.

Duesenberry also emphasizes consumption habits. He proposes a consumption function which accounts for some adjustments for "habits" or "standards of living". According to the traditional Keynesian consumption function, if income falls, then consumption should fall proportionally with the marginal propensity to consume. Once consumption habits are rooted in HHs behavior then it is hard to get rid of them. Csq: income shocks should have slightly different effects on consumption. Certain consumption habits are formed at high income levels which are not completely abandoned when income falls. Consumption therefore depends on the maximum level of income earned in the past which produces **ratchet effects** (see Tutorials exercise). If there are no business cycles, the MPC is constant and the LR consumption function prevails. However, MPC varies over the business cycle: it decreases when there is a recession; it increases when the national economy expands. There exists a LR consumption function and several SR consumption functions.

All these amendments weaken the political implications of Keynesian analysis. This is precisely the perspective chosen by neoclassicals to propose an alternative explanation of household consumption. This aims to base the consumption function not on the fundamental psychological law but on a microeconomic analysis of consumption behavior where present and future consumption (savings) are linked in a choice qualified as inter-temporal.

**Box 14. Nonfunctional demand according to Leibenstein**

“By the **bandwagon effect**, we refer to the extent to which the demand for a commodity is increased due to the fact that others are also consuming the same commodity. It represents the desire of people to purchase a commodity in order to get into "the swim of things"; in order to conform with the people they wish to be associated with; in order to be fashionable or stylish; or, in order to appear to be "one of the boys." By the **snob effect** we refer to the extent to which the demand for a consumers' good is decreased owing to the fact that others are also consuming the same commodity (or that others are increasing their consumption of that commodity). This represents the desire of people to be exclusive; to be different; to dissociate themselves from the "common herd." By the **Veblen effect** we refer to the phenomenon of conspicuous consumption; to the extent to which the demand for a consumers' good is increased because it bears a higher rather than a lower price.”  
Source: (Leibenstein, 1950, p. 189). Note that nonfunctional demand means that portion of the demand is due to factors other than the qualities inherent in the commodity. Conspicuous: visible

**Definition 14. Relative Income Hypothesis**

“People often care more about their relative well-being than their absolute well-being. Someone who prefers a \$100 a week pay rise when a colleague gets \$50 to both of them getting a \$200 increase, for example. Poor people may consume more of their INCOME than rich people do because they want to reduce the gap in their CONSUMPTION levels. The relative income hypothesis, set out by James Duesenberry, says that a household's consumption depends partly on its income relative to other families. Contrast with PERMANENT INCOME HYPOTHESIS. »

Source: The Economist, <http://www.economist.com/economics-a-to-z/r#node-21529816> acceded Feb. 6<sup>th</sup> 2017.

“By 1949, Duesenberry had become convinced that aggregate demand theory would be increasingly discredited if it could not accommodate the fact that **a large part of consumer demand was socially inspired** and that consumer preferences for socially visible goods were interdependent. Given the importance of social considerations in determining expenditures, Duesenberry argued that it was relative, rather than absolute, levels of income that determined the nature and direction of much individual consumption and saving. Consumption was social as well as economic, and the social dimension could only be accommodated by recognizing the importance of relative income effects.”

Source: (Mason, 2000).

### 3. CONSUMPTION AND SAVING

Critique of Keynesian theory: consumption depends only on flow variables (income) but not on stock variables, especially wealth. HHs do not have a constant flow of income over their lifetime while their consumption is relatively stable. Wealth is also stable. Keynesian analysis would attempt to reconcile two irreconcilable aspects. Neoclassical analysis attempts to provide a theoretical explanation for this fact, unlike Keynesian analysis, whose answer is more empirical in nature.

This new approach to consumer behaviour is inspired by the consumer's microeconomic analysis which dates back to Irving Fisher *Theory of Interest* (Fisher, 1930). Fisher (1867-1947) pioneered the study of intertemporal choices: gave microeconomic foundation to consumer choices. Considered to be one of the greatest American mathematical economists. Contrary to many economists of his time, was able to use mathematics in virtually all his theories. Made elegantly: introduced mathematics only after he had clearly explained the basic intuition in words. The formal microeconomic framework will not be developed here. Main idea of Fisher: current consumption depends (the present value of) lifetime income; the timing of income earnings does not matter because HHs are able to borrow or lend. Borrowing consists of bringing consumption forward in time. If HHs anticipate future higher income they likely borrow and consume now. Savings = future consumption is as important as current consumption because it is a means to smooth consumption (Definition 15).

Contributions of Friedman and Modigliani are rooted in Fisher's contribution:

- Milton Friedman's permanent income hypothesis (PIH) emphasizes the ability of households to plan their consumer spending throughout their lives. What matters is their expectations about their incomes in the future. PIH became the workhorse to understand consumption;
- Franco Modigliani's life cycle theory (LCH) emphasizes the limited life span of households. Demographic parameters have a critical role such as the age structure. It has important implications with regard to the financing of pensions.

### 3.1. Household saving

Neoclassical analysis emphasizes the savings as future consumption. We begin with stylized facts on saving rates in France. Then we proceed with the basic concepts used in the neoclassical analysis of consumption and saving.

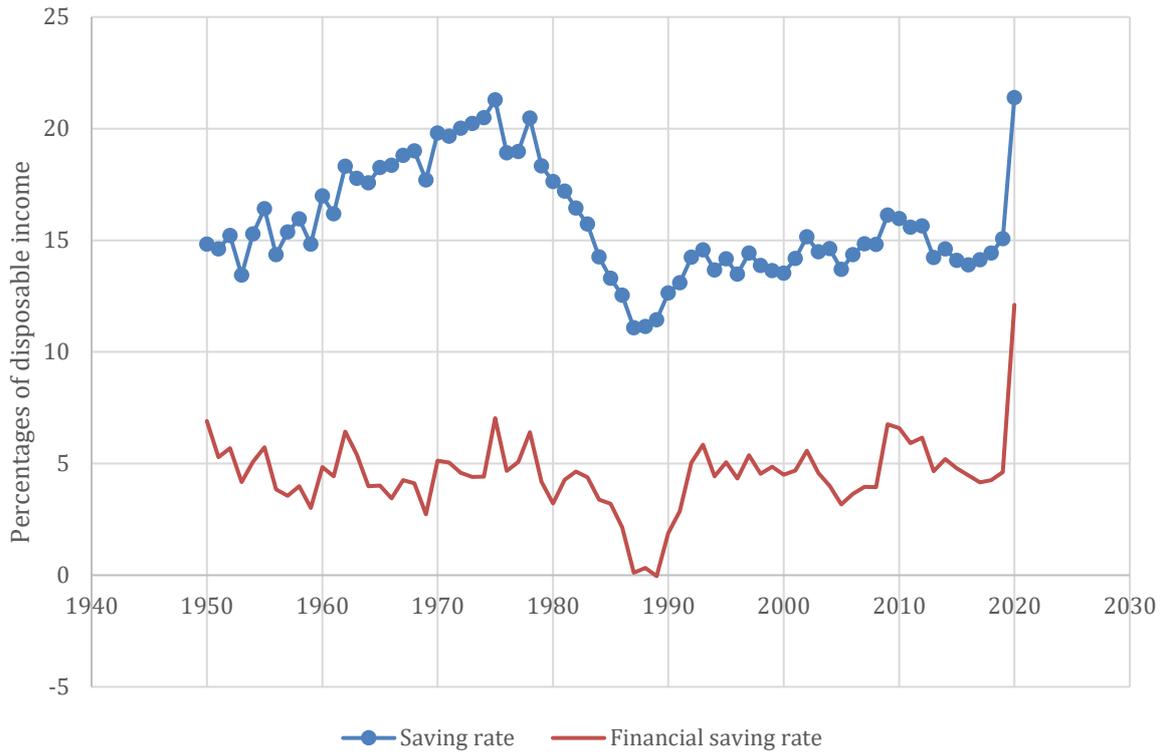
#### 3.1.1 Saving rates

On Figure 17 below, the difference between the savings rate and the financial savings rate corresponds to the non-financial savings rate, which mainly measures household housing purchases. These remain relatively stable over the period under consideration. Since 1995, the saving rate in France is rather stable around 15%. Focus on two facts.

Decrease in saving rates between middle 70s until the end of the 80s. Tentative explanation? Savings are countercyclical, HHs use their saving to keep their expenses when the current income does not increase => consumption smoothing. Another piece of explanation is also plausible: decrease in inflation rates over the 80s. Savings are no longer eroded by inflation so that HHs do not need to save in order to offset the effects of inflation.

Then saving rates increase at the beginning of the 90s. Explanation? Keynesian approach is not satisfactory because at the same time, growth rates are low and even negative (recession in 1993). The neoclassical analysis can be helpful while emphasizing the role of factors in the medium term: greater uncertainty on future income, higher public deficits and public debt (Ricardian effect according to which higher debt means higher future taxes) => incentives towards saving. On the contrary, ageing population should have a negative effect on aggregate savings (Life Cycle Hypothesis). Note the 2020 sharp increase (slowdown => lower confidence => higher savings). More on the savings motives in Table 13 p. 86 in appendix.

Figure 17. Saving rates in France, 1950-2020



Source : Insee, Comptes Nationaux base 2014. Champ : France, ménages y compris entrepreneurs individuels. <https://www.insee.fr/fr/statistiques/2830268> acceded December 14, 2021.

### 3.1.2 Concepts: lifetime consumption, utility and incomes

Saving is put at the forefront. Simply stated: current saving is future consumption of forward looking HHs (Definition 16), i.e. of HHs that are rather considering lifetime income and consumption rather than current income and consumption. They choose their consumption flows i.e. consumption from today, say  $C(t = 0)$ , more generally  $C(t)$ ,  $C(t + 1)$  over a time period.  $C(t)$  and  $C(t + 1)$  are chosen simultaneously so that we can say that HHs make a tradeoff between current consumption  $C(t)$  and future consumption  $C(t + 1)$ .  $C(t + 1)$  is like savings.

Intuition: the consumer faces an intertemporal budget constraint (sum of discounted lifetime expenses = sum of lifetime’s resources). Has an objective: achieves the highest lifetime satisfaction (utility). No instantaneous budget constraint, but an inter-temporal one. Means that s/he can borrow or save so that to meet the lifetime budget constraint. Reasoning presented on Figure 18 (compare with Figure 13 p. 59). Formally, expenditure is the discounted sum of consumer spending over a period of time that can be a lifetime

and that of future generations (lifetime consumption):  $\sum_t \frac{c(t)}{(1+r)^t}$  where  $c(t)$  denotes annual consumption expenditures and  $t$  is an index of time in years.

HHs choices are subjected to a measure of all resources available for current and future consumption  $W \equiv W_0 + \sum_t \frac{y(t)}{(1+r)^t}$  where  $W_0$  is the current material (non-human) wealth and  $y(t)$  is the labour income in year  $t$ . Households have the possibility either to use their savings to make an investment in the form of purchases of securities that enable them to own their homes (non-financial securities) or to make financial investments (savings accounts, PEAs, etc.). The latter is assessed by the financial savings rate. HHs can also borrow that is like bringing consumption forward in time.

Note that if the discount rate  $r$  is nil and annual consumption expenditures are constant that are equal to  $C$ , then lifetime consumption is  $\sum_t \frac{c(t)}{(1+r)^t} = T \times C$  under the assumption the HH lives for  $T$  years. Likewise, lifetime resources available to the HHs are  $W \equiv W_0 + \sum_t \frac{y(t)}{(1+r)^t} = W_0 + R \times Y$  under the assumption the HHs earn a constant yearly labour income and get retired in  $R$  years with  $< T$ . Then the inter-temporal budget constraint writes  $T \times C = W_0 + R \times Y$ . See the generalization in Box 15 that allows to determine non-constant annual consumption expenditures.

Household savings can be held in the form of cash balances. This is called hoarding when these cash balances are not remunerated. But in the neoclassical analysis, cash are hold only for transaction purposes, not for hoarding. Household savings = instruments to smooth consumer expenditure today and tomorrow (Figure 16 differs from Figure 13).

Takeaway:

- Keynesians: saving is a residual. Current disposable income is the main driver of income.
- Neoclassics: saving is future consumption. One of the main motive of saving is consumption smoothing. Wealth (human + material – see para. 3.2. ) is the main driver of current consumption. See the wealth effect Definition 18 p. 83.

**Definition 15. Consumption smoothing**

“At the most basic level, consumption smoothing is the idea that individuals maintain the same standard of living over time by adjusting their spending and saving throughout different phases of their lives. Consumption smoothing is often achieved through a variety of methods, including borrowing money when income is low, saving when income is high, and using insurance to protect yourself from any income shocks that could arise [...]

Consumption smoothing is defined as the tendency of households to adjust spending habits over time to consume similar levels of goods and services throughout their lifetime. This idea is based on the assumption that many people prefer a steady level of consumption, rather than consuming more during times when they’re making more money and less during times when they’re making less [...]

Instead of spending all of your extra money when you have a good month, or saving it all so you can splurge during a bad month, consumption smoothing suggests that you’ll adjust your spending and saving as needed so your standard of living doesn’t change dramatically between one period and the next [...]

This is essentially how consumption smoothing works. You “smooth out” your spending over time by saving in good times and borrowing (either from yourself or lenders) in bad times.

In fact, saving and borrowing are two main tactics that individuals use to smooth their consumption. For example, your family may create a monthly budget in which you set aside money for emergencies, unplanned expenses, and future goals. Then, you dip into your savings when it’s time to pay for one of these items. If you ever don’t have the money, you may take on credit card debt and loans to cover them (so you don’t have to alter your standard of living).”

Source: <https://www.thebalance.com/what-is-consumption-smoothing-5210793> acceded December 14, 2021

**Box 15. Households’ behaviour modelling in the neoclassical framework**

The behaviour of HHs and therefore their consumption function is derived from the following maximization problem. I.e. HHs choose their flows of consumption expenditures over time so as to maximize their inter-temporal (lifetime) utility:

$$\max_{c(t)} u(c(t))$$

Under the inter-temporal (lifetime) budget constraint:

$$\sum_{t=0}^T \frac{c(t)}{(1+r)^t} = W_0 + \sum_{t=0}^T \frac{y(t)}{(1+r)^t} \equiv W$$

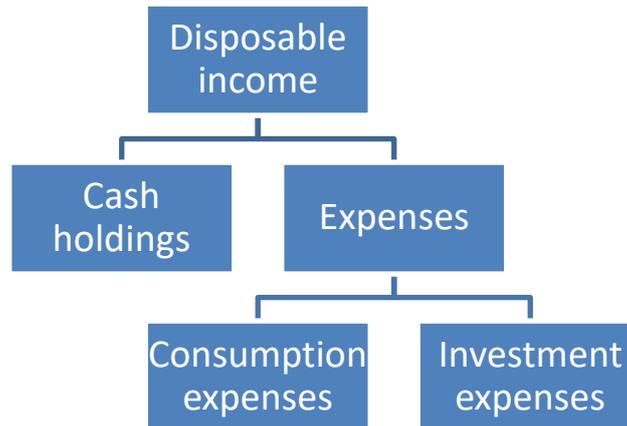
Where  $u$  is the intertemporal utility function that depends on instantaneous consumption flows denoted by  $c(t)$ .  $c(t)$  is the aggregate consumption expenditure i.e. all expenses on different items are aggregated using goods’ prices.  $t$  is an index of time that varies from today ( $t = 0$ ) towards  $T$ ;  $T$  can either tend towards the infinity (PIH) or be finite (LCH).  $y$  denotes the instantaneous labor incomes and  $w_0$  is initial material wealth; the discounted sum  $\sum_t \frac{y(t)}{(1+r)^t}$  denotes the human wealth. It is assumed that  $w_T$  is nil.  $W$  is the total HH’ (lifetime) wealth and  $r$  is the discount rate.

Simple numerical example. Assume that you earn 50,000 € a year over your 40 years working life. Your initial wealth  $W_0$  is nil and the discount rate denoted by  $r$  is nil. Then your total wealth is made of your lifetime labour income only that is equal to  $50,000 \times 40 = 2.10^6$ €

**Definition 16. Saving in a neoclassical perspective**

Savings are considered as delayed say future consumption. Households (HHs) save today in order to be able to spend later. It can be said that there exists a trade-off between current and future consumption. One major implication is that when HHs decide to consume today or to forego consumption, HHs are seeking stable consumption levels over their time horizon. Put differently they smooth their consumption profile.

**Figure 18. The use of disposable income in the neoclassical approach**



Source: own elaboration

**3.2. The crucial role of wealth**

The main idea of the neoclassical approach: consumption is not determined by income but by wealth:

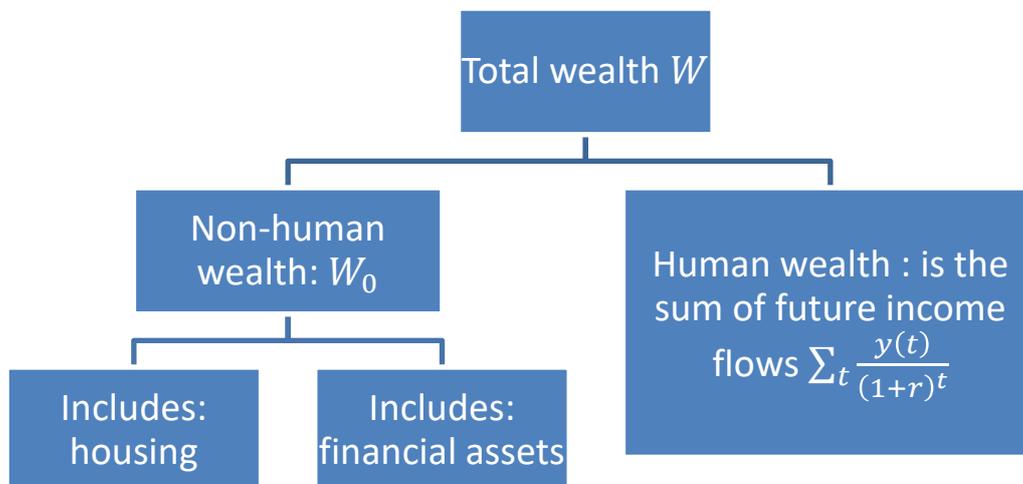
$$C = f(W, Y^d)$$

(+)

Wealth and income are linked: the increase in an individual's wealth depends on what s/he earns. But in some cases, the link between wealth and income does not exist. For example: a "rich" individual may have a low income in a particular year and conversely a "poor" individual may have a high income in a particular year. Thus, economists who support a wealth-dependent consumption function argue that **random, unexpected changes in current income, when not linked to a change in wealth, have little or no effect on current consumption.** This approach is attractive, but it faces the difficulty of defining and measuring household wealth. National accounts give a partial measure of wealth: they provide information on material or objective wealth. However, the neoclassical analysis highlights a broader notion of wealth that includes a subjective element namely human wealth that depends in particular on expectations of future income (Figure 19).

Another aspect of neoclassical analysis is that savings and consumption decisions are made simultaneously. We are talking about a tradeoff between current and future consumption i.e. a tradeoff between consumption and saving. Households are not just savers but also investors. They invest in their human capital (health, education, for themselves or their children). This notion of human capital was forged in the 1960s following the work of development economists such as Schultz (1961) or more recently Gary Becker's Nobel Prize in Economics in 1992 (Becker, 1991, 1993). The idea is that any expenditure that improves an individual's level of education or health status, increases productivity and future income. By extension, we speak of human wealth as the (discounted) sum of future labor incomes. The sociologist P. Bourdieu also introduces the difference between economic capital, social capital and cultural capital. But also, when pensions are financed by a pay-as-you-go system (système par répartition), pension contributions are also part of households' assets, as they give rise to rights to receive a pension.

Figure 19. Wealth components



- Material wealth = non-human wealth. Includes: stocks (actions), bonds (obligations) and housing which is often used as a collateral.  $r$  is the discount rate;  $y(t)$  is labour income.

### Box 16. Investing in human capital

“Although it is obvious that people acquire useful skills and knowledge, it is not obvious that these skills and knowledge are a form of capital, that this capital is in substantial part a product of deliberate investment, that it has grown in Western societies at a much faster rate than conventional (nonhuman) capital, and that its growth may well be the most distinctive feature of the economic system. It has been widely observed that increases in national output have been large compared with the increases of land, man-hours, and physical reproducible capital. Investment in human capital is probably the major explanation for this difference.

Much of what we call consumption constitutes investment in human capital. Direct expenditures on education, health, and internal migration to take advantage of better job opportunities are clear examples. Earnings foregone by mature students attending school and by workers acquiring on-the-job training are equally clear examples. Yet nowhere do these enter into our national accounts. The use of leisure time to improve skills and knowledge is widespread and it too is un-recorded. In these and similar ways the quality of human effort can be greatly improved and its productivity enhanced. I shall contend that such investment in human capital accounts for most of the impressive rise in the real earnings per worker.”

Source: Schultz (1961, p.1)

### 3.3. Application: the Life-Cycle Hypothesis

« En mettre de côté pour en avoir devant soi demeure le principe directeur de tous ceux qui prennent les devants pour assurer leurs arrières. » - Pierre Dac (1893-1975)

Neo-classical analysis can be used in several approaches: Permanent income and Life-Cycle Hypothesis (LCH) that emphasizes the role of demographic parameters.

This year we give a focus on HH's over-indebtedness after (Betti *et al.*, 2007)

In the 50s, Modigliani and Brumberg presented an alternative explanation of consumption to Friedman's. Like Friedman (Permanent Income Hypothesis), they assume that households are seeking to maximize intertemporal utility / well-being. The difference between the two explanations is the time period for utility maximization. For Friedman, this period is infinite, in other words, individuals save not only for themselves but also for their descendants. On the contrary, in Modigliani and Brumberg, the period is finite because individuals save only for themselves. They insist on the heterogeneity of consumers who plan their consumption expenditures but over a finite time period, the duration of which they know.

Micro model: tradeoff between saving and consumption over HHs' lifetime. Saving is future consumption. The transition from micro to macro is done with the notion of overlapping generation (OLG). At a given moment, different generations of individuals live: young people, working people and retirees who consume and save differently. OLG vocabulary introduced by M. Allais and P. Samuelson (Allais, 1947; Samuelson, 1958).

**Definition 17. Life Cycle Hypothesis (LCH)**

“An attempt to explain the way that people split their INCOME between spending and saving, and the way that they borrow. Over their lifetime, a typical person's income varies by far more than how much they spend. On AVERAGE, young people have low incomes but big spending commitments: on investing in their HUMAN CAPITAL through education and training, building a family, buying a home, and so on. So they do not save much and often borrow heavily. As they get older their income generally rises, they pay off their mortgage, the children leave home and they prepare for retirement, so they sharply increase their saving and INVESTMENT. In retirement, their income is largely or entirely from state benefits and the saving and investment they did when working; they spend most or all of their income, and, by selling off ASSETS, often spend more than their income.

Broadly speaking, this theory is supported by the data, though some economists argue that young people do not spend as much as they should on, say, being educated, because lenders are reluctant to extend CREDIT to them. One puzzle is that people often have substantial assets left when they die. Some economists say this is because they want to leave a generous inheritance for their relatives; others say that people are simply far too optimistic about how long they will live. (See also PERMANENT INCOME HYPOTHESIS and RELATIVE INCOME HYPOTHESIS.)”

Source: The Economist, <http://www.economist.com/economics-a-to-z/l/node-21529483> accessed Feb. 6<sup>th</sup> 2017.

**Box 17. F. Modigliani on the Life Cycle Hypothesis**

“The point of departure of the life cycle model is the hypothesis that consumption and saving decisions of households at each of time reflect a more or less conscious attempt at achieving preferred distribution of consumption over the life cycle, to the constraint imposed by the resources accruing to the hold over its lifetime.”

Source: (Modigliani, 1966)

**3.3.1 Stylised facts**

Main finding of Ando & Modigliani and then Modigliani and Brumberg (Modigliani and Brumberg, 1954; Ando and Modigliani, 1963), see also (Modigliani, 1986a, 1986b) :<sup>10</sup> labor incomes, that are the most predictable, are unevenly distributed over the life course of the HHs. Modigliani places particular emphasis on the relationship between age, income and wealth.

- Young, not yet working people, invest in their human capital (education). They have no or low labor incomes, they can even borrow money to pay the education expenses. They can also depend on transfers they receive from their parents or grand-parents;
- Young working people with stable employment may have low incomes but be rich because their future income increases: they can consume a significant fraction of their current income, i.e. have a low savings rate;
- Older working people (45-50 years old) have a higher income in relation to their wealth - i.e. their permanent income does not increase or increases only slightly:

<sup>10</sup> Modigliani was awarded the Nobel prize in economics in 1985.

they will tend to consume a smaller fraction of their income and therefore have a higher savings rate than young people.

According to the LCH, working households accumulate wealth that will be consumed out when they are retired. The evolution of consumption is disconnected from that of household incomes over the life cycle (Figure 20, Figure 21). It is therefore conceivable that households are indebted at the beginning of their working lives, especially those who anticipate a significant increase in their income during their professional careers. It also makes it possible to introduce the influence of the institutional framework, such as the social security system or debt constraints (true in developing countries in particular).

The simplest version of the LCH is over 2 periods: individuals know with certainty the dates of entry into working life (in F around 23-24 years on average), retirement (around 60 years) and even their life expectancy (around 80 years). Simplification: individuals earn a constant income during their working life, and have no labor income during retirement. Individuals maintain a constant level of consumption  $c$  over their lifetime, net wealth  $a$  is zero at the beginning, goes through a maximum when they retire, and then decreases under the effect of dissatisfaction and is cancelled when they die. Figure 16 shows this hump saving in household wealth as a function of age.

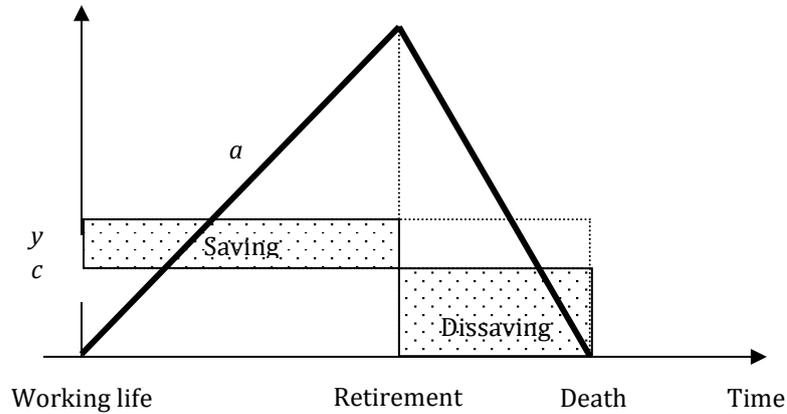
Roles of saving:

- It allows translating consumption towards the future when expected incomes might be lower;
- On the contrary, under the assumption of perfect credit markets, the timing of income earnings is not relevant because HHs can borrow or lend at any time;
- Accumulation makes it possible to adjust fluctuating income to a relatively more stable expenditure. Wealth is built up to finance consumption in retirement and follows a hump-shaped pattern as a function of age: the hump saving phenomenon, as expressed by R.F. Harrod in *Towards a Dynamic Economics*, (London, 1948, p. 41). Figure 22 shows this hump saving in household wealth as a function of age.
- Link with JMK motives of saving i.e. life cycle saving i.e. "To provide for an anticipated future relationship between the income and the needs of the individual". See above para. 2.4.2.1.

Remark. Most of non-human wealth held by the F HHs is housing wealth. En France 6 ménages sur 10 sont propriétaires de leur résidence principale ou en accession à la propriété. Patrimoine immobilier = facteur ppal des inégalités de patrimoine en France : les moins bien cotés sont locataires. Le montant du patrimoine des ménages propriétaires

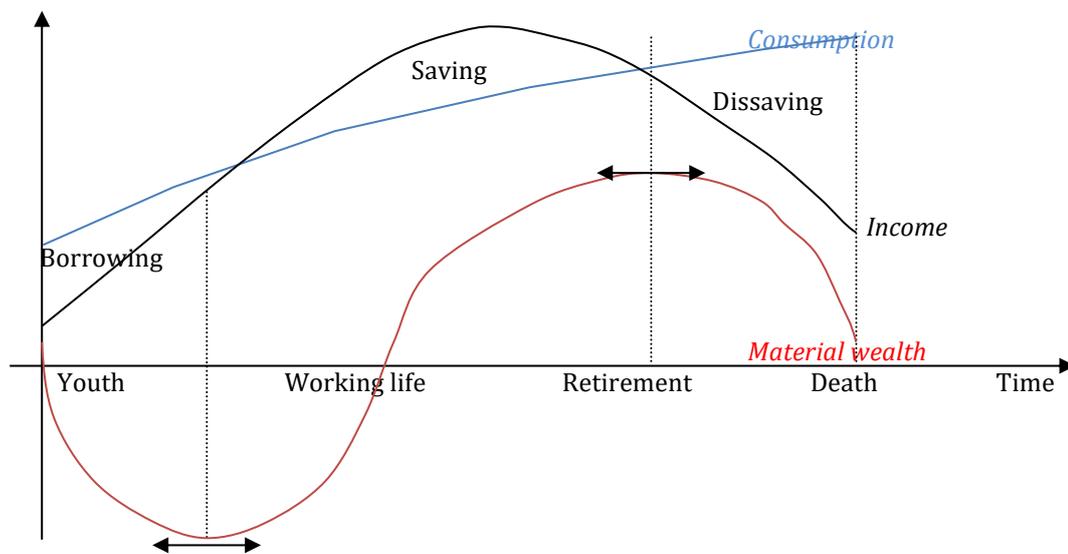
de leur résidence ppale ou accédants est 8 fois plus élevé que celui des ménages locataires. Important de noter que les inégalités dans la détention de patrimoine sont plus importantes que les inégalités de revenu.

**Figure 20. Wealth, income and consumption expenses time profiles over the life cycle (2 periods)**



Adapted from (Modigliani, 1986a, p. 25) ;  $a$  : net assets (richesse),  $y$  : income,  $c$  : consumption

**Figure 21. Wealth, income and consumption expenses time profiles over the life cycle (3 periods)**



**Box 18. Mr Harrod on hump savings**

“Mr. Harrod distinguishes between two broad types of personal saving. First, there is the saving a man does for his heirs-saving for posterity. The second he terms hump saving. **Hump savings are savings a man makes only in order to be able to spend at some later stage of his life-**in order to secure for himself that distribution of consumption through time that maximises his utility, discounted to the present. The term ‘hump’ is appropriate because, broadly speaking, a man may be expected to accumulate assets during youth and middle age to provide for his retirement and senescence. If he calculates correctly, and desires to leave nothing for posterity, he will dissipate these assets at such a rate that their exhaustion coincides with his death. **The curve depicting the time path of the volume of his assets will therefore be humped.**”

Source: (Graaff, 1950)

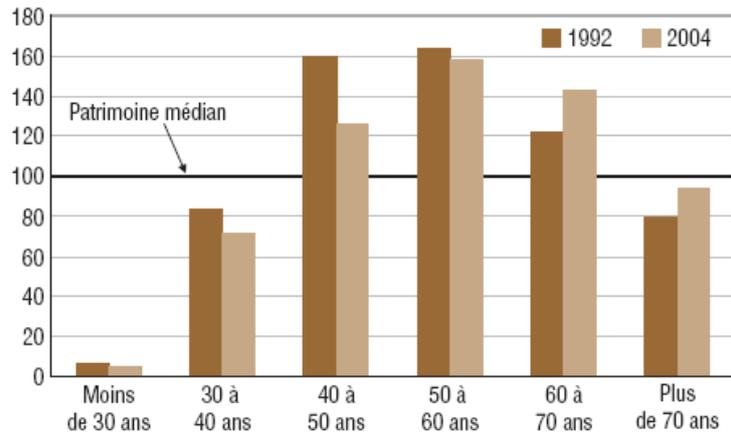
Household

**Figure 22. HH wealth in France by age group - Le patrimoine des ménages en France par tranche d'âge**

(a) relativement au patrimoine médian de la population, en pourcentages

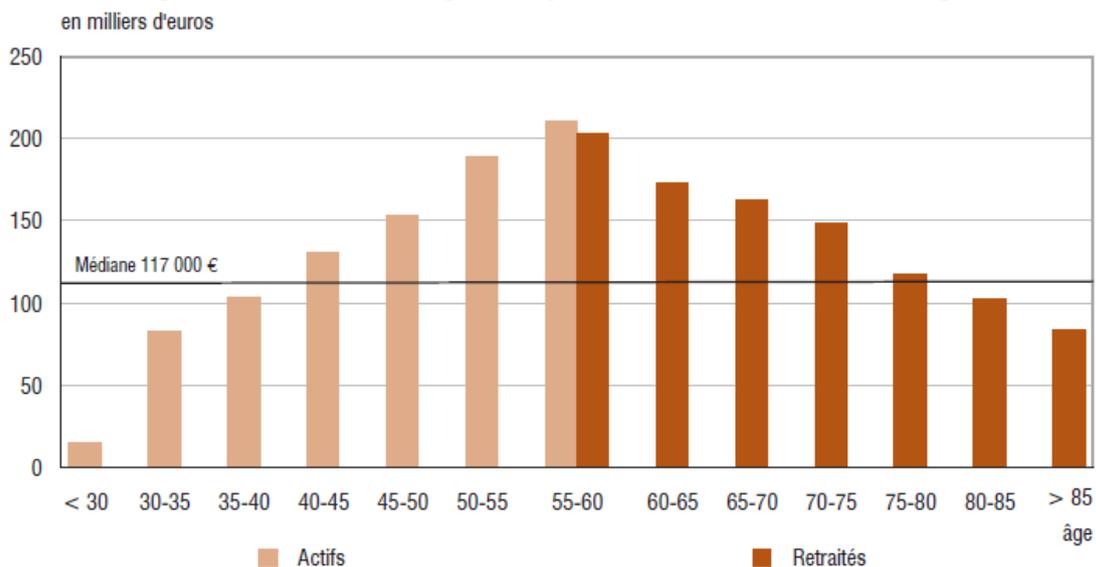
**2. Évolution du profil par âge du patrimoine médian relatif**

Lecture : en 1992, le patrimoine médian des 40-50 ans valait 160 % du patrimoine médian de la population totale.  
 Champ : ensemble des ménages.  
 Source : Insee, enquête Patrimoine 2004.



Source : (Cordier, Houdré and Rougerie, 2006)

(b) en milliers d'€



Source : Insee, enquête Patrimoine 2004, montants recalés sur la Comptabilité nationale.

Source : (Girardot-Buffard, 2009). Rappel : la médiane d'une série statistique est la valeur du caractère qui partage l'effectif total en **deux parties égales**, c'est à dire telle qu'il y ait autant d'observations ayant une valeur supérieure ou égale à la médiane que d'observations ayant une valeur inférieure ou égale à la médiane. Dans le cas ci-dessus, la médiane est calculée de telle sorte que le nombre de ménages ayant à un patrimoine inférieur ou égal à la médiane est égal au nombre de ménages ayant un patrimoine supérieur ou égal à la médiane. Sur la figure (a), la valeur du patrimoine médian est normée à 100 ; sur la figure (b) la médiane du patrimoine des ménages en France est de 117 000 €.

3.3.2 LCH Modelling

Gives the neoclassical consumption function that can be considered as an augmented K C function:

$$C = f(W, Y^d) \quad (+)$$

Main hypotheses. HH lives for  $T$  years and have an annual consumption expenditure of  $C$ . It perfectly knows future yearly labor incomes  $Y$  until s/he retires in  $R$  years. A 0 interest rate is assumed. Holds a wealth denoted by  $W_0$ . It is not credit constrained. It has no other constraint but to repay its loans in the future. It can get indebted anytime but it is not indefinitely. They are solvent. The relevant approach is borrowed from Fischer's inter-temporal framework. We therefore calculate lifetime resources (total wealth  $W$ ) as:

$$W_0 + R \times Y = W$$

When lifetime consumption expenditures are:

$$T \times C$$

Where  $C$  denotes yearly consumption. Then, subject to her intertemporal budget constraint, the HH has to meet lifetime resources and lifetime consumption expenditures:

$$W_0 + R \times Y = T \times C$$

The consumption function is:

$$C = \frac{1}{T} W_0 + \frac{R}{T} Y$$

Taking numbers:  $T = 50$  and  $R = 30$  gives:

$$C = 0.02W_0 + 0.6Y$$

The MPC to consume out wealth is 0.02 and the MPC to consume income is 0.6. The MPC to consume out wealth is a wealth effect (Definition 18).

In the short term wealth is exogenous, but in the long term it is also linked to income. Assuming that wealth represents 5 times annual income, we have:

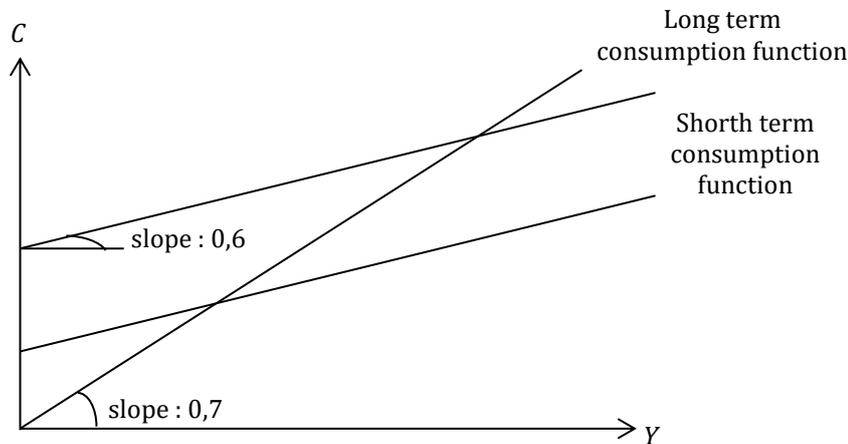
In the SR:  $C = 0,6Y + 0,02W_0$ ;

In the LR:  $W_0 = 5 \times Y$  then  $C = 0,6Y + 0,02 \times 5Y = 0,7Y$

This makes it possible to represent the consumption function that emerges from the life cycle Figure 23. It helps to explain why there are several short-term consumption functions: they are related to household wealth. When wealth changes, the consumption schedule moves upwards or downwards. In the long run, when wealth becomes variable,

i.e. income and wealth vary in the same proportions, the consumption function schedule is steeper. It solves the consumption puzzle (Figure 15)

**Figure 23. Consumption function under the life cycle hypothesis**



Remarque 1 : Ando et Modigliani proposent la fonction suivante :

$$C(t) = cY(t) + dW(t) ; c \cong 0,7 \text{ et } d \cong 0,06 ; \text{ à LT } W = 5Y$$

A CT, le patrimoine est exogène et varie indépendamment du revenu, donc la PmC est constante et la PMC décroît avec le revenu courant ; formulation keynésienne mais la PmC est plus faible. A LT il existe une relation entre richesse et revenu le patrimoine est endogène *i.e.* devient une variable choisie par les individus et varie dans les mêmes proportions que leur revenu. Dans leur exemple, la PmC et la PMC sont égales à  $1 ; 0,7 + 0,06.5 = 0,7 + 0,3 = 1$ .

Remarque 2. La richesse humaine est la somme actualisée des revenus futurs. Dans l'hypothèse d'un taux d'intérêt et de revenus constants, on peut approximer la richesse humaine de la manière suivante  $W = \frac{Y}{r}$ . La fonction de consommation devient :

$$C = cY + dW = cY + d\frac{Y}{r} = \left(c + \frac{d}{r}\right)Y$$

With :

$$\left(c + \frac{d}{r}\right) > c$$

It means that the slope of the LR is greater than the SR's.

**Definition 18. Wealth effect - Effet richesse**

The wealth effect characterizes the effect of a change in wealth on expenses. It is usually positive: if perceived wealth increases (decreases), expenses increase (decrease). Wealth should be understood as the sum of material and human wealth.

Adapted from: (Chauvin and Damette, 2010)

“Standard applications of the life cycle hypothesis of saving and consumption, first developed by Brumberg and Modigliani (1954) and later augmented by Ando and Modigliani (1963), indicate that consumption spending is determined by the lifetime resources of consumers, which includes wealth, whether from stock, real estate or other assets.”

Source: (Boivin, Kiley and Mishkin, 2010)

### 3.3.3 Implications: determinants of saving

Main predictions are (i) aggregate savings depend on the growth of national income and not on its level, which is not in line with the Keynesian theory and (ii) household wealth depends on the length of the retirement period. This is an important theory because it helps to understand the influence of social security, population, and stock market financing on national savings, as well as the role of savings in economic growth, and the determinants of national wealth.

The following statements are made other things held equal.

#### 3.3.3.1 Demographic characteristics

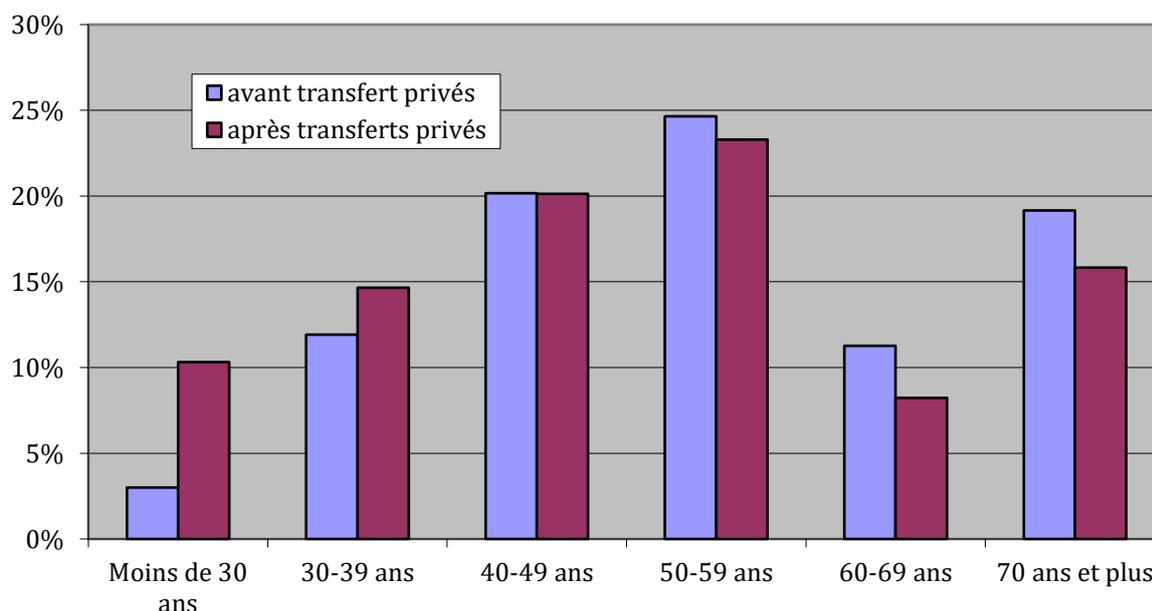
Aggregate savings are determined by demographic factors such as the age structure of the population, labor force growth, life expectancy, or dependency ratio, *etc.*). Note that the size of the pop is not the relevant variable; LCH mainly focus on demographic structure.

Figure 24. The savings rate by age group is in line with life cycle theory. Peak just before the age of retirement (50-59 years old). However, the decline in the savings rate after retirement is limited. It is probably necessary to consider amendments to the theoretical framework: uncertainty about life expectancy, importance of health expenditures, and uncertainty about income during retirement or "intergenerational altruism." Notice: role of private transfers for young HHs. Transfers from older to younger cohorts may show that France is becoming a country of heirs. More details [here](#).

If population growth results in an increase in the relative weight of working people (who save) compared to retirees (who dissave), then the savings rate is positive. Be

careful, if population growth leads to an increase in the weight of young inactive people or older inactive people (higher age dependency ratio), the savings rate may even be negative.

**Figure 24. Saving rate by age group in France in 2011**



Source: Insee. Les comptes de la Nation en 2016. Comptes nationaux annuels - base 2010.

<https://www.insee.fr/fr/statistiques/3148891?sommaire=2832834> Accessed 16 dec. 21.

Private transfers cover transfers between HHs. They can consist in gifts from one household to another, or amounts of money corresponding to the resale by one household to another of a second-hand property.

Note that the savings rate after transfers is higher than the savings rate before transfers for the 'younger' age groups. This means that older households transfer to younger households.

### 3.3.3.2 Economic growth

Aggregate savings depend on the economic growth rate not on the level of income (main difference with the K approach). Stronger economic growth leads to positive savings by working people, while retirees' dissaving, determined by previous income, is not affected. This results in a positive influence of economic growth on aggregate savings. In short, an increase in the growth rate leads to a favourable income distribution for the younger generations. This was probably the case in Japan in the high-growth years or in France in the 1960s.

### 3.3.3.3 *Social security system*

LCH is consistent with one of the saving motives presented by JMK (para. 2.4.2 p. 60), namely savings related to foreseen changes in income in relation to anticipated needs. JMK labelled them (“foresight”) or life cycle motive (*prévoyance*). Not to be confused with the precautionary motive. Savings are built because HHs foresee increased future expenditures (childcare, old age, home purchase). These savings depend on how the education and pension systems are financed. For instance, the introduction of a pay-as-you-go system leads to a fall in the aggregate savings rate. More generally the welfare state translates self-insurance for health, old-age to social safety nets.

#### 4. CHAPTER 1 - APPENDIX

To extend the analysis of saving, see (Arrondel and Masson, 2011, p. 30) who insist that the PIH/LCH can account for observed wealth behaviour but has limited predictive capacity. Hence the recent developments in research outside the standard framework, which are more complex, but which may better account for certain anomalies. Also, see (Antonin, 2014) on post-Keynesian approaches to consumption.

**Table 13. Factors that can determine savings rates**

Event	Mechanism	Expected impact on household savings
The public deficit is decreasing	The prospect of additional taxes is less likely in the near future	Negative ("Ricardian effect")
The population of a country is ageing	Consumption of accumulated wealth over a lifetime. Willingness to transfer a heritage. al	Unknown, due to the composition effects (depends on the relative purchasing power of older people, inheritance taxes, degree of intergenerational altruism, etc.)
Income increases	If the income increase is seen as permanent, increase consumption (and possible decrease in savings depending on the household's preference for its current consumption). If the increase is seen as temporary, increase savings to increase future consumption.	Unknown, because it depends on the HHs preferences i.e. towards more or less "intertemporal consumption smoothing"
Interest rate increases	Household can save more because savings are better remunerated (substitution effect) or consume more today because capital earnings increases (income effect)	Unknown, because it depends on the HHs preferences i.e. towards more or less "intertemporal consumption smoothing"
Inflation is rising	Unanticipated, the increase in inflation is seen as an erosion of household wealth and purchasing power. According to the hierarchy of his preferences between consumption and savings, the agent can choose to renounce consumption to reconstitute his wealth ("real cash effect"), or on the contrary to privilege consumption at the expense of savings because it is less interesting ("flight from money effect"), all the more so when inflation is expected	Unknown, because it depends on the HHs preferences i.e. towards more or less "intertemporal consumption smoothing"
Household wealth is increasing	Households can consume and borrow more (especially in countries where loans are secured by collateral)	Negative ("wealth effect")
Inequalities are increasing	Better-off households save more than low-income households.	Positive ("marginal propensity to consume decreases")
Economic uncertainty is increasing	Households are increasing their savings to use them when needed.	Positive ("precautionary" motive)

Source: (Galiana, Lafféter and Simon, 2017) . Available at : <https://www.insee.fr/fr/statistiques/2894030?sommaire=2894036&q=evolution+du+%22taux+d%27%C3%A9pargne%22%20de+m%C3%A9nages>

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Table 14. Integrated economic accounts of the Households, 2018, billion €

Uses		Households	Households	Ressources	
<b>Production and external account of goods and services</b>			<b>Production and external account of goods and services</b>		
P1	Output		446,8	P1	Output
P2	Intermediate consumption	81,2		P2	Intermediate consumption
<b>B1g/GDP</b>	<b>Value added, gross</b>	<b>365,6</b>			
	<b>total</b>	<b>446,8</b>	<b>446,8</b>		
<b>Generation of income account</b>			<b>Generation of income account</b>		
D1	Compensation of employees	41,5	<b>365,6</b>	<b>B1g/GDP</b>	<b>Value added, gross</b>
D2	Taxes on production and imports	21,6			
D3	Subsidies	-7,7			
<b>B2g</b>	<b>Operating surplus, gross</b>	<b>188,8</b>			
<b>B3g</b>	<b>Mixed income, gross</b>	<b>121,3</b>			
	<b>total</b>	<b>365,6</b>	<b>365,6</b>		
<b>Allocation of primary income account</b>			<b>Allocation of primary income account</b>		
			1 251,9	D1	Compensation of employees
				D2	Taxes on production and imports
				D3	Subsidies
			<b>188,8</b>	<b>B2g</b>	<b>Operating surplus, gross</b>
			<b>121,3</b>	<b>B3g</b>	<b>Mixed income, gross</b>
D4	Property income	16,3	98,3	D4	Property income
<b>B5g/GNI</b>	<b>Balance of primary incomes</b>	<b>1 644,1</b>			

<b>total</b>	<b>1 660,4</b>	<b>1 660,4</b>
<b>Secondary distribution of income account</b>		<b>Secondary distribution of income account</b>
		<b>1 644,1</b> B5g/GNI Balance of primary incomes
D5 Current taxes on income, wealth, etc	248,3	D5 Current taxes on income, wealth, etc
D61 Social contributions and benefits	480,2	0,0 D61 Social contributions and benefits
D62 Social benefits other than social transfers in kind	0,0	504,9 D62 Social benefits other than social transfers in kind
D7 Other current transfers	69,3	70,1 D7 Other current transfers
<b>B6g/GDI Disposable income</b>	<b>1 421,2</b>	
<b>total</b>	<b>2 219,1</b>	<b>2 219,1</b>
<b>Use of disposable income account</b>		<b>Use of disposable income account</b>
		<b>1 421,2</b> B6g/GDI Disposable income
P3 Final consumption expenditure	1 219,8	P3 Final consumption expenditure
<b>B8n National saving, net</b>	<b>201,5</b>	
<b>total</b>	<b>1 421,2</b>	<b>1 421,2</b>
<b>Redistribution in kind account</b>		<b>Redistribution in kind account</b>
<i>Or: taking into account income in kind</i>		<i>Or: taking into account income in kind</i>
		<b>1 421,2</b> B6g/GDI Disposable income
D63 Social transfers in kind		409,0 D63 Social transfers in kind
<b>B7g Adjusted disposable income, gross</b>	<b>1 830,3</b>	<b>1 830,3</b> B7g Adjusted disposable income, gross
P4 Actual final consumption	1 628,8	P4 Actual final consumption
<b>B8g National saving, gross</b>	<b>201,5</b>	

<b>total</b>		<b>3 660,5</b>	<b>3 660,5</b>		
<b>Changes in assets</b>		Households	Households	<b>Changes in liabilities</b>	
<b>Capital account</b>				<b>Capital account</b>	
D9r	Capital transfers, receivable			<b>201,5</b>	<b>B8g National saving, gross</b>
D9p	Capital transfers, payable			6,5	D9r Capital transfers, receivable
P51g	Gross fixed capital formation	136,3		-16,4	D9p Capital transfers, payable
P52	Changes in inventories			P51g	Gross fixed capital formation
P53	Acquisitions less disposals of valuables	0,7		P52	Changes in inventories
NP	Acquisitions less disposals of non-produced assets	-2,4		P53	Acquisitions less disposals of valuables
<b>B9NF</b>	<b>Net lending (+)/net borrowing (-)</b>	<b>57,0</b>		NP	Acquisitions less disposals of non-produced assets
<b>total</b>		<b>191,6</b>		<b>191,6</b>	

Insee National accounts - Base 2010. In red, balances that are first calculated in Uses (on the left) and then reported in Resources (on the right). Available at: <https://www.insee.fr/en/statistiques/4132168?sommaire=4132171> Figures in Billion €.

# **First Part - Aggregate functions**

## **Chapter 2. The investment function**

Reminder. Accounting identity between uses and resources we already studied in chapter 1:  $GDP + M := C + GCF + G + X$ . Chapter 2 focuses on GCF Gross Capital Formation (FBC)

## 1 DEFINITIONS AND INDICATORS

Q : how to define and measure investment in macroeconomics?

Investment is an economic operation whose accounting definition is much more restrictive than the ordinary meaning. In this chapter, “investment” is neither financial (=> financial transaction) nor the purchases of durable goods by households (=> final consumption). We recall first the accounting definition of investment and then the purposes of investment (para 1.1). Then focus on indicators (para 1.2) and the distinction between gross/net investment (para 1.3).

### 1.1 Accounting Definition

La définition comptable de l’investissement repose sur la durée d’immobilisation des biens investis, n’est pas une définition économique. La CN permet d’identifier les SI qui réalisent l’investissement. Cette définition comptable permet de diriger l’étude des déterminants de l’I : on s’intéressera à la FBCF des SNF-EI (sociétés non financières – entreprises individuelles) ce qui ne couvre bien évidemment pas tout l’investissement au sens comptable.

#### 1.1.1 Gross Capital Formation

L’investissement FBC est comptablement la somme de 3 éléments (Figure 25) :

$$\begin{aligned} FBC &= FBCF + \Delta S + \text{Acquisitions nettes des ventes d'objets de valeur} \\ GCF &= GFCF + \Delta S + \text{Acquisitions less disposals of valuables} \end{aligned} \quad (1)$$

*GFCF* : Gross Fixed Capital Formation ;  $\Delta S$  : changes in inventories ;

Elément le plus important est la FBCF réalisée essentiellement par les entreprises et secondairement par les ménages (investissement en logements) Figure 25. Il faut ajouter :

- les variations de stocks (changes in inventories) qui sont des B&S produits mais dont l’immobilisation est courte. L’analyse économique n’étudie pas les déterminants des stocks parce qu’ils n’ont pas d’effet à long terme sur

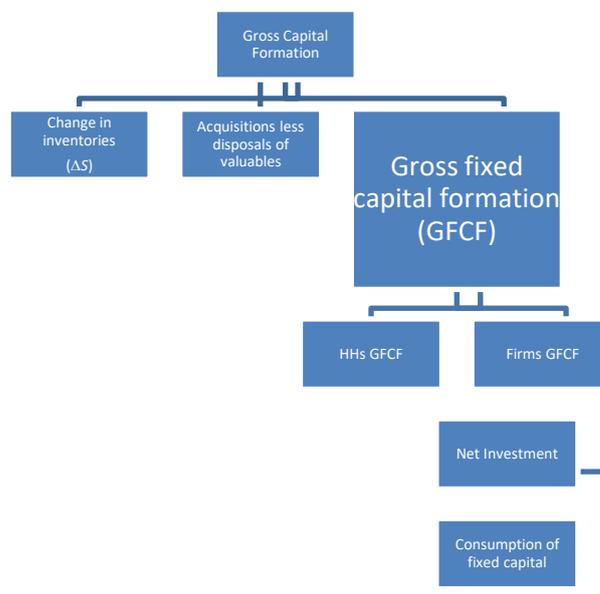
l'économie. A court terme existent cependant des raisons poussant les entreprises à détenir des stocks ;

- les objets de valeur (acquisitions less disposals of valuables) sont des actifs qui ne sont ni biens d'équipement ni des biens qui sont consommés ; ils servent de réserve de valeur (store of value). Definition 20

GFCF (Definition 19) is what determines the productive capacity of an economy, i.e., its capital stock denoted  $K(t)$ . The evolution of the total capital stock, i.e., the aggregate capital, depends on the investment decision. Investment, therefore, determines the production capacity of a company and at the aggregate level of the national economy. Be careful not to make a frequent mistake of equating investment with productive capital. Investment is a flow variable (therefore measured over a period). Capital is a stock variable (therefore measured at a particular date): the investment must be related to the change in capital.

GFCF represents a lower proportion of GDP Table 15; significant differences among countries.

**Figure 25. Gross capital formation in macroeconomic accounting**



**Table 15. Gross Capital Formation (GFC), 2016, percentages of GDP**

<i>Country Name</i>	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>	<b>2016</b>
<i>Brazil</i>	20,5	23,3	20,2	18,9	21,8	15,4
<i>China</i>	32,7	35,4	34,7	34,4	47,6	44,3
<i>India</i>	16,9	21,4	29,0	27,0	40,7	30,3
<i>France</i>	28,2	25,7	24,4	22,5	21,9	22,7
<i>Germany</i>	32,5	27,0	24,7	23,9	19,6	19,2
<i>Japan</i>	41,1	34,0	34,5	27,3	21,3	23,6
<i>United States</i>	21,4	23,3	21,5	23,6	18,4	19,7
<b>World</b>	<b>27,1</b>	<b>27,3</b>	<b>26,0</b>	<b>24,5</b>	<b>24,2</b>	<b>23,8</b>
<i>Low income</i>	..	..	15,7	16,2	22,0	25,7
<i>Middle income</i>	25,5	29,0	28,7	26,2	33,1	30,6
<i>European Union</i>	28,7	25,6	24,6	22,9	20,4	19,9

Source: World Bank Indicators, accessed Feb. 6 19. GFC: Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.

#### **Definition 19. Gross Fixed Capital Formation (GFCF) – Formation Brute de Capital Fixe (FBCF)**

“Gross fixed capital formation (GFCF) comprises fixed asset acquisitions minus disposals by resident producers. Fixed assets are **tangible or intangible** assets from production processes that are used repeatedly and continuously in other production processes **for at least one year**.”

Part of the category of capital formation that covers expenditures on produced assets that are not used primarily for production or consumption but acquired and held as stores of value. Examples of valuables are precious metals (non-monetary gold if used as a store of value) and stones, antiques and other art objects.”

Source: Insee, Eurostat, and European Central Bank. <https://www.insee.fr/en/metadonnees/definition/c1371> accessed January 24, 2022

#### **Definition 20. Acquisitions less disposals of valuables – Acquisitions nettes des ventes d’objets de valeur**

“Acquisitions less disposals of valuables (P53) are acquisitions less disposals of non-financial goods that are not used primarily for production or consumption, do not deteriorate (physically) over time under normal conditions and are acquired and held primarily as stores of value.

Valuables include the following types of goods:

- (a) precious stones and metals, such as diamonds, non-monetary gold, platinum, silver, etc.;
- (b) antiques and other art objects, such as paintings, sculptures, etc.;
- (c) other valuables, such as jewellery fashioned out of precious stones and metals and collectors’ items.”

Source: Insee. <https://www.insee.fr/en/metadonnees/definition/c2287> accessed January 24, 2022.

**Definition 21. Changes in stocks (or changes in inventories)**

“Change in stocks (P52) corresponds to the value of entry into stocks minus the value of de-stocking and current inventory losses.

Inventories consist of materials and supplies, work in progress, finished goods and goods for resale.

Current inventory losses correspond to physical deterioration, or accidental damage or pilfering.”

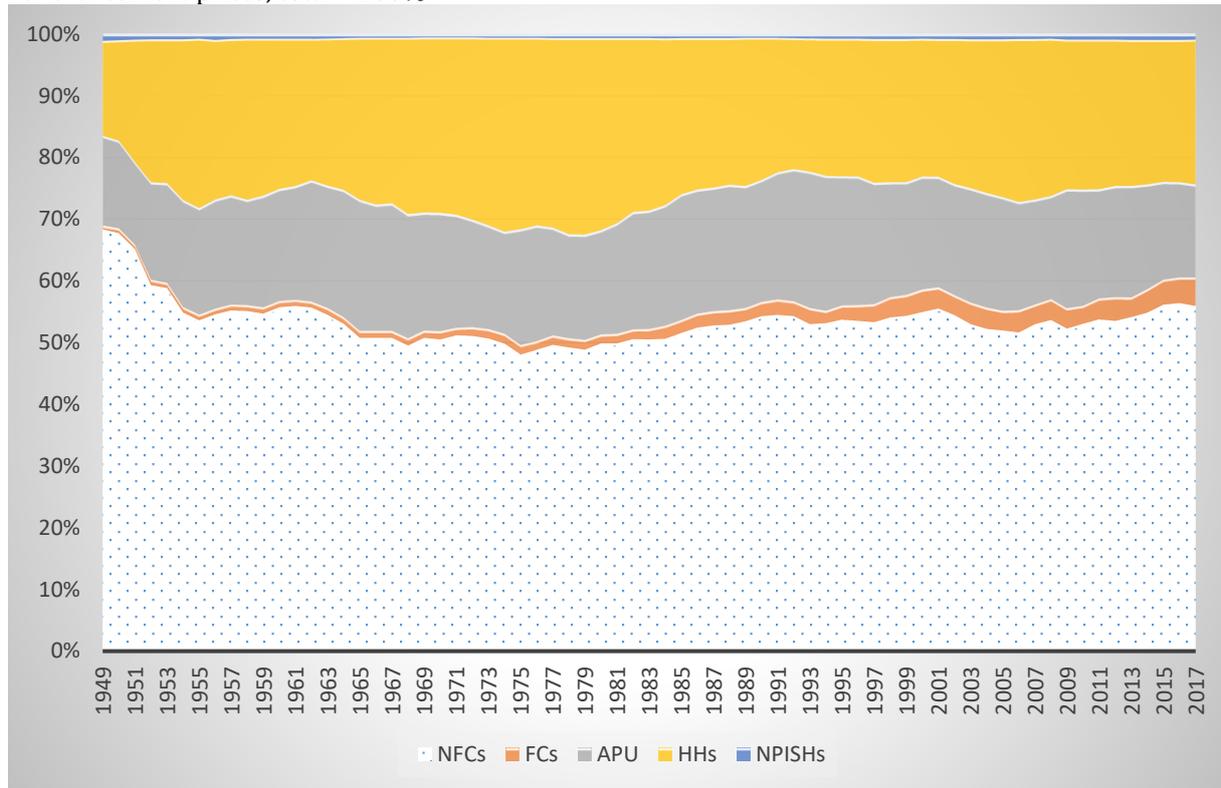
Source: Insee. <https://www.insee.fr/en/metadonnees/definition/c1989> acceded January 24, 2022.  
Pilfering: vols

1.1.2 Who invests?

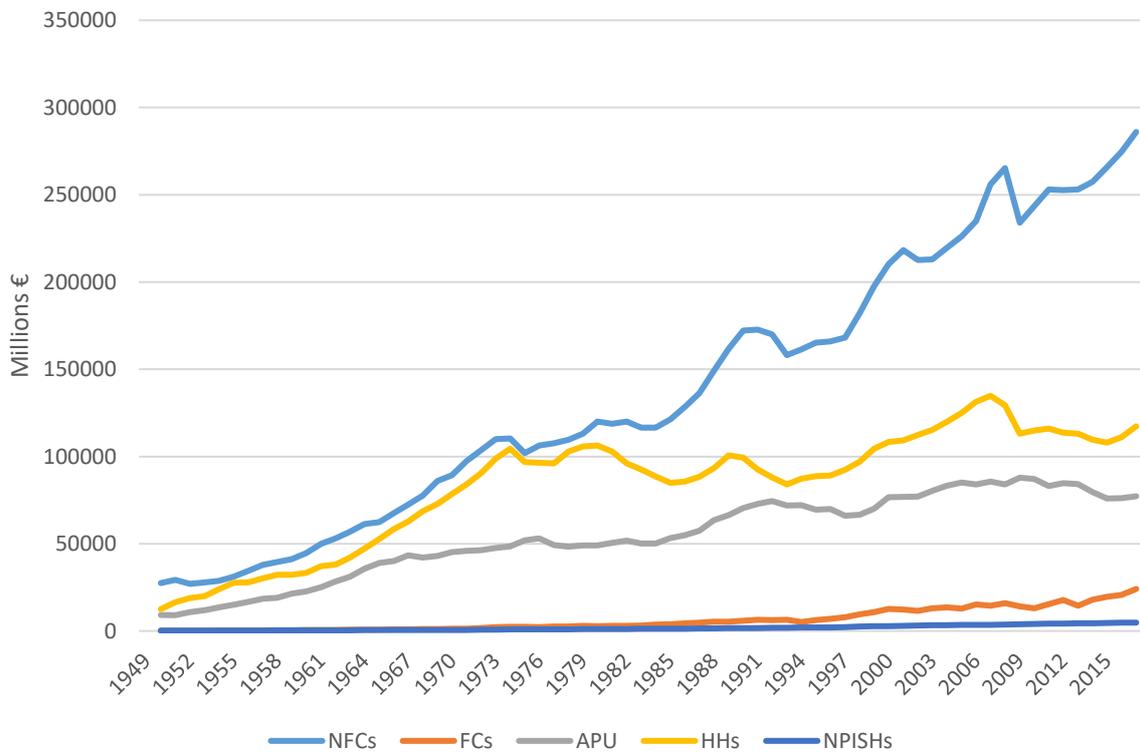
Figure 26. Companies make more than 50% of total investments as measured by GFCF. APU carry out what could be called collective I such as construction of hospitals, schools, transport infrastructure, etc., representing about 15% of the total GFCF. Households account for almost a quarter of GFCF, particularly in the form of new housing.

**Figure 26. Gross fixed capital formation (GFCF) by institutional sectors, 1949-2017**

Panel a: current prices; total = 100%



Panel b: constant prices; millions €



Source: Insee, National Accounts, Base 2014. NFCs: Non-financial corporations and sole proprietorships; FCs: Financial corporations and sole proprietorships; APU: General government; HHS: Households excluding sole proprietorships; NPISHs: Non-Profit Institutions serving HHS.

### 1.1.3 Which goods?

Produced assets only can be considered as an investment (Definition 19). Non-produced assets are excluded from GFCF. Examples of non-produced assets are patents, leases, and transferable contracts (brevets, baux et contrats cessibles intangibles), land, mineral deposits, reserves (water, fauna, flora). BUT the **cost of their transfer of ownership** (transport, installation costs) and administrative costs (lawyers' fees) appear as a separate category in GFCF.

Material fixed assets. National accountants agree that most kinds of capital goods are fixed assets. Examples: transport equipment, machinery, offices, warehouses (entrepôts), engineering works (ouvrages de genie civil). However, certain types of expenditures could either investment or intermediate consumption. Examples: expenditures on software, R&D or trademarks. How to make the difference. IC is entirely consumed during the process of production, whereas it is not the case for investment. National accounting definitions may somehow differ from business accounting. Investment in intangible assets remain underreported in the national accounts. More : (Camus, 2006; Delbecque *et al.*, 2011).

If you consider a dwelling and the land on which it is situated, GFCF includes the dwelling but excludes the land. But if there is a transfer of ownership, GFCF includes the cost of the transfer of the land (transport if any or installation cost, lawyers' fees, taxes related to the purchase of the goods).

Intangible assets. Intangibles (immatériel) assets have received increasing attention. They are "identifiable non-monetary asset(s) without physical substance." Definition 22. Like other assets, they originate from spending that builds up a stock. Examples:

- Mineral exploration namely searching for oil or mineral deposits is costly
- Softwares and databases. Purchase of software or spending for in-house software. These expenditures relate to computerized information
- Literary and artistic originals (films, music, etc.)

The ESA2010 distinguishes the following different types of produced assets: "dwellings; other buildings and structures (this includes major improvements to land);

machinery and equipment (such as ships, cars, and computers); weapons systems; cultivated biological resources (trees and livestock); **costs of ownership transfer** on non-produced assets (land, contracts, leases, and licenses); R&D (Expenditure on R&D will only be treated as fixed capital formation when a high level of reliability and comparability of the estimates by the Member States has been achieved); mineral exploration and evaluation; computer software and databases; entertainment, literary or artistic originals.” See Box 19 on the implications of including R&D as investment. In France (2017), R&D expenditure amounts to about 50 billion € and nears 3% of GDP. Two thirds are from corporations. Public R&D is mainly from the CEA and the CNRS.

We observe a rapid expansion of investment in intangible assets by firms in the US, Japan, Europe. They supposedly have a significant impact on productivity. Investments in intangibles seem to have a less cyclical character than tangible investments. They better absorbed the economic crisis that started in 2008 than tangible investments. A related issue is that we can observe a growing gap between the stock-market value and the book-value (valeur comptable) of firms’ assets. The gap is biggest for companies that have most rapidly boosted spending on research and development (R&D).

#### Definition 22. Intangible assets

Intangible assets are assets that do not have a physical or financial embodiment. Termed ‘intellectual assets’ in previous OECD work, intangible assets have also been referred to as knowledge assets or intellectual capital. Much of the focus on intangibles has been on R&D, key personnel and software. But the range of intangible assets is considerably broader. One classification groups intangibles into three types: **computerised information** (such as software and databases); **innovative property** (such as scientific and nonscientific R&D, copyrights, designs, trademarks); and **economic competencies** (including brand equity, firm-specific human capital, networks joining people and institutions, organisational know-how that increases enterprise efficiency, and aspects of advertising and marketing).

Source: OECD

#### Box 19. Consistency of Treatment of R&D in the National Accounts and the Balance of Payments

“Under ESA 2010, R&D expenditure is recognised as investment and is included as gross fixed capital formation in the national accounts, adding to a country’s capital stock. As a consequence, intermediate consumption does not include R&D expenditure, nor is R&D expenditure included in the calculation of gross operating surplus. On the other hand, depreciation of the capitalised R&D asset is considered an expense item when calculating net operating surplus.”

Source: Central Statistics Office (CSO) that is Ireland's national statistical office. Accessed January 31, 2022 at <https://www.cso.ie/en/releasesandpublications/in/rdnabop/consistencyoftreatmentofrdinthenationalaccountsandthebalanceofpayments/>

## 1.2 Indicators

On insistera sur la place de l'I dans la DA pour montrer que si celui-ci représente une fraction plus modeste du PIB que la DCF, il est très variable. Idée que l'on retrouvera dans la notion d'accélérateur

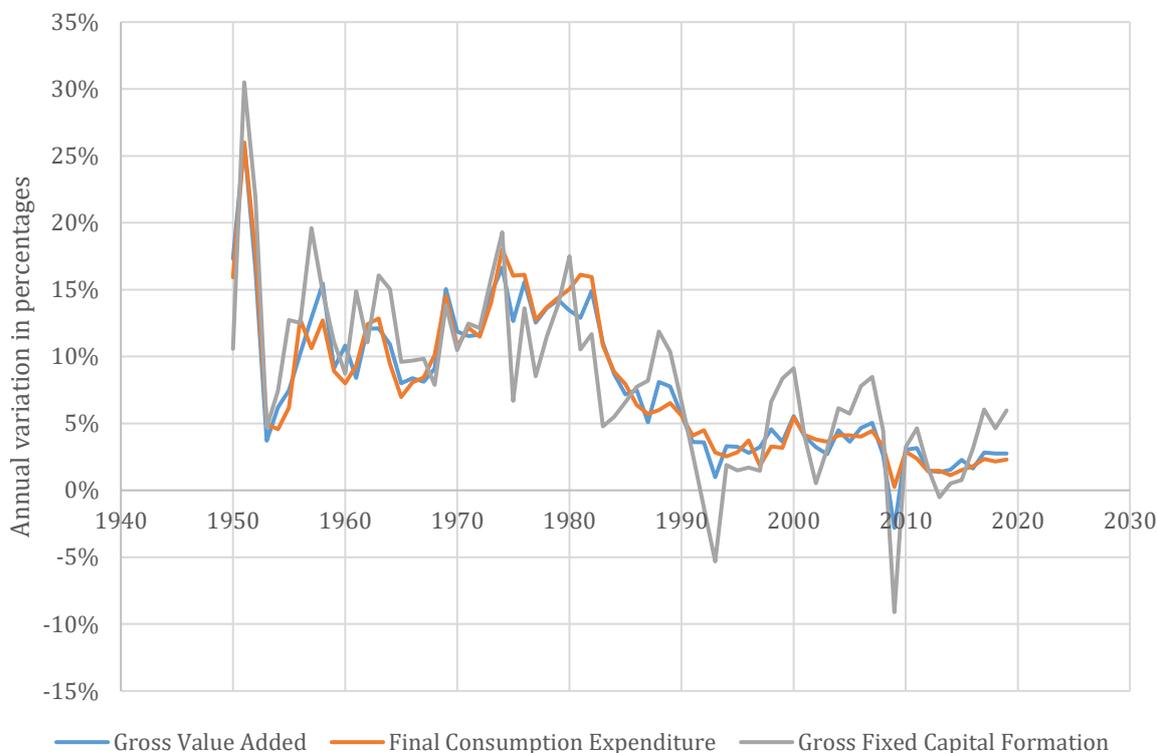
Les entreprises ont un emploi final de B&S mesuré par leur investissement (n'ont par convention pas de CF). Importance peut être mesurée en rapportant FBCF des SNF et SF au PIB. Fait stylisé important. En 2000 (2016) est de 13% (13%) contre 54% (53%) pour la dépense de CF des ménages. Correspond à une fraction du PIB largement inférieure à celle de la consommation. Investment is the most volatile component of aggregate demand. Are therefore proximate causes of GDP fluctuations ie they are source of business cycles: the variance of GFCF is far higher than the variance of final consumption expenditures. Therefore, variations in GDP are mostly the result of variations in GFCF (Figure 27).

Les données d'enquête sur l'investissement dans l'industrie confirment cette caractéristique (Figure 28) : sont présentées les taux de variation en valeur de l'I dans le secteur manufacturier et automobile. Ce dernier est sans doute le plus volatile et illustre la sensibilité du secteur industriel à la conjoncture. Autre élément important est la différence entre les anticipations d'I des entreprises et l'I qu'elles réalisent effectivement. Voir par ex les années 2009 à 2011 dans l'industrie automobile.

How to explain I volatility? In the rest of this chapter, the accelerator principle will be presented. A complementary explanation is proposed by JMK. It is related to animal spirits (Box 20). All explanations presented in this chapter are made rational i.e. they are related to objective factors. Interestingly, JMK argues that investment decisions also originate from irrational behaviours. This is currently referred as "market psychology". Investments are connected to intuitions and emotions (confidence, hope, fear, pessimism/optimism) of investors. JMK labelled this as "animal spirits". If spirits are low, Is are discouraged even if objective factors related to economic fundamentals are good. A promising activity can therefore be driven down despite good (objective) good economic indicators. On the contrary, there might be a surge in investments despite no solid objective pieces of information. Implication: trying to predict the future yield of economic activities "amounts to little and sometimes to nothing" (le calcul du rendement de l'I se résume à peu de choses et parfois à rien). How to understand the emphasis put on animal spirits? The main reason lies in the highly uncertain environment of investment decisions.

Important to notice that animal spirits are not that bad. They can fuel financial bubbles. On the contrary, they can also bolster and boost economic activity.

**Figure 27. Annual variations in GDP, Consumption and Investment in France (1950 – 2019)**



Source : Insee, Annual macroeconomic accounts, base 2014. Original data in current €.

### Box 20. JM Keynes' animal spirits

“Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits—of a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities.”

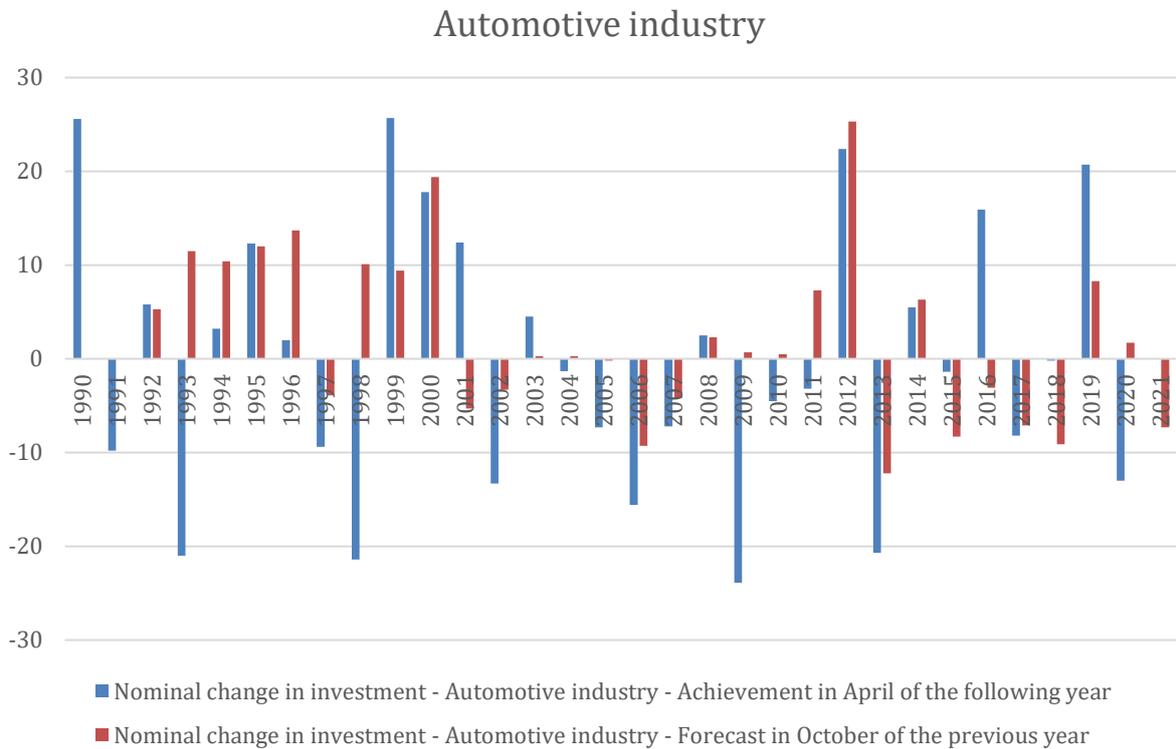
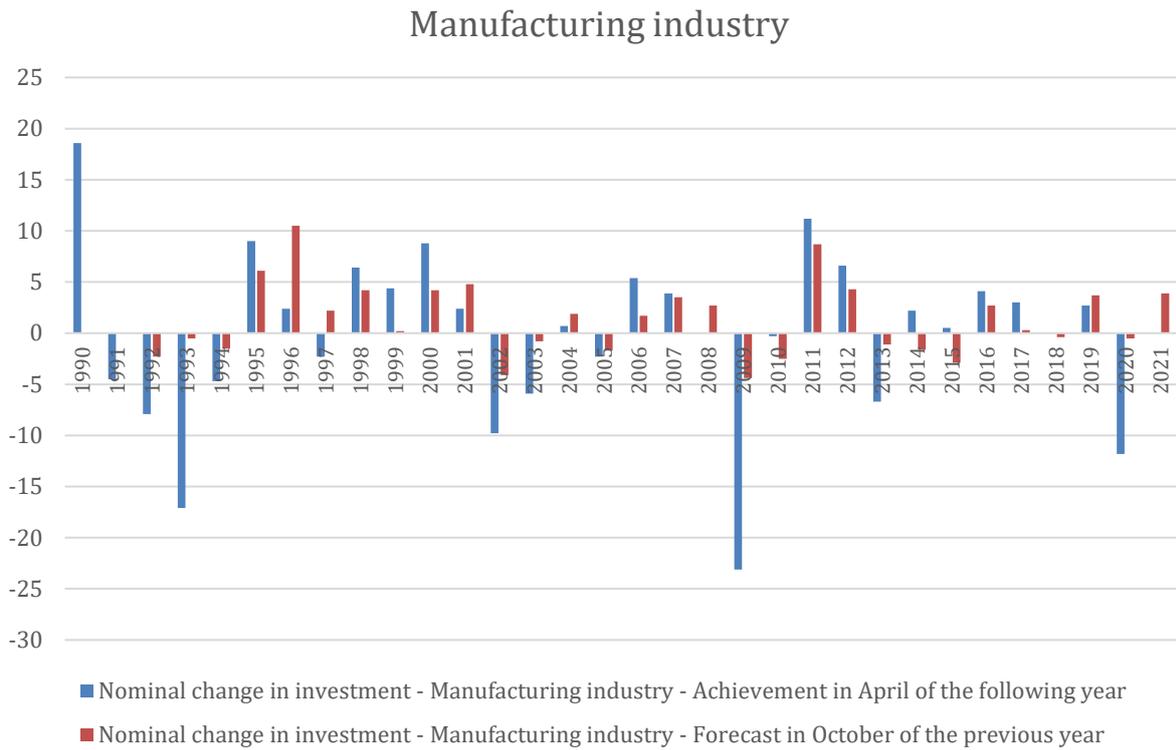
Source: Keynes, 1936 Chapter 12 The state of LR expectations

“In both Descartes' physiology and Keynes' economics, animal spirits lead people to act independently of reason or even contrary to it, and they may lead to error. However, there is a subtle difference, a sort of joke that Keynes made in his choice of the term "animal spirits." In Descartes' theory, the errors caused by animal spirits lead to regret and repentance. In Keynes's theory, they induce investment.

When placed in the broader context of Keynes' thought, animal spirits are not an ad hoc mechanism for making things go wrong. Although Keynes would have agreed that animal spirits can lead to bubbles and fads and crashes, he also argued that positive investment generally occurs because of a mistake by the investor, a mistake undertaken because of animal spirits. Keynes argued that since entrepreneurs and investors would often be immobilized if they sought to make rational economic decisions, animal spirits are needed to leapfrog rationality and bolster the economy.”

Source: (Koppl, 1991)

Figure 28. Nominal change in investment in the industry sector, France, 1992 – 2019



Source : Insee, Industrial investment survey – Accessed : <https://www.insee.fr/fr/plan-du-site/famille-bdm/102410343>

The nominal change in investment writes as  $\left(\frac{\Delta I}{I}\right)_t$ . It can be positive or negative. In year  $t$ ,  $\left(\frac{\Delta I}{I}\right)_t = \frac{I_t - I_{t-1}}{I_{t-1}}$ . This graph reports the ex post (a posteriori) values (Achievements) and ex ante (a priori) values (Forecasts).

“Achievement in April of the following year”. The reported value in 2019 (Automotive industry : 20.9) means that in April 2019, firms find a 20.9 (yearly) increase in the value of their investments in the year 2018.

“Forecast in October of the previous year”. The reported value in 2020 (Automotive industry: 1.7) means that in October 2020, firms expect a 1.7% (yearly) increase in the value of their investments in the year 2021.

### 1.3 Gross and net investment

Gross investment is total investment on capital inputs. It is the total amount that the economy spends on new capital inputs. Net investment is gross investment adjusted for capital consumption. Some new investment is needed each year to replace worn machinery. If gross investment in a given year is higher than capital consumption, then net investment will be positive and the capital stock will grow.

Investissement de remplacement (replacement investment) ou de renouvellement, sert à compenser la CCF (usure, obsolescence). Représente une grande partie de la FBCF (Figure 29). Replacement is driven by technical and economic reasons :

- technical : worn equipment goods (wear and tear: usure).
- economic : obsolescence. Equipment goods can also be useless because they are obsolete. Old equipment goods are less efficient than new ones. Or old equipment goods require increasing maintenance costs.

The available new equipment may have operating advantages over that already existing or the present equipment may be obsolete => this can lead to scrapping equipment. Economic life of equipment good is far more important than their physical life.

There is a relationship between gross, net and replacement investment:

$$\Delta K(t) \equiv K(t+1) - K(t) \equiv I(t) - \varepsilon K(t) \text{ avec } 0 < \varepsilon < 1; \quad (2)$$

$\varepsilon$  est le taux de dépréciation du capital (replacement rate or erosion rate) ; augmente quand découpage temporel augmente ;  $K(t+1) - K(t)$  est l'investissement net ;  $I(t)$  est l'investissement brut,  $\varepsilon K(t)$  est l'usure du capital productif (CCF) supposée être une fonction linéaire du capital existant. Quand obsolescence rapide ( $\varepsilon$  tend vers 1), l'investissement net peut être très différent de l'investissement brut ce qui pose un problème de mesure. Quelle valeur attribuer à  $\varepsilon$  ? Est arbitraire : 4 à 15% pour les machines, 2 à 4% pour les biens immobiliers.

**Definition 23. Fixed-capital consumption – Consommation de capital fixe**

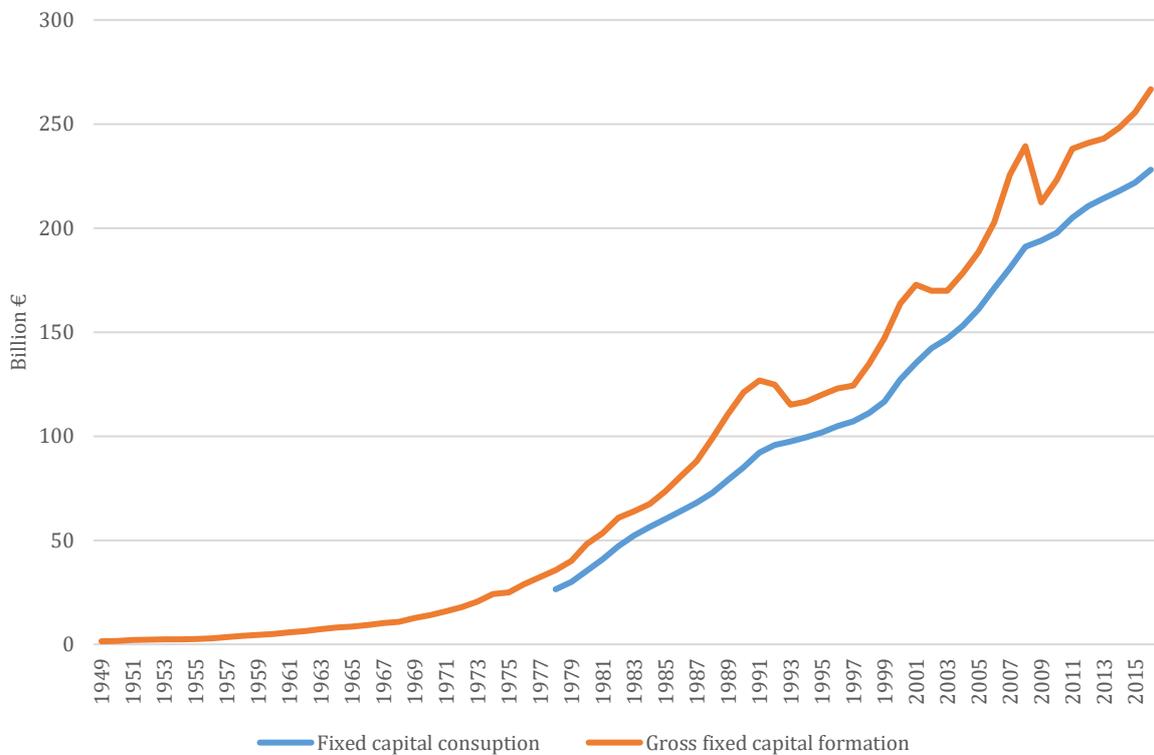
“Consumption of fixed capital (P51c) is the decline in value of fixed assets owned, as a result of normal wear and tear and obsolescence or normal accident damage.

Consumption of fixed capital covers anticipated terminal costs, such as the decommissioning costs of nuclear power stations or oil rigs or the clean-up costs of landfill sites. Such terminal costs are recorded as consumption of fixed capital at the end of the service life, when the terminal costs are recorded as gross fixed capital formation.

In the system of accounts, consumption of fixed capital is recorded below each balancing item, which is shown gross and net. Recording ‘gross’ means without deducting consumption of fixed capital, while recording ‘net’ means after deducting consumption of fixed capital.”

Source: Insee. <https://www.insee.fr/en/metadonnees/definition/c1115> accessed January 24, 2022. wear and tear: usure; oil rigs: plate-formes pétrolières; landfill site: sites de décharge de déchets

**Figure 29. Evolution of GFCF and fixed capital consumption, 1978 – 2016 in France**



Source : Insee, Macroeconomic accounts, base 2010

## 2 INVESTMENT AND AGGREGATE DEMAND: THE ACCELERATOR PRINCIPLE

Projected investment decisions are made essentially from a demand perspective: investment is decided in relation to the opportunities anticipated by companies. The opportunities are:

La consommation des ménages ;

La demande du RdM (exportations) ;

L'investissement lui-même dans le sens où la décision d'investissement induit une demande de biens d'équipement c'est-à-dire des biens servant à produire d'autres biens.

Cette optique de la demande sera complétée par une optique de l'offre qui privilégie le coût des investissements et notamment le taux d'intérêt (*cf.* paragraphe 3 p. 111).

Keynesian analysis introduces the notion of accelerator into the investment decision. Its main effect is to make the investment unstable. This acceleration effect of anticipated demand on investment is an old idea that still has an important place in contemporary economic analysis.

### 2.1 History

The precise wording is attributed to (Clark, 1917): investment reacts strongly to demand for final goods when demand cannot be met by existing production capacity. The intuition is older and is generally attributed to (Aftalion, 1909) :<sup>11</sup>

- John Maurice Clark (1883-1963) remarked that the rail wagons orders placed by the US railway companies depended on the variation in traffic (rail traffic) i. e. its "acceleration" and not on its level;
- Albert Aftalion (1874-1956) is interested in business cycles. It notes that even a moderate decrease in the AD can have two effects: (i) it gives rise to a more than proportional fall of investment, (ii) it can cause a collapse of the AD and

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<sup>11</sup> Il existe bien évidemment d'autres travaux sur le principe de l'accélérateur. (Guitton and Vitry, 1981) affirment que le premier à avoir exposé le principe n'est pas Aftalion mais un économiste allemand Mentor Bouniatian en 1907 (*Wirtschaftskrisen und Überkapitalisation*). Ces auteurs citent également les travaux de Harrod voir <http://cepa.newschool.edu/het/profiles/harrod.htm> et ceux de (Kuznets, 1935).

generate an "overproduction", a phenomenon which is relatively common in the crises of the 19th century.

Both authors underlined that investments strongly reacted to demand variations thus producing cycles. Business cycles are successions of booms and busts over time (Definition 24). The accelerator or acceleration principle is part of the broader field of economic analysis of cycles. The premises date back to the beginning of the 20th century when economists were trying to understand the cyclical crises affecting the most advanced economies. These cycles are generally analysed as periodic crises of overproduction.<sup>12</sup> Which intuition? Periodic crises are the result of investment lagging behind the development of demand as predicted by Aftalion. The consequence of this delay is that economic fluctuations are amplified. Explanation: Consumption needs change very quickly, while investment decisions to meet consumption trends are slower and are usually made late. In addition, once capital goods are installed they have lasting effects (lock-in).

Lastly, the accelerator effect could be related to Keynes' "animal spirits" (Box 20). Animal spirits lead people to behave independently of economic rationality. Animal spirits can lead investors to errors. However, instead of being frozen when seeking to make rational economic decisions, animal spirits induce investors to leapfrog rationality, decide to invest whereby bolstering the economy.

**Definition 24. The business cycle**

"Boom and bust. The long-run pattern of economic growth and recession. According to the Centre for International Business Cycle Research at Columbia University, between 1854 and 1945 the average expansion lasted 29 months and the average contraction 21 months. Since the Second World War, however, expansions have lasted almost twice as long, an average of 50 months, and contractions have shortened to an average of only 11 months. Over the years, economists have produced numerous theories of why economic activity fluctuates so much, none of them particularly convincing."

Source: The Economist, acceded Feb. 12 17 at <http://www.economist.com/economics-a-to-z/b#node-21529423>

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<sup>12</sup> The crisis of the 1930s will initially be analysed as a similar phenomenon. The unusual length and depth of the crisis will provide the context for the Keynesian revolution.

## 2.2 Modelling

Exogenous variable: the demand for finished products; endogenous variable: the so-called induced investment which comes under the acceleration principle.

Basic hypothesis. Modelling the accelerator principle relies on the capital output-ratio (coefficient de capital) (Definition 25). This ratio is assumed to be a constant. This assumption is made after Kaldor. Kaldor (1961) Kaldor (1961) remarks that the capital-output ratio changes little over time i.e. is stationary or constant. As a consequence, aggregate capital and output have a similar trend. The K/Y ratios were very different a century ago, but seem to be converging towards a similar level (Table 16).<sup>13</sup>

Notations, first in levels then in variations:

$$v \equiv \frac{K}{Y}$$

Basic idea is to transform this capital output ratio into a relationship between capital needed for production purposes over period  $t$  is related to expected profits or sales.  $Y^e(t)$  is expected sales or profits (like VA) at the beginning of period  $t$ :

$$K(t) = vY^e(t)$$

Under the assumption of fixed capital-output ratio, one obtains:

$$\Delta K(t) = v\Delta Y^e(t)$$

With  $Y^e(t)$  the expected demand / output and  $\Delta K(t)$  the net investment. Gross investment is net investment augmented by replacement investment:

$$I(t) \equiv \Delta K(t) + \varepsilon K(t)$$

Replacement demand stands for capital goods demand due to obsolescence. It is assumed that replacement investment is proportional to the stock of capital, with  $\varepsilon$  taking values between 0 and 1. Gross investment therefore writes as:

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<sup>13</sup> Explications : insuffisance il y a un siècle du capital agrégé dans des pays (Japon, Royaume-Uni) qui ont ensuite rétabli l'équilibre ; conséquence de la lenteur de l'accumulation de capital productif : équilibre économique atteint à long terme i.e. économies atteignent lentement des situations où croissent à taux constant. Plus de développements : (Rainelli, 1968)

$$I = v\Delta Y^e + \varepsilon K$$

$\Delta Y^e$  the variation in the expected demand. The only way for firms and businesses to meet an anticipated increase in demand is to increase their production capacity. Since  $v > 1$ , aggregate demand variations turn into more important variations in investment namely an investment acceleration. Investment is therefore more unstable than GDP because it is based on expectations about the future (Definition 26). This is the simple accelerator. Sophisticated versions account for delays, existing stocks of produced goods, etc. See for instance the flexible accelerator (Definition 26).

**Table 16. Capital output ratios  $K/Y$  for several countries**

	1913	1950	1973	1992	2008
Germany	na	1,6	1,6	2,3	2,7
France	na	1,8	1,9	2,3	2,5
Japan	0,9	1,8	1,7	3,0	3,7
UK	0,8	0,8	1,3	1,8	2,1
USA	3,3	2,5	2,4	2,4	3,0

Source : (Burda and Wyplosz, 2014, p. 58)

**Definition 25. Capital-output ratio  $K/Y$  and incremental capital-output ratio (ICOR)  $\Delta K/\Delta Y$**

The coefficient of capital is “[t]he ratio of capital used to produce an output over a period of time. This ratio has a tendency to be high when capital is cheap as compared to other inputs. For instance, a country with abundant natural resources can use its resources in lieu of capital to boost its output, hence the resulting capital output ratio is low.”

Source: [http://www.investorwords.com/15287/capital\\_output\\_ratio.html#ixzz4YDr6Stq2](http://www.investorwords.com/15287/capital_output_ratio.html#ixzz4YDr6Stq2)

The incremental capital-output ratio (ICOR) assesses the investment necessary for a corporation to increase an additional unit of output. If it is assumed the capital output-ratio is constant, then the ICOR is also a constant.

### Definition 26. Acceleration principle

“The acceleration principle holds that the demand for capital goods is a derived demand and that changes in the demand for output lead to changes in the demand for capital stock and, hence, lead to investment. The flexible accelerator, which includes both demand and supply elements, allows for lags in the adjustment of the actual capital stock towards the optimal level. The principle neglects technological change but has been used successfully in explaining investment behaviour and cyclical behaviour in a capitalist economy. Almost all macroeconomic models of the economy employ some variant of it to explain aggregate investment.”

Source: The New Palgrave Dictionary of Economics. Available at: [http://www.dictionaryofeconomics.com/article?id=pde2008\\_A000014](http://www.dictionaryofeconomics.com/article?id=pde2008_A000014)

“The accelerator model provides an intuitively clear and hence very popular approach to explaining fluctuations in investment. In this model, net investment (i.e., changes in production capacity) depends on the expected change in output because a certain level of output corresponds to a desired capital stock. Under the assumption that initially the existing capital stock is not fully used, an increase in expected output will not be met by net investment (there will only be replacement investment to replace depreciated assets). Net investment becomes positive only when a company approaches full capacity and expects further increases in the demand for its products. Gross investment (depreciation + net investment) jumps: this is the acceleration effect. When expected demand no longer grows, net investment will stop.”

Source : <http://economic-research.bnpparibas.com/Views/DisplayPublication.aspx?type=document&IdPdf=29177> . Accessed January 24, 2022

## 2.3 Numerical illustration

It is assumed below that the replacement rate is 20%. Main outcome is that investment fluctuations are larger, investment peaks before demand (Figure 30). Main observations:

- Demand is the exogenous variable and investment the endogenous variable;
- Precedence of fluctuations in investment relative to anticipated demand (or product);
- The fluctuations in investment are greater than demand' ones (or product's ones).

**Table 17. Numerical illustration of the (simple) Acceleration principle– Replacement rate  $\varepsilon = 20\%$  ;  $v = 3$**

Period	Final demand $Y$ (exogenous variable)	$K = vY = 3Y$	Replacement investment $\varepsilon K = 0.2K$	Induced investment $v\Delta Y = 3\Delta Y$	Gross investment $I = v\Delta Y + \varepsilon K = 3\Delta Y + 0.2K$
1	1284	3852	770		
<b>2</b>	<b>1382</b>	<b>4146</b>	<b>829</b>	<b>293</b>	<b>1122</b>
3	1242	3727	745	-419	327
4	897	2692	538	-1035	-497
5	721	<b>2162</b>	432	-530	-98
6	1032	3097	619	935	1555
7	1660	4980	996	1883	2879
8	1991	<b>5974</b>	1195	995	2190
9	1571	4713	943	-1262	-319
10	656	1968	394	-2745	-2351
11	100	<b>300</b>	60	-1668	-1608
12	556	1668	334	1368	1702
13	1746	5239	1048	3570	4618
14	2587	7761	1552	2522	4074
15	2175	6526	1305	-1234	71

Figures are computed as follows :  $K = vY$  ; Replacement investment is  $\varepsilon K$  ; Induced investment is  $v\Delta Y$  and finally  $I = v\Delta Y + \varepsilon K$ . For example in period 2 we have:  
 $K = 3 \times 1382 = 4146$  ;  $\varepsilon K = 0.2 \times 4146 = 829.2$  ;  $v\Delta Y = (1382 - 1284) \times 3 = 98 \times 3 = 294$  ;  $I = 294 + 829 = 1123$

**Figure 30. Investment and demand fluctuations according to the accelerating principle**



## 2.4 Discussion

The accelerator principle relies on important hypotheses:

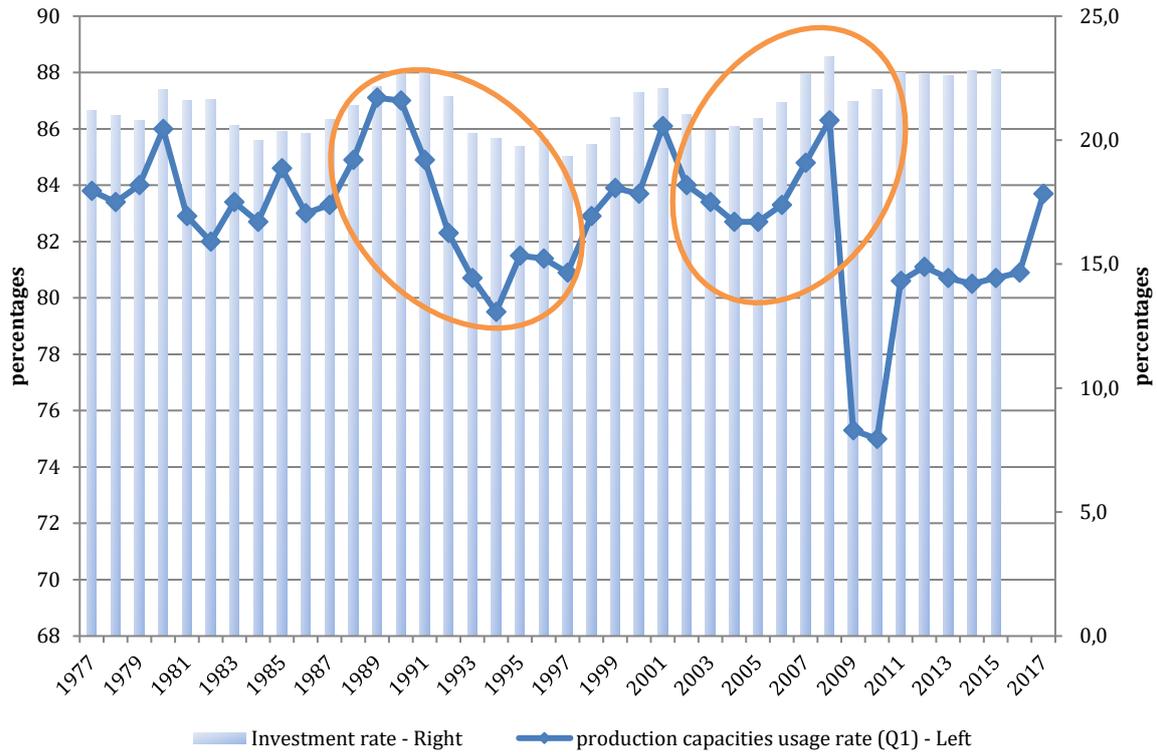
- Demand: the increase in demand is long lasting enough to justify additional investment. Prices do not change: companies respond to this increase in demand by increasing quantities, not prices of their products. This hypothesis gives the Keynesian flavor to the acceleration principle. In addition, it is assumed that the production capacity usage rate is 100% so that firms have no other choice but to increase i.e. net investment ;
- If demand decreases, one could theoretically expect a negative net investment. This is not necessarily true. Instead of having a negative investment, firms rather react by (i) reducing replacement investment or by (ii) underusing workers or (iii) underusing existing equipment goods namely decrease the production capacity usage rate (Definition 27 et Figure 31). Producers can allow some of the existing capital goods to lie idle. Csq: when the economy is moving downwards, the fall in investment reduces to the demand for replacement investment and can fall to zero. Figure 31 shows than when the rate if investment decreases (increases) we observe an decrease (increase) in the capacity usage rate.
- No constraint on labor: it is assumed that labor is available
- Firms have no stocks of produced goods; if firms want to sell more they have to produce them; they cannot rely on existing stocks;
- Firms can buy as much equipment goods they want to. There are no bottlenecks regarding buying and operating new equipment goods.

**Definition 27. Production capacity usage rate**

“The production capacity usage rate (machinery and facilities) is the ratio between the production capacities actually used for production and all the production capacities potentially available at a given date.”

Source: Insee

**Figure 31. Evolution of investment rates and utilization rate of production capacities, France, 1977-2015**



Source : Insee. Production capacities usage rate of manufacturing firms (Quarterly business survey in goods-producing industries) and investment rate of non-financial corporations (National accounts 2015, base 2010. “The production capacity usage rate (machinery and facilities) is the ratio between the production capacities actually used for production and all the production capacities potentially available at a given date.”

### 3 INVESTMENT AND THE INTEREST RATE

Tutorials: US proposes global corporate tax rate of at least 15% in international talks (OECD)

Both the Classical school and Keynesians theoretically studied the effect of the interest rate on investment. In the Keynesian view, the interest rate is called the marginal efficiency of capital. It has a negative effect on corporate investment. But the main feature is that this investment function is highly unstable (animal spirits) (para 4). The Neoclassical approach also finds that high interest rates lower investments. This section presents this analysis that draws on Jorgenson (para. 3.1).

#### 3.1 Jorgenson's reasoning (neoclassical approach)

The neoclassical model examines the benefits and costs to firms of owning capital goods. It shows how the level of investment is related to the marginal product of capital, the interest rate, and the tax rules affecting firms. (Jorgenson, 1963) derives investment demand that has microeconomic foundations. He assumes that firms maximize their profit while using capital (or equipment goods) and labor. This is the starting point of the neoclassical theory of investment. It relies on a neoclassical production function, where the ICOR is no more a constant. Two basic concepts: the desired or optimum capital stock and the user cost of capital.

##### 3.1.1 The optimal capital stock

In the initial paper, investment allows firm to hold the desired stock of capital. Jorgenson's premise is that firms try to reach an optimal capital stock that allows to maximize profits. They therefore decide to invest / disinvest in order to reach it. Let us note  $K^*$  the desired capital stock and  $K$  the current capital stock:

Firms invest when  $K < K^*$  ; on the contrary they disinvest (or do not invest) when  $K > K^*$ . The crucial point is to understand why the optimal capital stock changes:

- Changes in demand. Demand increases => firms can increase the amount of goods in order to meet this demand. They however need to expand production capacities. This pushes up the optimal capital stock;
- Changes in tax policy i.e. corporate tax. The higher the corporate tax the lower the desired capital stock and the lower the investment;

- Costs. When firms invest, they bear a cost. This cost arises from the user cost of capital. When the user cost of capital increases, the optimum stock decreases.

In the following we focus on the user cost of capital.

**Definition 28. The user cost of capital**

“The user cost of capital is the unit cost for the use of a capital asset for one period--that is, the price for employing or obtaining one unit of capital services. The user cost of capital is also referred to as the ‘rental price’ of a capital good, or the ‘capital service price’.

Source: OECD Available on line <https://stats.oecd.org/glossary/detail.asp?ID=2826>

“[...] the user cost of capital is the minimum rate of return a corporation needs on an investment to break even - that is, to cover the costs of the asset's depreciation, to pay the associated taxes on the investment, and to compensate investors for the funds they provide.”

Source: (Gale and Orszag, 2005, p. 410)

**Definition 29. The neoclassical approach to corporate investment**

“The neoclassical theory [...] states that firms will invest in an extra unit of capital to the extent that the extra output that it generates (the marginal product of capital) is at least equal to the user cost of capital. When this user cost declines, the desired capital/output ratio increases. The user cost is influenced by the level of interest rates, the depreciation rate, and taxes.”

Source: <http://economic-research.bnpparibas.com/Views/DisplayPublication.aspx?type=document&IdPdf=29177>

3.1.2 The user cost of capital

The user cost of capital is derived from an arbitrage equation that presents a trade-off between returns against costs (including opportunity costs) from investing in new capital goods. A trade-off compares two possible ways of investing money. Important to notice that the reasoning is done at the margin: the firms do not consider levels but incremental variations denoted by  $\Delta$ . DO NOT confuse the price of equipment goods denoted by  $p_k$  with the user cost of capital; the price of equipment goods is only one component of the user cost of capital.

In the following  $Y$  is the value of goods produced;  $K$  is the capital stock, and  $p_k$  is the unit price of the capital / equipment goods:

Earnings:  $\frac{\Delta Y}{\Delta K}$   
 Cost:  $rp_k \times 1 + \epsilon p_k \times 1$

First row: is the increase in production in € induced by an increase in the capital stock measured in € => no measurement unit.  $\frac{\Delta Y}{\Delta K}$  is the marginal productivity of capital it is not a constant term. It should not be confused with the average productivity. The average productivity is the inverse of the capital-output ratio that is no longer constant. This is one main difference between the neoclassical theory of investment and the accelerator principle. Note that the price of produced goods is set to one. It means that the price of produced goods is the *numeraire*. It means that the trade-off relies on real prices. Namely  $p_k = \frac{p_k}{1}$  is the price of equipment goods in relative terms namely the unit price of equipment goods relative to the price of produced goods.

Second row embeds two elements:

- $rp_k$  is the financial cost borne by the firm whenever it borrows money from the bank or misses an alternative investment. It is assumed that the financial cost is proportional to the interest rate and the unit price of capital.  $p_k$  is the price of an extra unit of capital.  $rp_k$  actually represents either the amount of (additional) financial costs borne by the firm should it borrow the money for investment purposes, or the foregone earnings had it decided to invest money in another project.
- Each equipment is subject to depreciation that incurs a cost to the firm. It is assumed that this depreciation cost is proportional to the depreciation rate. For the sake of simplicity,  $p_k$  is supposed to be constant over time. It means that there is neither  $K$  depreciation loss (moins-value) nor  $K$  appreciation or capital gain (plus-value) namely  $\Delta p_k = 0$ .

The second row simply means that the cost of renting out one machine for one year is equal to : (The rate of interest denoted by  $r$  + The rate of depreciation denoted by  $\varepsilon$ )  $\times$  The price of a new equipment. For example, if the price of the new equipment is 1,000€, the rate of interest is  $r = 5\%$  and the depreciation rate is  $\varepsilon = 10\%$ , the cost of renting out the capital is  $(0.05 + 0.10) \times 1,000 = 0.15 \times 1,000 = 150\text{€}$ .

The profit-maximizing firm equates marginal earnings and costs, which gives a no trade-off equation:

$$\frac{\Delta Y}{\Delta K} = r p_k + \varepsilon p_k = (r + \varepsilon) p_k$$

$r + \varepsilon$  is called the user cost of capital. The user cost of capital is the total cost to the firm of using one more unit of capital. Therefore, under the no trade-off equation, the profit maximizing firm' marginal productivity is 150 €. Namely, using one additional unit of capital allows it to earn an extra 150€.

If we take into account corporate taxes, the earnings decrease as follows:

$$\frac{\Delta Y}{\Delta K} (1 - \tau) = (r + \varepsilon) p_k$$

$\frac{\Delta Y}{\Delta K} (1 - \tau)$  is the marginal earnings net of corporate taxes.

$\frac{r+\varepsilon}{1-\tau} p_k$  is the tax-adjusted user cost of capital. The greater the interest rate, the depreciation rate or the corporate tax rate (and the price of the new equipment), the higher the user cost of capital. If the corporate tax is 15%, then:

$$\frac{\Delta Y}{\Delta K} (1 - \tau) = (r + \varepsilon) p_k$$

Becomes,

$$\frac{\Delta Y}{\Delta K} (1 - 0.15) = 150 \Leftrightarrow \frac{\Delta Y}{\Delta K} = \frac{150}{0.85} \cong 176.5\text{€}$$

The marginal productivity of capital is higher when a tax is implemented. The profit max firm needs to be more profitable to pay the taxes.

### 3.1.3 Sensitivity analysis

#### 3.1.3.1 The effect of the interest rate on investment

If there is an inequality, firms behavior restores the equilibrium. 2 cases:

- If  $r \uparrow$ , we have:

$$\frac{\Delta Y}{\Delta K} (1 - \tau) < (r + \varepsilon) p_k$$

Firms react by increasing production  $\Delta Y \uparrow$  or by decreasing capital  $\Delta K \downarrow$  namely investment decreases which restores the equality.

- If  $r \downarrow$ , we have:

$$\frac{\Delta Y}{\Delta K}(1 - \tau) > (r + \varepsilon)p_k$$

Firms react by decreasing production  $\Delta Y \downarrow$  or by increasing capital  $\Delta K \uparrow$  namely investment increases which restores the equality.

Discussion. Empirical evidence shows that it is often difficult to find a relationship between the interest rate and investment expenses. In addition, we could argue in favor of an ambiguous effect of the replacement rate on investment. On the one side, technical improvements may incite producers to invest for productivity purposes. But on the other side, technical progress pushes up the replacement rate and therefore the user cost of capital and at the end could have a negative effect on investment. This shows that the analysis of investment behavior based on the user cost of capital should be augmented. Other factors are worth to be taken into account.

### 3.1.3.2 Corporate taxes

- If  $\tau \uparrow$ , we have:

$$\frac{\Delta Y}{\Delta K}(1 - \tau) < (r + \varepsilon)p_k$$

Firms react by increasing production  $\Delta Y \uparrow$  or by decreasing capital  $\Delta K \downarrow$  namely investment decreases which restores the equality.

- If  $\tau \downarrow$ , we have:

$$\frac{\Delta Y}{\Delta K}(1 - \tau) > (r + \varepsilon)p_k$$

In brief, a decrease (increase) in the corporate tax rate decreases (increases) the user cost of capital and eventually increases (decreases)  $K^*$  and therefore investment. The effect can be formally established (not shown in class => see tutorials' exercise). Departing from the tax-adjusted user cost of capital:

$$\frac{r + \varepsilon}{1 - \tau} p_k$$

And calculating its partial derivative wto to  $\tau$ :<sup>14</sup>

$$\frac{\partial}{\partial \tau} \left( \frac{r + \varepsilon}{1 - \tau} p_k \right) = \frac{(r + \varepsilon)}{(1 - \tau)^2} p_k > 0$$

(Mankiw, 2010a, p. 532): “The corporate income tax is a tax on corporate profits. Throughout much of its history, the corporate tax rate in the United States was 46 percent. The rate was lowered to 34 percent in 1986 and then raised to 35 percent in 1993, and it remained at that level as of 2009, when this book was going to press”. It remains unchanged until 2017 and it was one of the highest rate in the world (Box 21). Since DJ. Trump came into office, the federal corporate tax rate is a flat 21% after an amendment approved by the US Congress (The Tax Cuts and Job Act) in January 2017. This is the lowest rate since 1939. The new US President Joe Biden has promised to raise the corporate tax rate from 21% to 28%. Important to not, that the effective tax rate i.e. that is actually paid, is much lower than the nominal rate because of tax shelters such as tax havens (paradis fiscal). See also Box 21

Figure 32 gives effective corporate tax rates in OECD countries in 2016. In 2019, receipts from corporate income taxes amounted to 230 billion USD (1.1 % of GDP) according to the Congressional Budget Office.<sup>15</sup> Ireland has one of the lowest corporate tax (12.5%). This low tax rate policy has attracted multinational headquarters in Dublin. It is interesting that, corporate tax revenues amount to more than 10% of total taxation earnings.

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<sup>14</sup> Note that this unambiguous result can be challenged. The positive relationship between the corporate income tax and the user cost can turn into a negative one when we assume revenue non-neutral variations in the corporate income tax (Gale and Orszag, 2005).

<sup>15</sup> <https://www.cbo.gov/publication/56073> acceded Feb. 16, 2021.

**Definition 30. Tax on corporate profits**

“Tax on corporate profits is defined as taxes levied on the net profits (gross income minus allowable tax reliefs) of enterprises. It also covers taxes levied on the capital gains of enterprises. This indicator relates to government as a whole (all government levels) and is measured in percentage both of GDP and of total taxation.”

“Statutory corporate income tax: Corporate income tax rate - shows the basic central government statutory (flat or top marginal) corporate income tax rate.”

Statutory means that is the tax rate imposed by law. It is often compared to the effective rate that is the rate that is actually paid. As a consequence, the effective rate is always lower than the statutory one. The main reason lies in the multiple legal ways of reducing taxes.

Source: OECD

**Box 21. In the USA, large corporations pay an effective 18.6% tax**

Before Trump's tax cut, the United States had one of the highest rates in the world. But most corporations don't pay the top rate. The 2017 effective rate was 40 percent. It included:

Federal tax rate of 35 percent for the highest income brackets.

State and local tax rates ranging from 0 percent to 12 percent. It averaged out to 7.5 percent.

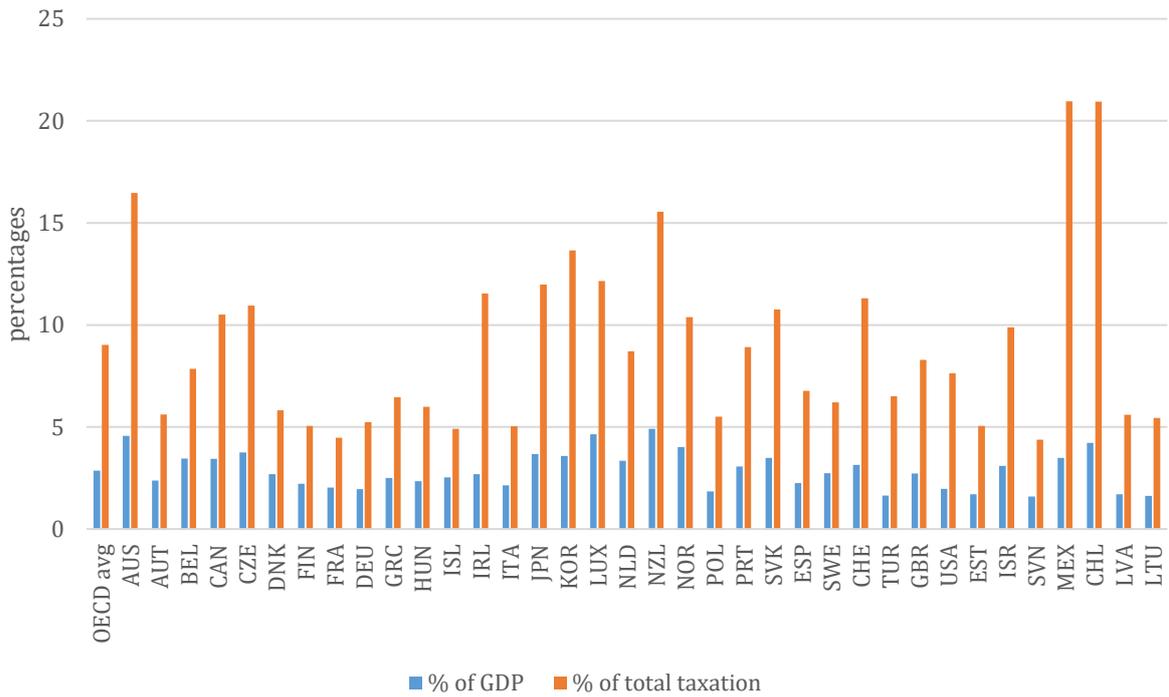
Companies deducted state and local tax expenses. That averaged out to around 40 percent.

But most large corporations never paid that much, thanks to tax attorneys who help them avoid paying more. On average, the effective rate was 18.6 percent, according to a 2017 report by the Congressional Budget Office.

Here's another way to look at it. In 2015, the Treasury Department collected \$390 billion. That's just 18 percent of U.S. corporate profits of \$2.1 trillion, according to Table 1.12 of the National Income and Products Accounts. That's about half the effective rate the government received in 2007, the year before the recession. Corporate taxes were \$395 billion on a profit of \$1.5 trillion.

Source: Amadeo, K. 2019 “US Corporate Income Tax Rate, Its History and the Effective Rate. How the Tax Act Changes Corporate Taxes”. Available at: <https://www.thebalance.com/corporate-income-tax-definition-history-effective-rate-3306024> accessed Feb. 18 19

**Figure 32. Government revenues generated by taxes on corporate profits in OECD countries, 2016**



Source: OECD, 2019, Tax on corporate profits (indicator). doi: 10.1787/d30cc412-en (Accessed on 08 February 2019). OECD: “Tax on corporate profits is defined as taxes levied on the net profits (gross income minus allowable tax reliefs) of enterprises. It also covers taxes levied on the capital gains of enterprises. This indicator relates to government as a whole (all government levels) and is measured in percentage both of GDP and of total taxation.”

## 4 CHAPTER 2 – APPENDIX

### 4.1. Marginal efficiency of capital

Formally, investment decision is based on intertemporal cash-flows associated to the purchase of one capital good:

$-I_0$   
stands for the purchase in period 0;

$Q_1, Q_2, \dots$   
Stand for positive cash-flows generated by this good. They are obviously related to expectations on future demand.

The basic idea is that the purchase generates some return. This return rate is called the marginal efficiency of capital. According to JMK: it is the “rate of discount which would make the present value of the series of annuities given by the returns expected from the capital-asset during its life just equal to its supply price.” (Box 22). Formally:

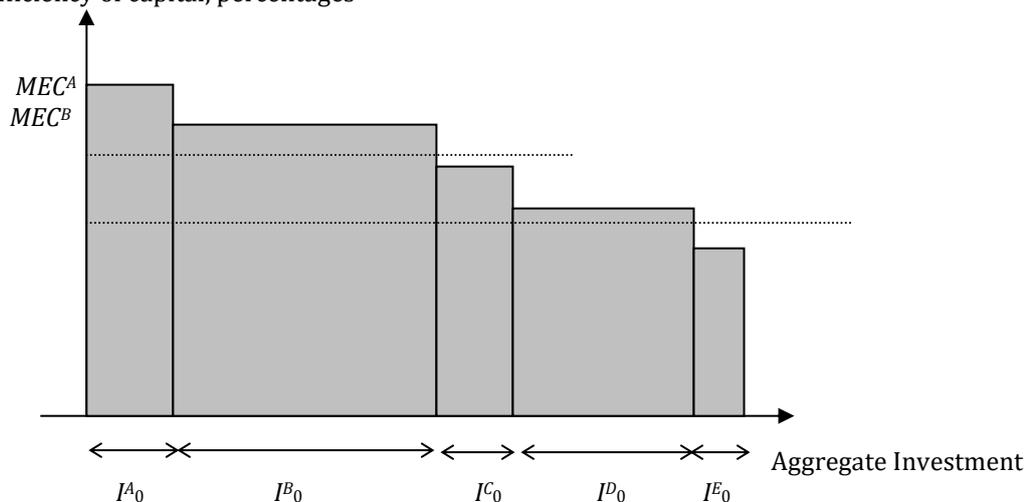
$$I_0 = \sum_{t=1}^{t=T} \frac{Q_t}{(1 + MEC)^t}$$

Then one compares the interest rate  $r$  to the  $MEC$ . Again  $r$  is the return earned from alternative investment opportunities.

#### 4.1.1 MEC and interest rate

**Figure 33. The schedule of marginal efficiency of capital**

The marginal efficiency of capital, percentages



### Box 22. The marginal efficiency of capital

When a man buys an investment or capital-asset, he purchases the right to the series of prospective returns, which he expects to obtain from selling its output, after deducting the running expenses of obtaining that output, during the life of the asset. This series of annuities  $Q_1, Q_2, \dots, Q_n$  it is convenient to call the prospective yield of the investment.

Over against the prospective yield of the investment we have the supply price of the capital-asset, meaning by this, not the market-price at which an asset of the type in question can actually be purchased in the market, but the price which would just induce a manufacturer newly to produce an additional unit of such assets, i.e. what is sometimes called its replacement cost. The relation between the prospective yield of a capital-asset and its supply price or replacement cost, i.e. the relation between the prospective yield of one more unit of that type of capital and the cost of producing that unit, furnishes us with the marginal efficiency of capital of that type. More precisely, I define the marginal efficiency of capital as being equal to that rate of discount which would make the present value of the series of annuities given by the returns expected from the capital-asset during its life just equal to its supply price. This gives us the marginal efficiencies of particular types of capital-assets. The greatest of these marginal efficiencies can then be regarded as the marginal efficiency of capital in general.

The reader should note that the marginal efficiency of capital is here defined in terms of the expectation of yield and of the current supply price of the capital-asset. It depends on the rate of return expected to be obtainable on money if it were invested in a newly produced asset; not on the historical result of what an investment has yielded on its original cost if we look back on its record after its life is over.

If there is an increased investment in any given type of capital during any period of time, the marginal efficiency of that type of capital will diminish as the investment in it is increased, partly because the prospective yield will fall as the supply of that type of capital is increased, and partly because, as a rule, pressure on the facilities for producing that type of capital will cause its supply price to increase; the second of these factors being usually the more important in producing equilibrium in the short run, but the longer the period in view the more does the first factor take its place. Thus for each type of capital we can build up a schedule, showing by how much investment in it will have to increase within the period, in order that its marginal efficiency should fall to any given figure. We can then aggregate these schedules for all the different types of capital, so as to provide a schedule relating the rate of aggregate investment to the corresponding marginal efficiency of capital in general which that rate of investment will establish. We shall call this the investment demand-schedule; or, alternatively, the schedule of the marginal efficiency of capital.

Source: Keynes GT, Book IV The Inducement to Invest.

« Quand un homme achète un bien de capital ou investissement, il achète le droit à la série de revenus escomptés qu'il espère tirer pendant la durée de ce capital de la vente de sa production, déduction faite des dépenses courantes nécessaires à obtenir ladite production. [...]

En regard du *rendement escompté* de l'investissement, nous avons le *prix d'offre* du bien de capital. Ce terme désigne, non le prix de marché auquel un capital du même type peut être en fait acheté sur le marché, mais bien le prix qui est juste suffisant pour décider un fabricant à produire une unité nouvelle supplémentaire de ce capital, c'est-à-dire ce que l'on appelle parfois son *coût de remplacement*. La relation entre le rendement escompté d'un capital et son prix d'offre ou coût de remplacement, i. e. la relation entre le rendement escompté et le coût de production d'une unité supplémentaire de ce capital, nous donne *l'efficacité marginale de ce capital*. Plus précisément nous définirons l'efficacité marginale d'un capital le *taux d'escompte* qui, appliqué à la série d'annuités constituée par les rendements escomptés de ce capital pendant son existence entière, rend la valeur actuelle des annuités égale au *prix d'offre* de ce capital. Ceci nous donne les *efficacités marginales des différents types de capital*. La plus élevée de ces efficacités marginales peut être considérée comme l'efficacité marginale du capital en général.

Le lecteur observera que l'efficacité marginale du capital est définie ici en fonction de la *prévision* de rendement d'un capital et de son *prix d'offre courant*. Elle dépend de l'importance du revenu attendu de l'argent lorsqu'on l'investit dans un capital *nouveau*, et non de la relation effective qu'après la fin de la vie d'un capital on constate rétrospectivement entre son rendement réel et son coût originel.

Lorsque l'investissement dans un type quelconque de capital s'accroît durant une certaine période, l'efficacité marginale de ce capital diminue pour deux raisons à mesure que l'investissement augmente. D'abord le rendement escompté de ce capital diminue lorsque son offre augmente. Ensuite la compétition autour des ressources servant à le produire tend normalement à faire monter son prix d'offre. C'est en général le second facteur qui dans un temps limité contribue principalement à établir l'équilibre ; mais, plus la période considérée est longue, et plus le premier tend à se substituer au second. On peut donc tracer pour chaque type de capital une courbe indiquant de combien l'investissement dans ce capital doit s'accroître au cours de la période pour que la valeur de son efficacité marginale baisse à un chiffre quelconque. On peut ensuite, en additionnant pour tous les types de capital les flux d'investissement qui correspondent à une même valeur de l'efficacité marginale, tracer la courbe reliant les divers flux globaux d'investissement aux valeurs de l'efficacité marginale qui leur correspondent. Nous appellerons cette courbe tantôt la courbe de la demande de capital tantôt la courbe de l'efficacité marginale du capital.

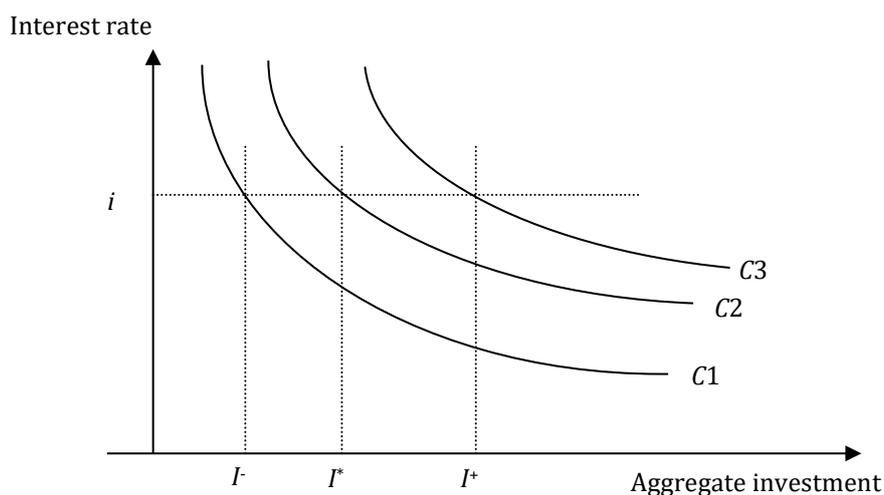
Dès lors il est évident que le flux effectif d'investissement tend à augmenter jusqu'à ce qu'il n'y ait plus aucune catégorie de capital dont l'efficacité marginale soit supérieure au taux de l'intérêt courant. En d'autres termes, l'investissement tend à grossir jusqu'à ce que sur la courbe de la demande de capital l'efficacité marginale tombe au niveau du taux d'intérêt du marché. »

Source : (Keynes, 1936b), Livre IV L'incitation à investir, paragraphe XI, L'efficacité marginale du capital. Italiques dans le texte original

« Bien qu'il n'emploie pas l'expression d' 'efficacité marginale du capital', le Professeur Irving Fisher dans sa *Theory of Interest* (1930) donne de ce qu'il appelle le 'taux de rendement par rapport au coût' une définition identique à la nôtre. 'Le taux de rendement par rapport au coût' écrit-il - 'est le taux qui, employé pour calculer la valeur actuelle de tous les coûts et la valeur actuelle de tous les rendements, rend ces deux quantités égales.' Le Professeur Fisher explique que l'extension de l'investissement dans une direction quelconque dépend de la relation existant entre le taux de l'intérêt et le taux de rendement par rapport au coût. Pour provoquer un investissement nouveau 'le taux de rendement par rapport au coût doit être supérieur au taux de l'intérêt. Cette grandeur nouvelle (ou ce facteur nouveau) introduite dans notre étude joue le rôle principal dans la partie de la théorie de l'intérêt qui a trait à l'opportunité de l'investissement'. La notion 'de taux de rendement par rapport au coût' du professeur Fisher et notre concept 'd'efficacité marginale du capital' ont donc le même sens et servent au même usage. »

Source, (Keynes, 1936b)

Figure 34. Optimism, pessimism and the investment demand-schedule



### Encadré 1. Fluctuations économiques et fluctuations de l'efficacité marginale du capital

« Il importe de comprendre l'influence des variations de la prévision sur l'efficacité marginale d'un stock donné de capital, car c'est principalement cette influence qui rend l'efficacité marginale du capital sujette à ces fluctuations d'une certaine violence qui expliquent le Cycle Économique. [...] On peut décrire et analyser l'alternance d'essor et de dépression en fonction des variations de l'efficacité marginale du capital par rapport au taux de l'intérêt. »

Source : (Keynes, 1936b), Livre IV L'incitation à investir, Chapitre XI L'efficacité marginale du capital

« The *state of confidence*, as they term it, is a matter to which practical men always pay the closest and most anxious attention. But economists have not analysed it carefully and have been content, as a rule, to discuss it in general terms. In particular it has not been made clear that its relevance to economic problems comes in through its important influence on the schedule of the marginal efficiency of capital. There are not two separate factors affecting the rate of investment, namely, the schedule of the marginal efficiency of capital and the state of confidence. The state of confidence is relevant because it is one of the major factors determining the former, which is the same thing as the investment demand-schedule. »

« **L'état de la confiance**, comme disent les hommes d'affaires, est une chose à laquelle ils prêtent toujours l'attention la plus stricte et la plus vigilante. Mais les économistes ne l'ont pas analysée avec soin et se sont contentés le plus souvent d'en disputer en termes généraux. En particulier, ils n'ont pas clairement indiqué que son importance dans les problèmes économiques vient de l'influence considérable qu'elle exerce sur la courbe de l'efficacité marginale du capital. L'état de la confiance et la courbe de l'efficacité marginale du capital ne sont pas deux facteurs distincts, agissant séparément sur le flux d'investissement. L'état de la confiance intervient parce qu'il est un des facteurs principaux qui gouvernent cette courbe, laquelle est la même que la courbe de la demande de capital. »

Source : (Keynes, 1936b), Livre IV, L'incitation à investir, Chapitre XII, L'état de la prévision à long terme

# **Second Part. Short-run macroeconomics**

First part devoted to the two pillars of aggregate demand carried out by two different categories of economic agents: households and businesses.

The last two chapters pave the road towards macroeconomic equilibrium modelling. Chapter 3 introduces to financial markets while paying attention to the money demand and money supply. This chapter provides basic concepts that are necessary to the understanding of monetary policy. Chapter 4 is dedicated to the study of macroeconomic equilibrium taking the lenses of Keynes. It is therefore an introduction to short-term macroeconomics and provides the (Keynesian) rationale of fiscal policy. Chapter 3 and chapter 4 are necessary to understand more elaborated macroeconomic modelling such as the IS-LM (or Aggregate Supply – Aggregate Demand) framework that will be extensively studied during Semester 3 and 4.

We leave aside the functioning of the labour market, or the relationship between inflation and unemployment.

# **Chapter 3. Money demand and supply (introduction to monetary policy)**

According to (Blanchard and Johnson, 2012, p. 41):

"In the short run, demand determines output. Many factors affect demand, from consumer confidence to fiscal and monetary policy".

This chapter focuses on the last aspect and is an introduction to the functioning of financial markets. Consumption and investment = physical flows of goods and services which are mirrored by monetary flows Figure 35. Need for payment means. In the following, they are described as money. Money is what can be readily used to pay for transactions or repayment of loans. Economists' use of the word does not always match the usual meaning given to it (Definition 31). There exist supply and demand of goods and services, it seems natural that it is the same for money. Main actors are HHs and Corporations. Financial markets have an influence on the general level of prices and banks (commercial and central) are the main actors. They are the main issuers of money.

Specific actors. Commercial banks are involved in the money supply. But they are key actors of financial intermediation. For instance, they take deposits and lend money = financial intermediation = a service of maturity transformation. On the one side, non-financial agents (HHs, firms) can withdraw their money from the commercial banks at any time. On the other side, commercial banks provide loans that will be repaid in the future because their customers engage in long-term investments such as buying a house, or running a business. They cannot ask the loans to be repaid earlier: they provide a service of maturity transformation that consists in taking short-term liabilities (deposits) and in holding long-term assets such as loans. The customers' deposits are liquid (free to flow out of the bank on demand) whereas bank loans to borrowers are illiquid. Com banks take a double risk: a liquidity risk related to the maturity transformation and a default risk (not be repaid). Com banks make money because they bear these risks.

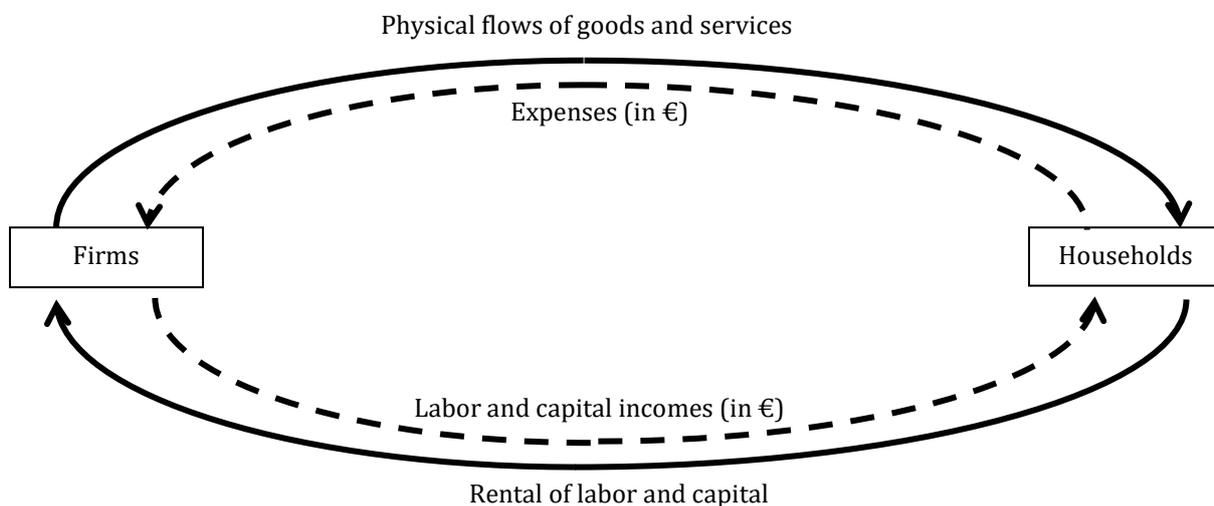
Real vs monetary sector dichotomy. Analysing money demand and supply means that we come from the real side of the economy to the financial sphere of it (Definition 32). One important assumption of Classical economists is the dichotomy of the economy.

Under that assumption, we can study "real variables" such as labour, output, real interest rates without paying attention to their nominal counterparts i.e. the nominal value of output, of wages or nominal interest rates. Therefore, real GDP is independent of the nominal money supply. Another way of qualifying the classical dichotomy is that money is neutral. Real economy is driven by relative prices only not absolute prices.

Aims of the chapter are:

- Identifying money as an economic concept (para 1). How: by defining its functions.
- Studying the demand for money from H.H.s and corporations para 2 p. 131. Economists disagree on the relative importance of motives for holding money. Classical approach of the demand for money (para 2.1 p. 132) and the Keynesian approach with focuses on the liquidity preference (para 2.2 p. 137) ;
- Introducing monetary policy that is conducted by the Central Bank (CB) para 3 p. 146.

**Figure 35. Monetary and Physical Flows of Goods and Services**



Physical flows : solid arrows ; Monetary flows : dashed arrows

### Definition 31. Money

"As the word money is used in everyday conversation, it can mean many things, but to economists, it has a very specific meaning. To avoid confusion, we must clarify how economists' use of the word money differs from conventional usage.

Economists define money (also referred to as the money supply) as **anything that is generally accepted in payment for goods or services or in the repayment of debts**. Currency, consisting of dollar bills and coins, clearly fits this definition and is one type of money. When most people talk about money, they're talking about currency (paper money and coins). If, for example, someone comes up to you and says, "Your money or your life," you should quickly hand over all your currency rather than ask, "What exactly do you mean by 'money'?"

To define money merely as currency is much too narrow for economists. Because checks are also accepted as payment for purchases, checking account deposits are considered money as well. An even broader definition of money is often needed, because other items such as savings deposits can in effect function as money if they can be quickly and easily converted into currency or checking account deposits. As you can see, there is no single, precise definition of money or the money supply, even for economists."

Source: (Mishkin, 2004, p. 44)

[money] "Makes the world go round and comes in many forms, from shells and beads to GOLD coins to plastic or paper. It is better than BARTER in enabling an economy's scarce resources to be allocated efficiently. Money has three main qualities:

- as a medium of exchange, buyers can give it to sellers to pay for goods and services;
- as a unit of account, it can be used to add up apples and oranges in some common value;
- as a store of value, it can be used to transfer purchasing power into the future.

A farmer who exchanges fruit for money can spend that money in the future; if he holds on to his fruit it might rot and no longer be useful for paying for something. INFLATION undermines the usefulness of money as a store of value, in particular, and also as a unit of account for comparing values at different points in time. HYPER-INFLATION may destroy confidence in a particular form of money even as a medium of exchange. Measures of LIQUIDITY describe how easily an ASSET can be exchanged for money (the easier this is, the more liquid is the asset)."

Source: The Economist, <http://www.economist.com/economics-a-to-z/m> accessed Feb. 24<sup>th</sup>, 17. The difference between money (monnaie) and currency (devise) is explained in Appendix Figure 47

### Definition 32. Real Economy and the Classical Dichotomy

"The part of the economy that is concerned with actually producing goods and services, as opposed to the part of the economy that is concerned with buying and selling on the financial markets"

Source: The Financial Times, <http://lexicon.ft.com/Term?term=real-economy> accessed Feb. 24<sup>th</sup>, 17.

"In a modern economy, there is an intimate link between money and activity. For a long time, however, this link seems to have been ignored in economic analysis. The so-called 'dichotomous' approach, still sometimes applied, separates the determination of the system of relative prices associated with full employment of resources from that of the general price level considered as being a function of the quantity of money available. This separation of the real from the monetary makes money merely a 'veil' behind which 'products are exchanged for products'. To this extent, money has no influence on the real economy, only on the general price level. This approach nevertheless overlooks an essential aspect of the functioning of a real economy, namely the fact that for the past several centuries money has been an inescapable intermediary in the functioning of trade, being held not only for its own sake but also because transactions have to be settled in money."

Source: (Brender, Pisani and Gagna, 2015, p. 5)

"[...] the dichotomy relates to the separation between the real sector, where relative prices are determined, and the monetary sector, where the absolute price level is determined by some version of the quantity theory of money (the Cambridge equation)."

Source: (Liviatan, 2020)

## 1 DEFINITIONS

Money is a financial asset. It is the most liquid (Definition 33). It has three basic functions of which identification dates back to Aristotle (para 1.1). One key character of money is its liquidity. Liquidity refers to the ease with which an asset can be spent. Money is therefore a peculiar asset since other assets (bonds, equities...) are less liquid: how easy assets can be "liquidated" refers to the ease with which they can be converted into cash. The liquidity characteristic of assets serves as a basis for the definition of monetary aggregates (para 1.2).

### 1.1 Money is what money does

Money is a medium of exchange, is a unit of account, and is a store of value.

Medium of exchange (intermédiaire des échanges): for buying goods and services. Money facilitates transactions, avoids barter because it is a liquid asset, Definition 33. Money is the most liquid asset Legal tender or forced tender: no one can refuse it as a means of payment. It cancels the debts and obligations related to a transaction such as a purchase of goods & services (Figure 35).<sup>16</sup> If the economy has 3 goods (peaches, economics lectures, and movies). With money, we need only 3 prices; this is not the same without

<sup>16</sup> Seule limite : la convertibilité quand on veut réaliser des achats dans un autre espace monétaire. Par exemple, en Chine jusqu'en 1995 coexistaient un marché officiel caractérisé par un taux de change fixe et un marché des changes, limité aux devises tirées des recettes d'exportation, où la monnaie évoluait en fonction de l'offre et de la demande, sous le contrôle des autorités.

money because we need to know how much peaches are worth in economic lectures, how much peaches are worth in movies and how much economic lectures are worth in movies. If the economy has 10 goods, we need 10 prices in a money economy but in a barter economy we need  $\frac{n(n-1)}{2}$  prices, i.e.  $\frac{10 \times 9}{2} = 45$  prices. This formula tells how many pairs we have when there are  $n$  items.

Unité de mesure ou unité de compte (unit of account): for pricing. The value of goods and services is measured in monetary units. Importance of this function (Mishkin, 2004, p. 46)? One curiosity. In the € zone we do not make any distinction between the name of the currency and the unit of account. This is not true in China. The name of the currency is the Renminbi while the unit of account is the yuan. Renminbi is the official name of the currency since the communist's rule. Means "the people's currency".

Réserve de valeur (store of value): for saving. Money enables the transfer of purchasing power over time. This last function is only possible if economic agents have confidence in the future value of money, particularly if they believe that inflation is not likely to erode the purchasing power of money holdings in the long term. Other assets have the same function. In addition, they often pay an interest rate whereas money does not or a low one. Why then do agents hold money? Liquidity that refers to the relative ease and speed with which an asset can be converted into a medium of exchange.

### Definition 33. The liquidity of assets

The liquidity of an asset refers to the relative ease and speed with which an asset can be converted into a medium of exchange. Money is the most liquid asset.

Source: adapted from (Mishkin, 2004, p. 47)

"How easily an ASSET can be spent, if so desired. Cash is wholly liquid. The liquidity of other assets is usually less; how much less may be measured by the ease with which they can be exchanged for cash (that is, liquidated). Public FINANCIAL MARKETS try to maximise the liquidity of assets such as BONDS and EQUITIES by providing a central meeting place (the exchange) in which would-be buyers and sellers can easily find each other. Financial market makers (middlemen such as investment BANKS) can also increase liquidity by using some of their CAPITAL to buy SECURITIES from those who want to sell, when there is no other buyer offering a decent PRICE. They do this in the expectation that if they hold the asset for a while they will be able to find somebody to buy it. Typically, the higher the volume of trades happening in a marketplace, the greater is its liquidity. Moreover, highly liquid markets attract more liquidity-seeking traders, further increasing liquidity. In a similar way, there can be vicious cycles in which liquidity dries up. The amount of liquidity in financial markets can vary enormously from one moment to the next, and can sometimes evaporate entirely, especially if market makers become too RISK AVERSE to put their capital at risk in this way."

Source: The Economist, <http://www.economist.com/economics-a-to-z/l#node-21529478> acceded Feb. 24<sup>th</sup>, 17.

## 1.2 Monetary aggregates

Those functions of money are mirrored in how money stocks are measured. Measuring the stock of money is not an easy task because money can have different forms and therefore different metrics. Modern economies: more difficult than in the past to measure the money supply, i.e. the money supply, when money was made of metal (silver or gold)

and had an intrinsic value. Today, transactions are settled by circulating debts, particularly those of deposit banks or commercial banks, i.e. those that collect household savings and provide them with their means of payment. (Grefe and Maurel, 2009, p. 580).

En Europe : triple définition de la monnaie, partant d'un agrégat étroit M1 à un agrégat large M3. En 2014, valeur de M1 s'élève à près de 6000 milliards d'euro, constituée pour majeure partie des valeurs sur les dépôts à vue pour près de 5000 milliards (Table 18). Focus on M1 which is the most the most « liquid » asset (Definition 34).

La monnaie fiduciaire = fiduciary money or fiat money. Has legal tender. Issued by the CB, which has a monopoly on issuing it, it cannot be refused for payment. It is the physical money : coins and banknotes (or paper money). It is not backed by a physical commodity such as gold but by the issuer. Most modern currencies are fiat currencies (USD, the Euro).<sup>17</sup>

La monnaie scripturale = scriptural money (bank or deposit money / checking account US / current account UK). Est aussi liquide que la précédente, est aisément convertible en monnaie fiduciaire et peut être utilisée à des fins de paiement. This money is not controlled directly by the Central Bank. It is issued by commercial banks under the supervision of the CB. Il s'agit par exemple des dépôts à vue à partir desquels on tire des chèques ou effectue des paiements par carte ou virements bancaires : sont des fonds immédiatement disponibles pour régler des transactions par un jeu d'écritures : un débit sur le compte de l'acheteur, un crédit sur le compte du vendeur. Remarque : monnaie électronique chargée sur les cartes prépayées fait également partie des dépôts, représente le stade le plus dématérialisé des transactions.

Monnaie fiduciaire + scripturale = monnaie au sens large. Correspond à l'agrégat M1

Money is different from currency (monnaie / devise). See Figure 47 in appendix p. 163

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<sup>17</sup> Pour une histoire plus détaillée de la monnaie, cf. par exemple Gerdesmeier (2009, chap.2)

**Definition 34. Monetary aggregates**

Monetary aggregates comprise monetary liabilities of Monetary Financial Institutions (MFIs) and central government (post office, treasury, etc.) vis-à-vis non-MFI euro area residents excluding central government.

M1 is the sum of currency in circulation and overnight deposits;

M2 is the sum of M1, deposits with an agreed maturity of up to two years and deposits redeemable at notice of up to three months; and

M3 is the sum of M2, repurchase agreements, money market fund shares/units and debt securities with a maturity of up to two years.

Source : European Central Bank, [https://www.ecb.europa.eu/stats/money\\_credit\\_banking/monetary\\_aggregates/html/index.en.html](https://www.ecb.europa.eu/stats/money_credit_banking/monetary_aggregates/html/index.en.html) accessed Feb. 24th, 17.

M1: A "narrow" monetary aggregate that comprises currency in circulation and overnight deposits.

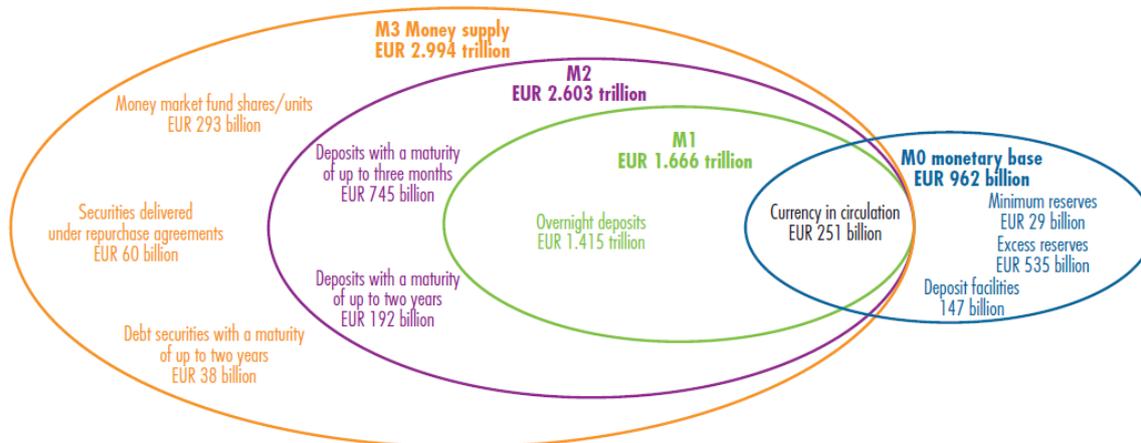
M2: An "intermediate" monetary aggregate that comprises M1 plus deposits with an agreed maturity of up to two years and deposits redeemable at notice of up to three months.

M3: A "broad" monetary aggregate that comprises M2 plus repurchase agreements, money market fund shares and units as well as debt securities with a maturity of up to two years.

Source: ECB <http://www.ecb.europa.eu/home/glossary/html/act2m.en.html#3> Redeemable: remboursable; overnight deposit: dépôt à vue

**Table 18. Monetary aggregates in France in June 2020**

(EUR billions)



Sources: Banque de France, ECB.

Source: Banque de France, available at: [https://publications.banque-france.fr/sites/default/files/medias/documents/bdf\\_234-2\\_monnaie\\_contreparties.pdf](https://publications.banque-france.fr/sites/default/files/medias/documents/bdf_234-2_monnaie_contreparties.pdf). Accessed on March, 2<sup>nd</sup> 2017. Outstandings: encours; overnight deposits: dépôts à vue; debt securities: titres de créances

**2 THE DEMAND FOR MONEY**

Studying the demand for money ≠ how much money would you wish to hold? Studying the demand for money is rather the question of which share of your wealth you want to hold in the form of money at any moment. This question is not trivial for 2 reasons:

- Holding money balances is costly. Opportunity cost is that money holders give up interest payments on less liquid assets;
- Money balances have no intrinsic value (in contrast with times when money was made of precious metals).

Following the ideas of Aristotle, economists have emphasised several functions of money. Depending on the approach, one reason is put forward with respect to other motives. Classical economists focus on the transaction motive:

- Agents hold money because they want to carry out current transactions. Main driver is income. At the aggregate level nominal GDP  $Y$  is a determinant of the money demand.

## 2.1 The classical approach: The Quantitative Theory of Money

Key principle of classical macroeconomics concerns the role of money: the quantitative theory of money (Definition 35) according to which money eases exchanges (exchange facilitator). Puts emphasis on its role as a medium of exchanges (para. 2.1.1). Then a simple equation (exchange equation) allows deriving basic propositions. First, inflation is a monetary phenomenon. Second (and more importantly), money is held because it is easy to buy things with. This is the transactions motive that echoes the exchange medium of Aristotle.

### Definition 35. The Quantitative (or Quantity) Theory of Money (QTM)

« The foundation stone of MONETARISM. The theory says that the quantity of MONEY available in an economy determines the value of money. Increases in the MONEY SUPPLY are the main cause of INFLATION. This is why Milton FRIEDMAN claimed that 'inflation is always and everywhere a monetary phenomenon'.

The theory is built on the Fisher equation,  $MV = PT$ , named after Irving Fisher (1867-1947).  $M$  is the stock of money,  $V$  is the VELOCITY OF CIRCULATION,  $P$  is the average PRICE level and  $T$  is the number of transactions in the economy. The equation says, simply and obviously, that the quantity of money spent equals the quantity of money used. The quantity theory, in its purest form, assumes that  $V$  and  $T$  are both constant, at least in the short-run. Thus any change in  $M$  leads directly to a change in  $P$ . In other words, increase the money supply and you simply cause inflation.

In the 1930s, KEYNES challenged this theory, which was orthodoxy until then. Increases in the money supply seemed to lead to a fall in the velocity of circulation and to increases in real INCOME, contradicting the classical dichotomy (see MONETARY NEUTRALITY). Later, monetarists such as Friedman conceded that  $V$  could change in response to variations in  $M$ , but did so only in stable, predictable ways that did not challenge the thrust of the theory. Even so, monetarist policies did not perform well when they were applied in many countries during the 1980s, as even Friedman has since conceded."

Source: The Economist, <http://www.economist.com/economics-a-to-z/q> accessed February 9, 2022.

"Developed by the classical economists in the nineteenth and early twentieth centuries, the quantity theory of money is a theory of how the nominal value of aggregate income is determined. Because it also tells us how much money is held for a given amount of aggregate income, it is also a theory of the demand for money. The most important feature of this theory is that it suggests that interest rates have no effect on the demand for money."

Source: (Mishkin, 2004, p. 517)

### 2.1.1 Theoretical foundations: the law of the outlets

One csq of the law of the outlets: money is neutral. Changes in the amount of money in the economy have no effect on the real economy i.e. on variables such as GDP, real interest rates or unemployment. Keystone in the supply-side economics (Reaganomics or economic policy conducted by Mrs Thatcher in the U.K.). Neutrality of money puts forward the role of money as a medium of exchanges.

Remarque. Les prémisses de la TQM remontent à la controverse entre J. Bodin (1530-1596) et Mr de Malestroit sur les causes de l'inflation suite à l'afflux de métaux précieux en Europe lors de la découverte de l'Amérique. Version moderne d'abord élaborée par I. Fisher (1867-1947, *The purchasing power of money - Le pouvoir d'achat de la monnaie*, 1911). Version moderne également élaborée par A. Marshall et A.C. Pigou connue sous le nom d'équation de Cambridge et aussi par les monétaristes parmi lesquels on retrouve Friedman.

#### Box 23. La loi des débouchés – The law of the outlets

« Il est bon de remarquer qu'un produit terminé offre, dès *cet instant*, un débouché à d'autres produits pour tout le montant de sa valeur. En effet, lorsque le dernier producteur a terminé un produit, son plus grand désir est de le vendre, pour que la valeur de ce produit ne chôme pas entre ses mains. Mais **il n'est pas moins empressé de se défaire de l'argent que lui procure sa vente**, pour que la valeur de l'argent ne chôme pas non plus. Or, on ne peut se défaire de son argent qu'en demandant à acheter un produit quelconque. **On voit donc que le fait seul de la formation d'un produit ouvre, dès l'instant même, un débouché à d'autres produits** »

Source : (Say, 1972), Livre I : de la production des richesses, Chapitre XV : des débouchés

Translation: "It is worthwhile to remark, that a product is no sooner created than it, from that instant, affords a market for other products to the full extent of its own value. ... Thus, the mere circumstance of the creation of one product immediately opens a vent for other products."

### 2.1.2 The Quantity Theory of Money Demand

Irving Fisher (1847-1947) proposes the equation of exchange. It relates nominal income to the quantity of money and velocity (Fisher, 1912) :<sup>18</sup>

$$M \times V = P \times Q$$

Notations:  $M$  is the stock of money,  $V$  is the velocity of money,  $P$  is the average price level (or the general price level) and  $Q$  is the volume of goods.  $P \times Q$  is the nominal income.

Nominal income (on the right) equals the quantity of money multiplied by the number of times that this money is spent in a given year. From this equation, we deduce that changes in the price level result solely from changes in the quantity of money.  $V$  and  $Q$  are constant; while  $M$  and  $P$  vary. The classical demand for money is an outcome of the above equation: the above identity transforms into a behavioral equation i.e. the demand for money.

#### 2.1.2.1 The Cambridge equation

After A. Marshall (1842 – 1924) and A.C. Pigou (1877-1959). Two steps. First the demand is established then equilibrium between the demand and the supply of money. From the Equation of Exchange :

$$\begin{aligned} M \times V &= P \times Q \\ M &= \frac{1}{V} \times P \times Q \end{aligned}$$

When the quantity of money held by agents equals the quantity of money demanded i.e. when the money market is in equilibrium, we can substitute  $M$  by  $M^d$  which stands for the money demand:

$$M^d = kPQ$$

With  $k \equiv \frac{1}{V}$  being a constant parameter in the short run since  $V$  is itself a constant.  $M^d$  is the endogenous (explained variable) and nominal income  $PQ$  (denoted  $Y$  hereafter) is the main explanatory variable.

---

<sup>18</sup> Cette équation fait l'objet d'une critique de JMK (Keynes, 1911).

This equation is the so-called Cambridge equation or Cambridge cash-balance theory. The QTM and the Cambridge equations establish a relationship between the quantity (volume) of goods produced, the price level, amounts of money, and the general level of prices. The QTM focuses on money supply and shows how inflation is related to the growth rate of monetary aggregates. The Cambridge equation focuses on money demand. Therefore, variables and parameters are almost the same:

$k$  is constant at least in the short run. No measurement unit (%). It is the ratio of total transactions to income and the ratio of desired money balances to total transactions;

$PQ$  is the nominal income, and  $Q$  is "predetermined" i.e. is determined by suppliers and buyers and therefore is exogenous;

For example, if the nominal income is 10€ and people wish to hold 20% of that as money, then the value of  $k$  is 0.2. Thus, the money demand is  $M^d = 0.2 \times 10 = 2\text{€}$ .

This demand for money illustrates the Classical approach according to which economic agents wish to hold money because they want to carry out exchanges. The Cambridge economists (Pigou, Marshall) argued not all money balances will be used for transactions. Instead, a portion  $k$  of money will be held for the convenience and security of having cash on hand. As such, they underline another motive of holding money related to the money being a store of value. Lastly,  $k$  also depends on payment habits and can therefore slowly evolve according to technological innovations on the means of payment.

#### 2.1.2.2 The Real Balance Effect - L'effet d'encaisses réelles (effet Pigou)<sup>19</sup>

Real balances are obtained by dividing money balances by prices :  $\frac{M}{P} = kQ$ . This allows determining the purchasing power of money i.e. the money holdings adjusted for inflation. When prices move, the equality does no longer hold and adjustment is needed.

If prices decrease, namely when deflation occurs (Definition 36):

- For any given supply of money  $M$ , a lower price level implies higher real money balances  $\frac{M}{P}$  ;
- -As agents wish to keep a constant fraction  $k$  of their income in cash, the amount of goods purchased  $Q$  will adjust upwards.

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<sup>19</sup> L'attribution à Pigou de cet effet aurait été faite à la suite de l'article de Patinkin (Courbis, 1975).

- Therefore, this effect is a channel through which falling prices can expand A.D. and lead to higher employment.

This effect is named after Pigou who pointed out in the 30s that real money balances are part of households' wealth. In that respect, Pigou emphasises money as a store of wealth. As prices fall, real money balances rise. Spending increases because consumers feel wealthier. If true, this real balance effect is a case of stabilising effects of deflation: when prices fall, the Pigou effect allows stabilising the A.D. For Pigou, this is a way of supporting aggregate demand in the presence of underemployment of production factors. This mechanism pushes the economy back towards full employment. This mechanism highlights the role of price flexibility in restoring the macroeconomic equilibrium. It contradicts the classical dichotomy.

Yet other economists are less confident in the economy's ability to correct itself. Among them JMK and other economists like Don Patinkin (1922 1995) (Patinkin, 1948; Rizzo and Herland, 2000). According to Patinkin, this mechanism does not always work / does not work satisfactorily:

- Returning to full employment may take too long a time;
- Lower prices and wages can also cause uncertainty: economic agents can wait for prices to fall further. This can fuel a wave of bankruptcies that deepen the crisis.

According to Patinkin, market mechanism are not sufficient; an active fiscal policy is needed. More generally, Patinkin disagrees with the classical dichotomy, like other Keynesian economists. Economic history gives examples whereby the Pigou effect is ineffective : the Great Depression (30s) ; the Japan's lost decade (Rubinstein, 2009), the aftermath of the 2008 2009 financial crisis in Europe.

**Definition 36. Real Balance Effect - Effet d'encaisse réelle**

"Named after Arthur Pigou (1877-1959), a sort of WEALTH EFFECT resulting from DEFLATION. A fall in the PRICE level increases the REAL VALUE of people's SAVINGS, making them feel wealthier and thus causing them to spend more. This increase in DEMAND can lead to higher employment."

Source : The Economist <http://www.economist.com/economics-a-to-z/p#node-21529509> acceded Feb. 24<sup>th</sup> 17.

Est encore appelé Effet Pigou ou plus rarement effet patrimoine. Il est « défini comme l'incidence d'un élément de la richesse (la quantité réelle de monnaie  $\frac{M}{P}$ ) sur la demande de biens » (Courbis, 1975). Pour A. C. Pigou qui est un contemporain de Keynes, l'effet d'encaisse réelle est moyen de soutenir la demande. Le mécanisme qui repose est le suivant. Lorsque la demande est insuffisante, le niveau général des prix  $P$  a tendance à baisser. Les encaisses réelles  $\frac{M}{P}$  augmentent. Cette augmentation stimule la demande de biens et services et par conséquent réoriente le niveau général des prix à la hausse. L'effet Pigou, repose sur l'hypothèse que l'équation de Cambridge est stable.

## 2.2 Keynes's Liquidity Preference Theory

According to the Classics, the demand for money is stable because crucial parameters are constant (velocity of money  $V$  or its inverse  $k$ ). This parameter reflects the reason for holding money, i.e. the carrying out of transactions that depends on the level of activity. But looking at monetary data, shows that even in the short run, velocity fluctuates too much to be reasonably considered as a constant (Figure 36). Fischer's equation of exchange is the subject of early criticism by JMK (Keynes 1911). JMK: money demand is unstable. Why? there exists a liquidity preference. Money is considered as a liquid asset. In the liquidity preference theory, emphasis is put on:

- On the monetary nature of the interest rate (Box 24). The interest rate is determined on the money market whereas the Classics consider that the interest rate is the result of the confrontation of the demand and the supply of loanable funds. Hence the real (monetary) nature of the interest rate in the classical (Keynesian) analysis. Reminder: the negative influence of the interest rate on investment does not have the same basis in the classical analysis.
- A particular motive for the demand for money is the speculative motive. The liquidity preference is the term used by JMK to describe the demand for money. The liquidity preference allows JMK to explain how monetary policy influences the interest rate and the aggregate demand. The speculation motive is not unknown to the Classics, but is deemed unimportant in relation to the demand for transactions money. Hence, the liquidity preference makes the velocity no

longer a constant. It depends on the interest rate. JMK generalises the motives for holding money:

The demand for money is driven by:

- The transaction motive. Agents hold money because they want to carry out current transactions. Main driver is income. At the aggregate level GDP  $Y$  is a determinant of the aggregate money demand (studied in para 2.1);
- The precautionary motive. Agents hold money as a cushion against an unexpected need or expense (unexpected discounted price which triggers a purchase, unexpected expense due to health hazards). Keynes believed that the amount of precautionary money cash holdings is determined primarily by the expected level of transactions; these transactions are proportional to income;
- AND the speculative motive that is the novelty that JMK brings into the analysis. Basic idea is that though money is liquid, economic agents take into account the money as a store of wealth. Speculators play on expectations on future prices of financial assets like bonds (Definition 37 and Definition 38).

Look at <https://thistimeitisdifferent.com/us-money-velocity-may-2018> to comment on the significance of a decreasing velocity of money.

In the remaining, focus on the specificity of the Keynesian analysis: para. 2.2.1 p. 140. Then we move to the generalised formulation of the demand for money: para. 2.2.2 p. 143.

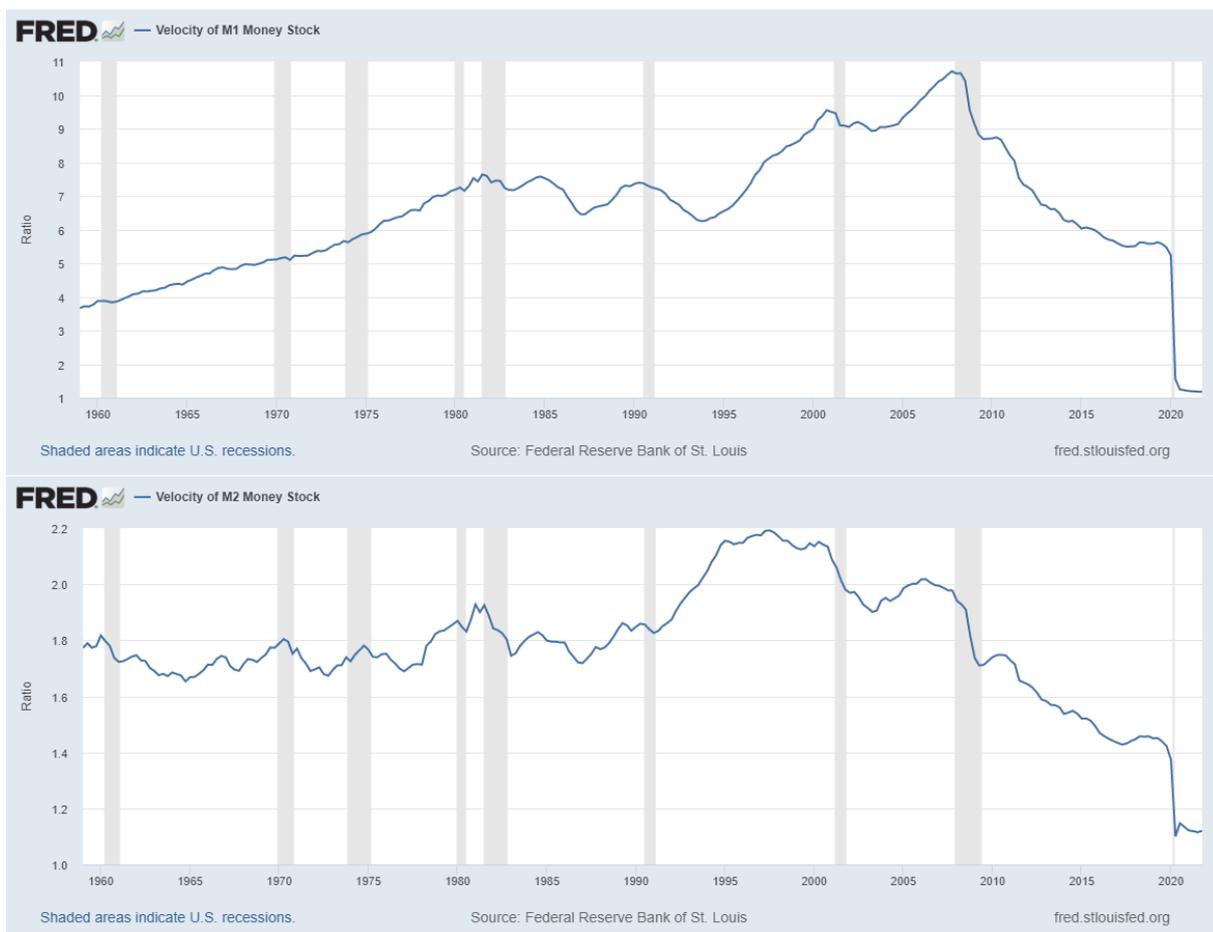
**Box 24. The role of interest rate**

"This, expressed in a very general way, is my theory of the rate of interest. The rate of interest obviously measures [...] the premium which has to be offered to induce people to hold their wealth in some other form than hoarded money. The quantity of money and the amount of it required in the active circulation of current business (mainly depending on the level of money-income) determine how much is available for inactive balances, *i.e.* for hoards. **The rate of interest is the factor which adjusts at the margin the demand for hoards to the supply of hoards.** [...] p. 216

The owner of wealth, who has been induced not to hold his wealth in the shape of hoarded money, still has two alternatives between which to choose. He can lend his money at the current rate of money-interest or he can purchase some kind of capital-asset. Clearly in equilibrium these two alternatives must offer an equal advantage to the marginal investor in each of them. This is brought about by shifts in the money-prices of capital-assets relative to the prices of money-loans. The prices of capital- assets move until, having regard to their prospective yields and account, being taken of all those elements of doubt and uncertainty interested and disinterested advice, fashion, convention, and what else you will, which affect the mind of the investor, they offer an equal, apparent advantage to the marginal investor who is wavering between one kind of investment and another [...] p. 217

Source: Keynes (1937). Note: en anglais, to hoard money signifie thésauriser

**Figure 36. Evolution of the velocity of money in the USA**



V1 (top chart) and V2 (bottom chart) are the ratio of nominal GDP to M1 and M2 respectively:  $V = \frac{PQ}{M}$ . Money velocity is "a ratio of nominal GDP to a measure of the money supply (M1 or M2). It can be thought of as the rate of turnover in the money supply--that is, the number of times one dollar is used to purchase final goods and services included in GDP." Source: Federal Reserve of Saint Louis <https://fred.stlouisfed.org/categories/32242#> acceded February 9, 2022.

### 2.2.1 Theoretical foundations: the speculative Motive

JMK rejects Say's law and consequently the neutrality of the currency. Simple idea: money is demanded for itself: economic agents demand "inactive balances" namely hoarded money. Classics know that motive but consider it as a minor motive compared to the transaction motive. JMK challenged the Classical view on the demand for money in the *Treatise on Money* and then included it in the G.T. (Keynes, 1914, 1930). The supply of money is still exogenous as with the Classics. For the first time, JMK coins the term liquidity hence the Liquidity preference theory. A new key variable in the demand for money that is the interest rate. The interest rate clears the market, namely it "adjusts the demand for hoards to the supply of hoards" (Box 24).

The speculative motive emphasises on one function of money: store of wealth. Since the return on wealth is determined by the interest rate, this motive introduces the interest rate in the demand for money. When the interest rate denoted by  $i$  is low, we observe an increase in cash holdings because there is little incentive to invest money in low-yielding assets. Basic analysis with bonds because there is a simple negative relationship between a bond's coupon, its stock price and the interest rate (Definition 38):

$$i = \frac{\text{coupon}}{\text{stock price}}$$

For example, if a bond offers a 5% coupon and its stock price is 25 €. The return namely the interest rate calculates as follows:

$$i = \frac{\text{coupon \%}}{\text{stock price €}} = \frac{5\%}{25} = 0.002 = 0.2\%$$

This is a speculation on expected future bonds' prices, which is different from an arbitrage (Definition 37). More generally, speculators balance the earnings they make on holding illiquid (financial or non-financial) assets such as bonds (shares, real estates, land) and money that is perfectly liquid.

Then JMK asks the following question: why would individuals decide to hold their wealth in the form of money rather than bonds? Interest rates are the reward earned on

bonds. At the aggregate level, the demand for money negatively depends on the interest rate  $i$ .

Detailed reasoning:

If asset prices are too high, i.e. the interest rate is low, then the operators anticipate the fall in bond prices, they no longer buy securities, they sell them. They prefer the currency whose opportunity cost is low. Traders prefer to hold wealth in liquid form when the interest rate is too low. A low interest rate leads to the constitution of money balances: the demand for money for speculative purposes is strong. Operators hold all their wealth in liquid form below a threshold interest rate level. It is undoubtedly this case that prevails nowadays.

Asset prices  $\uparrow\uparrow = i \downarrow\downarrow$  then  $\Delta^e p < 0 \Rightarrow$  sale of bonds = liquidity preference  $\Rightarrow \uparrow$  speculative demand for money. Threshold: when the interest rate is VERY low, it cannot decrease further = there is floor or minimum interest rate denoted by  $i_m \Rightarrow$  liquidity trap.

If asset prices are too low, i.e. the interest rate is high, and then the operators anticipate the increase of bond prices, they no longer want to hold money. They rather want to buy bonds. They turn aside from the money whose opportunity cost is high (opportunity cost of money = the interest rate). The demand for money for speculative purposes is weak. There is an interest rate ceiling beyond which speculative money balances falls to zero: the speculative money demand becomes inelastic namely unresponsive to the interest rate.

Asset prices  $\downarrow\downarrow = i \uparrow\uparrow$  then  $\Delta^e p > 0 \Rightarrow$  purchases of bonds = operators turn aside from money  $\Rightarrow \downarrow$  speculative demand for money. The speculative demand for money falls to 0 beyond a ceiling interest rate denoted by  $i_M$ . Namely beyond  $i_M$  the demand for money is solely a demand for transition motives.

From Keynes's reasoning, we can conclude that as interest rates rise, the price of bonds fall, agents want to the demand for money falls, and therefore money demand is negatively related to the level of interest rates (Mishkin, 2004, p. 522).

See the recapitulative Table 19.

**Definition 37. Speculation vs arbitrage**

"Speculation [...] may be defined as the purchase (or sale) of goods with a view to re-sale (re-purchase) at a later date, where the motive behind such action is the expectation of a change in the relevant prices relatively to the ruling price and not a gain accruing through their use, or any kind of transformation effected in them or their transfer between different markets. Thus, while merchants and other dealers do make purchases and sales which might be termed 'speculative,' their ordinary transactions do not fall within this category. What distinguishes speculative purchases and sales from other kinds of purchases and sales is the expectation of an impending change in the ruling market price as the sole motive of action. Hence 'speculative stocks' of anything may be defined as the difference between the amount actually held and the amount that would be held, if other things being the same, the price of that thing were expected to remain unchanged; and they can be either positive or negative."

Source : (Kaldor, 1939). See (Kaldor, 1987) for the French translation.

"Buying an asset in one market and simultaneously selling an identical asset in another market at a higher price. Sometimes these will be identical assets in different markets, for instance, shares in a company listed on both the London Stock Exchange and New York Stock Exchange. Often the assets being arbitrated will be identical in a more complicated way, for example, they will be different sorts of financial securities that are each exposed to identical risks.

Some kinds of arbitrage are completely risk-free-this is pure arbitrage. For instance, if EUROS are available more cheaply in dollars in London than in New York, arbitrageurs (also known as arbs) can make a risk-free PROFIT by buying euros in London and selling an identical amount of them in New York. Opportunities for pure arbitrage have become rare in recent years, partly because of the GLOBALISATION of FINANCIAL MARKETS. Today, a lot of so called arbitrage, much of it done by hedge funds, involves assets that have some similarities but are not identical. This is not pure arbitrage and can be far from risk free."

Source: The Economist. <https://www.economist.com/economics-a-to-z/a/node-21529935> accessed April 18<sup>th</sup>, 2020.

**Definition 38. Bond - Obligation**

"A bond is a debt investment in which an investor loans money to an entity (typically corporate or governmental) which borrows the funds for a defined period of time at a variable or fixed interest rate. Bonds are used by companies, municipalities, states and sovereign governments to raise money and finance a variety of projects and activities. Owners of bonds are debtholders, or creditors, of the issuer."

Source: Investopedia <http://www.investopedia.com/terms/b/bond.asp#ixzz4ZdPjqUVw> accessed Feb. 24<sup>th</sup>, 17.

The owner of bonds earns payments. They are determined by the coupon rate (e.g. the nominal yield) that is determined at the date of issuance. The higher the coupon rate, the higher the yield of the bond. Bonds can be traded on financial markets. Their stock price can vary according to the demand and the supply. The relationship between the nominal yield (the coupon rate), the stock price and the yield (on the right) is:  $i = \frac{\text{coupon rate}}{\text{stock price}}$

**Table 19. Summary of the influence of the interest rate on the demand for speculative money**

	The demand for speculative money is high when:	The demand for speculative money is low when:
Asset prices (bonds) are	High	Low
Interest rate is	Low (limit case: the liquidity trap)	High (demand for money no longer depends on the interest rate)

Source: own elaboration

## 2.2.2 The Money demand

Taking into account the liquidity preference gives the demand for money

### 2.2.2.1 Basic features

Reminder: the transaction and the precautionary motive of the demand for money positively depends on the volume of economic activity denoted by  $Y$ ; the speculative motive depends negatively of the interest rate denoted by  $i$ . Combining the three motives gives the demand for money. JMK made a distinction between nominal and real terms. In nominal terms, we can write:

$$M^d = kPYL(i)$$

If we focus is on the real demand for money, we rather write:

$$\frac{M^d}{P} = kQL(i)$$

This function is known as the liquidity preference function. Nowadays we simply say that this is the demand for money. Means that the demand for real money balances  $\frac{M^d}{P}$  depends negatively on the interest rate  $i$  and positively on income (in volumes) denoted by  $Q$ .

- The demand for money in real terms increases in proportion to real income. If real  $Q$  doubles then the demand for money also doubles. The effect of income on the money demand is inversely proportional to the velocity of money;
- Diminue quand le taux d'intérêt  $i$  augmente, i.e.  $L'(i) < 0$ . Traduit le motif de spéculation ; l'effet de  $i$  est négatif.

### 2.2.2.2 Graphical representation

How to represent graphically a function that depends on two variables? One possibility is to assume that one of the two explanatory variables is unchanged. The choice that is made focus on the relationship between money holdings and the interest rate while assuming that nominal income is constant (Figure 37). We have Figure 38 if we relax the assumption of a constant nominal income.

Figure 37 shows two special cases:

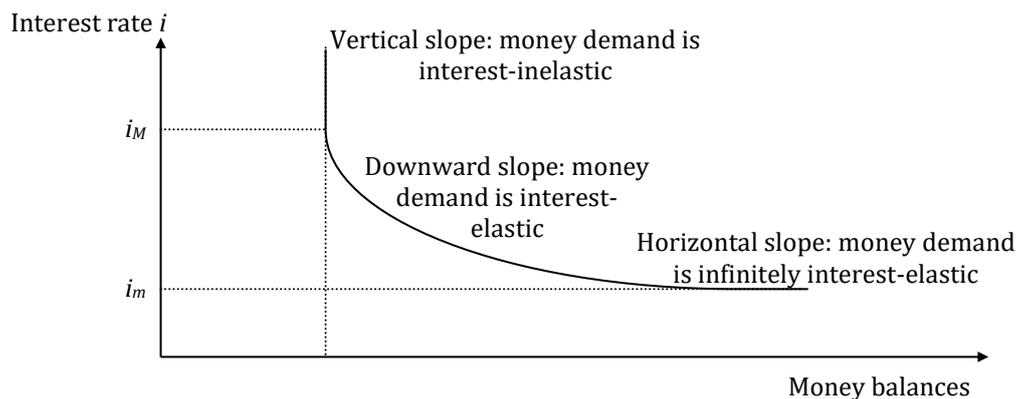
- When the interest rate exceeds  $i_M$ , the economic agents have no more speculative money holdings: their demand for money is only determined by the transaction or precautionary motive;
- When the interest rate reaches the threshold level  $i_M$  the liquidity trap opens. This phenomenon can be the cause of the failure of monetary policy.

In the general case, we have a money demand function that is made of three segments:

- A segment that is inelastic to the interest rate where the demand for money is essentially for transaction or precautionary reasons. This is the Classical case;
- A segment that is elastic to the interest rate where transaction, precaution and speculation motives jointly exist;
- A segment that infinitely interest-elastic where any increase in the money supply leads to an increase in speculative balances (liquidity trap).

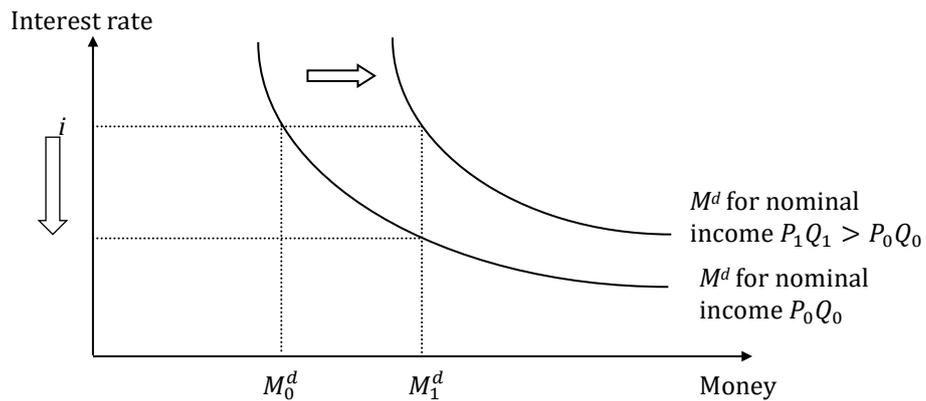
This representation of the money demand function is valid all other things being equal. Any change in the level of activity  $Y = PQ$  leads to a shift in the money demand schedule parallel to itself (Figure 38).

**Figure 37. The demand for money**



Note: the elasticity refers to the sensitivity. In that case, the interest-elasticity evidences how sensitive is the demand for money to a change in the interest rate.

**Figure 38. The demand for money – some comparative statics**



2 readings. 1) An decrease in the interest rate generates an increase in the demand for money ceteris paribus i.e. if nominal income is constant (movement **on** the graph). 2) An increase in the nominal income generates an increase in the demand for money if the interest rate is unchanged: the demand for money is shifted to the right. If nominal income  $P_1 Q_1 = 2P_0 Q_0$ , then **for the same interest rate**, the demand for money doubles:  $M_1^d = 2M_0^d$ .

### 3 AN INTRODUCTION TO MONETARY POLICY

One of the ultimate goals of a monetary policy is price stability. It is the case for the ECB (Box 25).<sup>20</sup> The mandate of the Fed is somehow different “promoting maximum employment, stable prices, and moderate long-term interest rates” (taux d’emploi maximum, stabilité des prix et taux d’intérêt à long terme modérés (Box 26)). Therefore, for the ECB, objective = control for inflation while employment and growth = secondary objectives.

An independent entity conducts monetary policy in the € zone. It began in France in the 90s: BdF became independent in 1993 and then became part of the European System of Central Banks (Système Européen de Banques Centrales). Monetary policy is no longer discretionary in the € zone. The Maastricht Treaty was signed in 1992 and entered into force in 1993.<sup>21</sup> It is the founding treaty of the European Union. It also introduced a fundamental change: staged progress towards the monetary union and the ECB.

The CB monitors the supply of money, i.e. the amount of money circulating throughout the economy. This monitoring is usually done using the interest rates (Definition 40): conventional monetary policy. The Central Bank sets the interest rate at which banks refinance (i.e. borrow) from it. Then, Commercial bank borrowing from the CB influences how Commercial banks make loans. Therefore, the interest rate on CB reserves affects a range of interest rates in the economy, including those made on loans to commercial bank customers. The CB interest rates on CB are the key rates of the CB (Figure 39). An increase (decrease) in these rates is expected to reduce (increase) inflation. The CB will set its key rates and adjust monetary policy according to the economic conditions at the time, including inflation.

The CB is the key actor of the financial system. It operates alongside (commercial) banks that can also create money (Definition 39).

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<sup>20</sup> CBs have intermediate targets that are beyond the scope of this Chapter. They are discussed e.g. in (Mishkin, 2004, chap. 21). The definition of targets was the subject of strong propositions by the Monetarists which favored monetary targets.

<sup>21</sup> France adopted it after a referendum (short victory of the "yes" 51%). See Table 23 the main steps towards the Euro.

In exceptional circumstances, when interest rates are at their lowest level and even negative, conventional monetary policy is ineffective. The CB can resort to non-conventional monetary policy. Non-conventional monetary policy consists of directly purchasing assets from Gvts or non-bank companies.

Need to understand the linkages between money supply and interventions of the central bank:

Need to have a look at T-accounts in order to locate monetary aggregates (para 3.1). The process of creating money will be looked at through accounts. Main keyword is the fractional-reserve banking system that is a system under which banks keep only a fraction of their deposits in reserve.

Then back to economic analysis in para 3.2. Confrontation de l'offre à la demande de monnaie ; analyse complétée ensuite par de la statique comparative On s'intéresse donc au résultat de la politique monétaire : la fixation du taux d'intérêt qui détermine la quantité de monnaie dans le circuit économique ;

Ensuite examen de la mise en œuvre de celle-ci, càd comment est contrôlée la masse monétaire dans l'économie. Simplified framework : we only take the role of the Central Bank i.e. the commercial bank which can also create money (para. 3.3 p. 155). Main tool under study: open market operations though the CB has other means (Definition 40).

#### **Box 25. The European Central Bank**

"The European Central Bank (ECB) is the central bank of the 19 European Union countries which have adopted the Euro. Our main task is to maintain price stability in the euro area and so preserve the purchasing power of the single currency."

Christine Lagarde is currently the President of the European Central Bank. In 2022, Euro banknotes and coins have been circulating for 20 years in the E.U.

Source : ECB, <https://www.ecb.europa.eu/ecb/orga/html/index.en.html>

#### **Box 26. The Federal Reserve Bank**

The Congress established the statutory objectives for monetary policy--maximum employment, stable prices, and moderate long-term interest rates--in the Federal Reserve Act (1913).<sup>22</sup> The Federal Reserve Act gave the Federal Reserve (FED) responsibility for setting monetary policy. Though the FED is an independent entity, it is under the supervision of the U.S. Congress (for more details see [https://www.federalreserve.gov/monetarypolicy/files/FOMC\\_LongerRunGoals.pdf](https://www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals.pdf)).

Jerome Powell is currently the Chair of the Federal Open Market Committee (FOMC). He took office on February 2018 for a four-year term.

Source: elaborated from different pages from the FED website <https://www.federalreserve.gov/aboutthefed/default.htm>.

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<sup>22</sup> The FED was created after a panic that burst in 1907. This panic is known as the 1907 Bankers' Panic or Knickerbocker Crisis.

### Definition 39. Commercial banks

"A bank is a firm that creates money in the form of bank deposits in the process of supplying credit. The terms on which banks lend to households and firms differ from their borrowing terms. The interest they pay on deposits is lower than the interest they charge when they make loans, and this allows banks to make profits."

Source: CORE <https://core-econ.org/the-economy/book/text/10.html#108-banks-money-and-the-central-bank> acceded April 17th, 2020

### Definition 40. Monetary policy

"Monetary policy concerns the decisions taken by central banks to influence the cost and availability of money in an economy.

In the euro area, the European Central Bank's most important decision in this respect normally relates to the key interest rates. Any change it makes to these rates affects in turn the interest rates commercial banks charge their customers for borrowing money. In other words, the decision influences consumer spending and business investment. In the case of the ECB, the objective of monetary policy is to keep prices stable, i.e. to keep inflation below, but close to, 2% over the medium term. This in turn helps it support general EU economic policies aiming at full employment and economic growth.

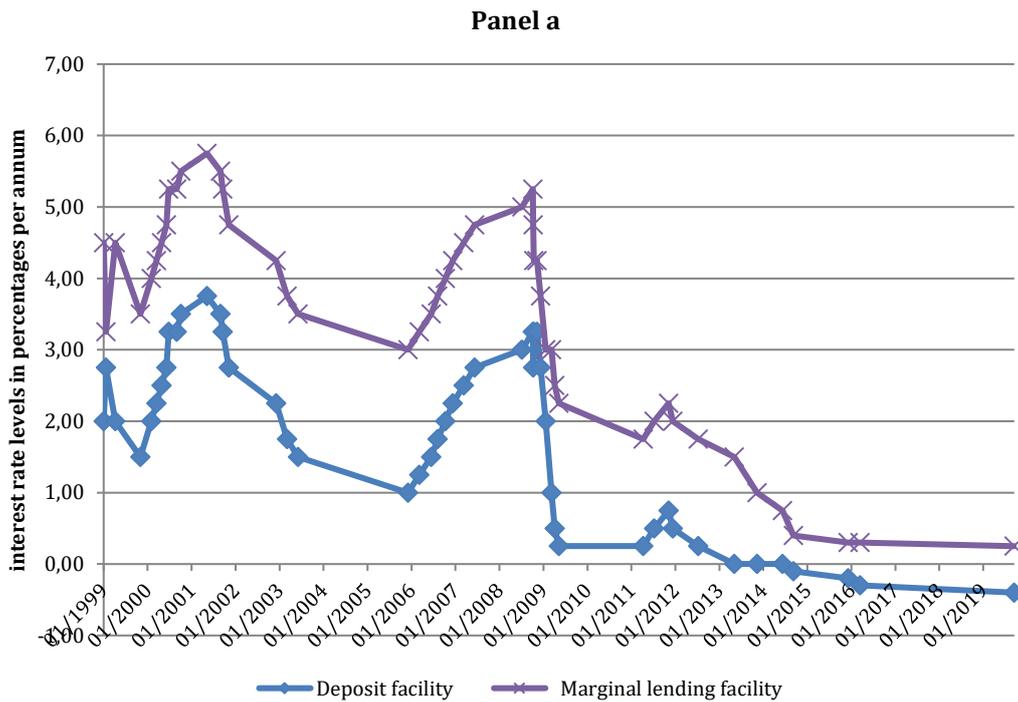
In times of prolonged low inflation and low interest rates, central banks may also adopt non-standard monetary policy measures, such as asset purchase programmes."

Source: European Central Bank <https://www.ecb.europa.eu/explainers/tell-me/html/what-is-monetary-policy.en.html>.

Monetary policy is "[w]hat a CENTRAL BANK does to control the MONEY SUPPLY, and thereby manage DEMAND. Monetary policy involves OPEN-MARKET OPERATIONS, RESERVE REQUIREMENTS and changing the short-term rate of INTEREST (the DISCOUNT RATE). It is one of the two main tools of MACROECONOMIC POLICY, the side-kick of FISCAL POLICY, and is easier said than done well."

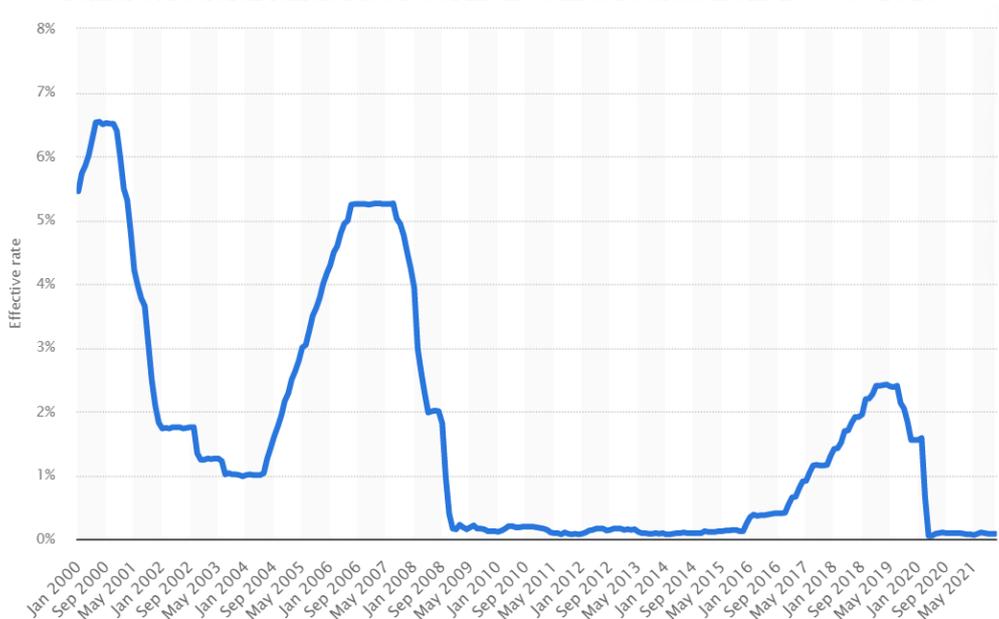
Source: the Economist. Available at: <http://www.economist.com/economics-a-to-z/m#node-21529786>.  
. Acceded Feb 26<sup>th</sup>, 2017

Figure 39. Central Banks' key interest rates



Source: Banque de France, [https://www.ecb.europa.eu/stats/policy\\_and\\_exchange\\_rates/key\\_ecb\\_interest\\_rates/html/index.en.html](https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html) updated February 9, 2022. The ECB sets 3 key interest rates: (i) The interest rate on the main refinancing operations (MRO) provides the bulk of liquidity to the banking system; (ii) The deposit facility rate (facilité de dépôt) is the interest banks receive for depositing money with the central bank overnight (24 hours). It is negative since 2014; (iii) The marginal lending facility rate (facilité de prêt marginal) is the interest rate banks pay when they borrow from the ECB overnight.

**Panel b: Federal funds rate level in the United States from 1990 to 2019**



Source : Federal Reserve and Statista <https://www-statista-com.ezproxy.uca.fr/statistics/187616/effective-rate-of-us-federal-funds-monthly/> acceded Feb. 9, 2022. "The federal funds rate is the rate at which financial institutions can borrow overnight from other depository institutions. These overnight loans are vital for banks because they ensure that the bank has constant access to cash, guaranteeing liquidity in the financial system. However, a higher rate means

banks prefer to hold their money, slowing the loans issued and causes a decrease in the money supply. While this slows the economy, it also reduces inflation."

### 3.1 Who creates money ?

<https://2012books.lardbucket.org/books/finance-banking-and-money-v2.0/index.html>

on the freezing of the CB of Russia: <https://www.euractiv.com/section/economy-jobs/news/eu-to-sanction-russian-central-bank-destabilise-the-ruble/>

T-account : The right-hand side of the balance sheet lists a bank's liabilities or the sources of its funds / The left-hand side shows the bank's assets or how the bank uses its funds. The numbers are stocks and NOT flows. Reminder: variations in liabilities are equivalent to resources and variations in assets are equivalent to uses for non-financial operations.

M1 = coins + banknotes (fiat money) + deposits. The CB is the sole emitter of banknotes. Coins and banknotes appear on the right of the CB's balance sheet that is represented by a T-account Table 20. Note that fiat money held by private agents appear on the left of their balance sheet (Table 22) and is a liability of the CB (Table 20). The private agents carrying banknotes in their wallets are creditors: banknotes represent the CB's debt to banknote holders. Similarly, a bank deposit represents the commercial bank's debt to private agents (Table 21).

Money can be created by new deposits. Deposits are under the control of private institutions i.e. commercial banks (ComB). This activity allows them to earn money (Definition 39). They do it by lending money to their customers at a higher interest rate than the one they are charged when they borrow money from other financial institutions and the CB How to describe money creation by ComB? The ComB decides to make a loan to a customer ( $\Delta$ asset); this is balanced by crediting the current account of the customer ( $\Delta$ liabilities). We can say that bank lending creates deposits. That done, ComBs increase M1 i.e. they have created money (not wealth). The more they lend the more money they earn because they charge an interest rate. In brief, when a ComB provides a loan to a private agent, it creates money. Symmetrically, when the private agent repays the loan, repayment destroys money.

But ComBs cannot lend all the deposits they have. The deposits that have not been lent out are called reserves. Reserves are put in vaults allow commercial banks to satisfy their customers willing to make withdrawals. However, reserves are mainly held at the CB Since reserves are assets of CBanks, they are liabilities of the CB (Table 20). This is fractional-reserve banking: commercial banks keep only a fraction of their deposits in reserve. See the Definition 42. Holding reserves is compulsory (required reserves), but Cbanks can also voluntarily increase their reserves: they can have excess reserves. The CB influences the reserves because they are subjected to an interest rate. In addition, when ComBs want to increase loans they made, they can borrow the money from the CB This borrowing is costly. The CB influences the amount of money throughout the economy by using reserves and by influencing the cost of funds that ComBs lend. The cost of funds is the interest rate set by the CB (Figure 39).

We can now define a new monetary aggregate that is made of reserves and banknotes and coins: M0. The CB has a direct and indirect control on it. Reason why it is called the Central Bank Money. Therefore, all future charts will describe the demand and supply of central bank money (Figure 40). An expansionary monetary policy increases the supply of Central money, which modifies the balance sheets of the Central Bank and Commercial Banks.

**Table 20. A stylised Central Bank balance sheet**

Assets	Liabilities
Foreign assets (net)	<b>Banknotes and coins (fiat money)</b>
Government balances (net)	<b>Commercial bank reserves</b>
Central bank operations (net)	
Other items (net)	Capital and reserves

**Banknotes + coins + Reserves = M0 i.e. the Central Bank money. It is also coined as the Base money or high-powered money. Commercial bank reserves are only exchanged between banks on the interbank market**

**Table 21. A stylised Commercial Bank balance sheet**

Assets	Liabilities
Reserves and cash items	Checkable Deposits (scriptural money)
Loans to private agents	Borrowings / Debts
Securities and other assets (titres)	Bank capital or Equity capital (fonds propres)

A balance sheet reports assets (actifs) and liabilities (passifs ou engagements) in a T-account. A balance sheet presents an identity : assets = liabilities + capital (fonds propres). Reserves are the most liquid assets held by commercial banks. They include vault cash, deposits at other banks and deposits at the Central Bank. Commercial banks are forced to hold a % of customers' deposits: these are required reserves.

**Table 22. A stylised private agent's balance sheet**

Assets	Liabilities
Bank account Banknotes and coins	Borrowings / Debts to commercial banks

**Definition 41. Base money or CB money**

"This is legal tender money namely it has to be accepted as payment by law. It comprises cash (notes and coins) and accounts held by commercial banks at the central bank, called commercial bank reserves. Reserves are equivalent to cash because a commercial bank can always take out reserves as cash from the central bank, and the central bank can always print any cash it needs to provide. As we will see, this is not the case with accounts held by households or businesses at commercial banks—commercial banks do not necessarily have the cash available to satisfy all their customers' needs."

Source: CORE <https://www.core-econ.org/the-economy/book/text/10.html#108-banks-money-and-the-central-bank> accessed Feb. 22, 2021.

**Definition 42. Reserves requirements: The ECB and the FRB**

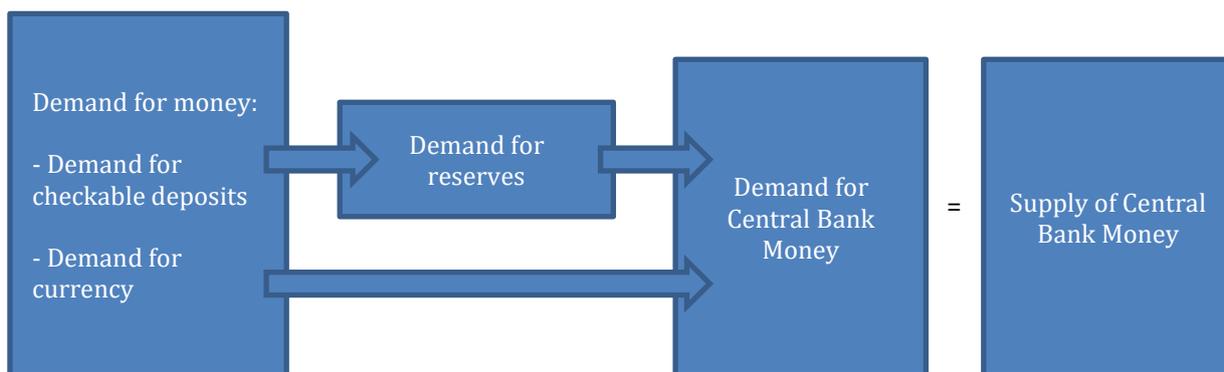
"The ECB requires credit institutions established in the euro area to hold deposits on accounts with their national central bank. These are called "minimum" or "required" reserves (MRR)"

Source: The ECB <https://www.ecb.europa.eu/mopo/implement/mr/html/index.en.html>

"Reserve requirements are the amount of funds that a depository institution must hold in reserve against specified deposit liabilities. Within limits specified by law, the Board of Governors has sole authority over changes in reserve requirements. Depository institutions must hold reserves in the form of vault cash or deposits with Federal Reserve Banks."

Source: Board of Governors of the Federal Reserve System. <https://www.federalreserve.gov/monetarypolicy/reservereq.htm>

**Figure 40. Demand and supply of Central Bank money**



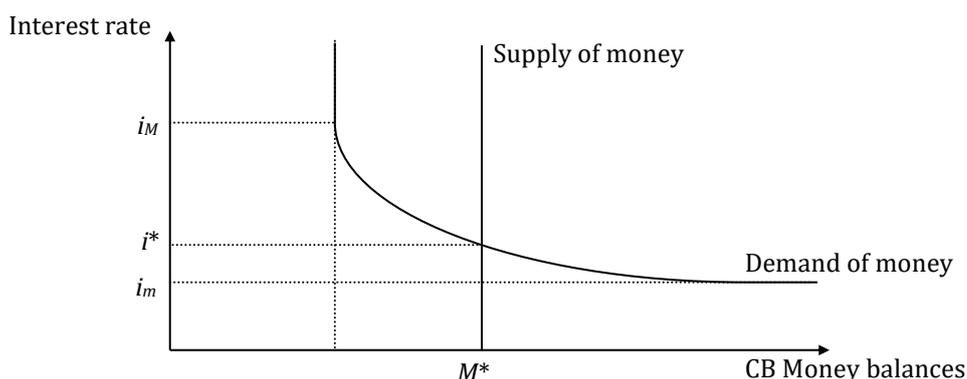
Source : (Blanchard and Johnson, 2012, p. 76)

### 3.2 The equilibrium interest rate

Describes the equilibrium on the money market, which will determine the equilibrium value of CB money. The CB chooses the money supply and at the same time, the interest rate is determined.

The demand for money is expressed by all economic agents according to the different motives identified (para 2 p. 131). It gives rise to a demand for central bank money (Figure 40). The supply of money, on the other hand, is the responsibility of monetary policy, which is steered by the CB. The outcome of monetary policy is an interest rate that determines the supply of money that is equal to the demand for money, as described by JMK (Box 24 p. 139). The interest rates set by the CB enable it to achieve the monetary policy objectives of price stability in the euro area. The equilibrium is described in Figure 41.

**Figure 41. Determination of the equilibrium interest rate**



Note: CB Money means Central Bank Money ( $M_0$ ); the interest rate stands for the interest rates as set by the Central Bank.

#### 3.2.1 Comparative statics

The interest rate determines the currency in circulation; but it is also influenced by economic activity. Hence the comparative statics that allow us to study the joint developments in the money supply and the interest rate (Figure 42) and the effect of the change in the level of activity on the equilibrium interest rate (Figure 43).

Figure 42. An increase (decrease) in the money supply (exogenous variable) leads, all other things being equal, to a decrease (increase) in the interest rate. As money becomes more abundant (scarce), its price/opportunity cost decreases (increases), all other things held equal. Reasoning: an increase in the money supply is reflected in a rightward shift in

the vertical line representing the money supply from  $M_0^s$  to  $M_1^s$ . If the interest rate remains at its initial level  $i_0^*$  then there is an excess supply compared to the demand of money. To restore the balance between supply and demand, the demand for money must increase. The demand for speculative money must increase under unchanged economic conditions that leave the demand for transaction money unchanged. This can be achieved by lowering the interest rate to  $i_1^*$ . A monetary policy aimed at increasing the means of payment in the economy i.e. an expansionary monetary policy contributes to a fall in the equilibrium interest rate.

**Figure 42. The effect of an expansionary monetary policy on the equilibrium interest rate**

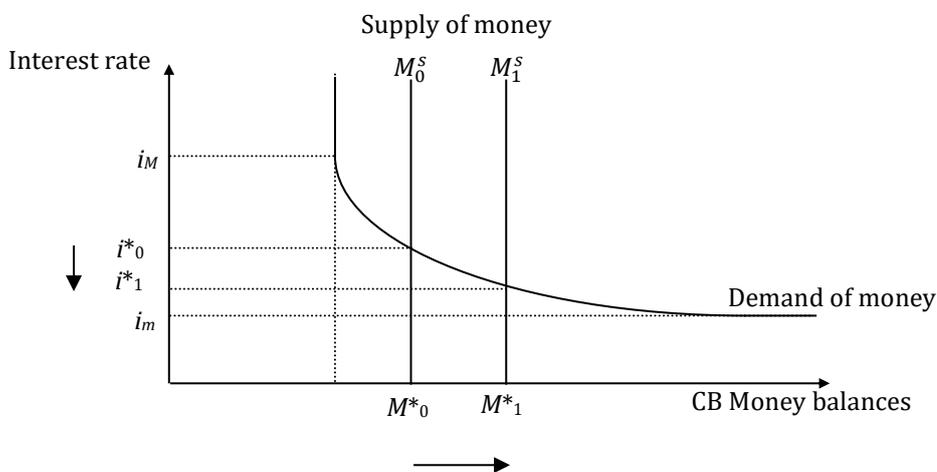
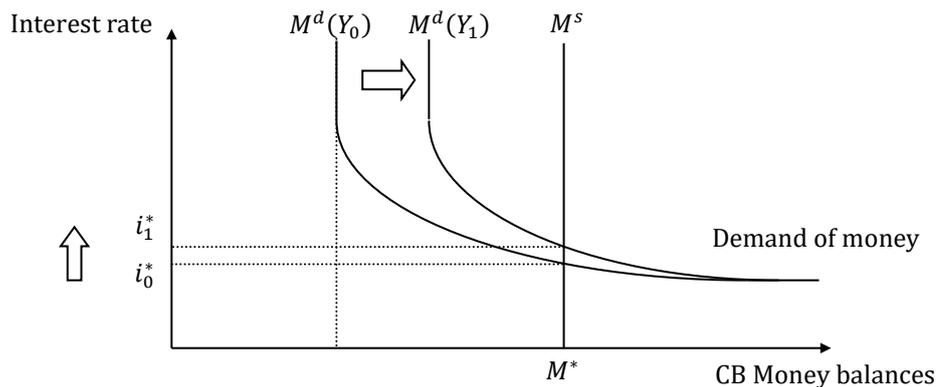


Figure 43. Déjà vu Figure 38 but without the money supply. An increase in nominal income from  $Q_0$  to  $Q_1$  leads to an increase in the equilibrium interest rate with an unchanged money supply. Reasoning: an increase in income leads to an increase in transactions and, therefore, to an increase in the demand for transactions money regardless of the level of the interest rate. With an unchanged money supply, there is an excess demand for money. This excess can be absorbed by a fall in the demand for speculative money. Knowing the negative effect of the interest rate on the demand for speculative money, the fall in the demand for speculative money can only be achieved by a rise in the equilibrium interest rate.

Sous réserve. Interprétation en termes de la relation LM : une hausse du revenu entraîne une hausse du taux d'intérêt toutes choses égales par ailleurs, notamment à offre de monnaie inchangée ; une baisse du revenu entraîne une baisse du taux d'intérêt sur le marché de la monnaie. Illustration : en période d'activité ralentie, la demande de monnaie de transaction diminue. A offre de monnaie inchangée il existe une insuffisance de la

demande de monnaie, la demande de monnaie de spéculation doit augmenter. D'où la baisse des taux d'intérêt. Dans la réalité, les autorités monétaires baissent leurs taux d'intérêt directeurs pour obtenir cet ajustement. On retrouve bien la relation LM : la baisse du revenu nominal s'accompagne d'une baisse du taux d'intérêt. En résumé : l'équilibre sur les marchés financiers requiert que revenu nominal et taux d'intérêt évoluent dans le même sens.

**Figure 43. The Effect of an increase in nominal income on the equilibrium interest rate**



Notations :  $Y_0$  and  $Y_1$  are nominal GDP with  $Y_0 < Y_1$  ;  $i_0^*$  and  $i_1^*$  are equilibrium interest rates ;  $M^S$  is the money supply that is the equilibrium's one  $M^*$ .

### 3.3 How is monetary policy implemented?

In order to achieve its primary objective, the Eurosystem uses a set of monetary policy instruments and procedures. This set forms the operational framework to implement the the monetary policy in the € zone. This operational framework relies on several instruments. One of which are Open Market operations.

The CB has several instruments at its disposal to implement monetary policy.<sup>23</sup> Once the key interest rates are announced, the CB the central bank must ensure that these key rates are consistent with the rates charged on the interbank market. To do this, it uses open market operations: allows the liquidity of the banking system to be adjusted by means of liquidity injections or withdrawals.

<sup>23</sup> Plus de développements sur les instruments de la politique monétaire : (Banque Centrale Européenne, 2004, 2011; European Central Bank, 2008, 2011)

### 3.3.1 Open market operations (OMOs)

One of the main instruments of contemporary monetary policy is open market operations, which have replaced credit control policies.<sup>24</sup> OMOs belong to the conventional monetary policy measures that the CBs can use in order to manage the liquidity needs of the banking system. Reserve requirements are another aspect of conventional monetary policy measures. All these "conventional" measures rely on the role of interest rates.

OMOs are purchases or sales of financial securities carried out on the interbank market by the CB. To understand the principle, look at a CB's balance sheet.<sup>25</sup>

The assets of the CB consist of the securities (titres) or claims (créances) it holds. There are three main categories: claims on foreign countries (foreign currencies), claims on commercial banks and claims on the Treasury, which is the financial embodiment of the State. The liabilities of the CB consist of the reserves of the Bcom, banknotes held by the non-banking sector, public sector deposits and own funds. Through open market operations, the CB can change the quantity of money in the national economy.

- Expansionary open market operation. The CB buys securities on the interbank market, prints money to buy them (in our example of a single B) or more generally injects liquidity (when BCom). Contributes to increasing the demand for securities and pushes up their prices and thus lowers their yield and the equilibrium interest rate. Therefore, purchases of securities by the CB = expansionary monetary policy.
- Contractionary open market operation. The CB sells securities on the interbank market, withdraws from circulation the money it receives in return (in our example of a single B) or, more generally, withdraws liquidity from the

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<sup>24</sup> Credit control is a means of monetary policy used to control the demand and supply of money (liquidity) in the economy. The Central Bank administers control over the credit that the commercial banks grant to their customers.

<sup>25</sup> Il existe d'autres moyens d'action sur les taux d'intérêt à CT : facilités permanentes (facilité de prêt marginal et facilité de dépôt), non développés ici. Plus d'info <https://www.banque-france.fr/politique-monetaire/presentation-de-la-politique-monetaire/definition-de-la-politique-monetaire/les-instruments-de-politique-monetaire/les-facilites-permanentes>

economy's financing circuits (when taking into account the ComB). The increase in the supply of securities lowers their price and thus increases their yield and interest rates.

The CB acts on interest rates but also on the price of securities. An increase (decrease) in the key rate => decrease (increase) in bank lending, decrease (increase) in solvent demand for goods and services, tendency to slow down (accelerate) changes in the general price level. When the CB anticipates a risk of price inflation, it raises its key rate.

Figure 44 shows the effects of an open market operation on the CB's balance sheet. When the CB injects liquidity into the economy, it does not actually print money; it does so through securities purchase operations that increase its assets. At the same time, the CB's liabilities increase either in the form of an increase in coins and banknotes in the economy and/or in the form of an increase in deposits, which are the two components of M1.

#### Definition 43. Open market operations

Open Market Operations (OMO) consist for the Central Bank, in buying and selling bonds to regulate the money supply of the national economy.

Open market: purchase or sale of securities (Treasury bills) by the central bank on the interbank market. By modulating the volume of its interventions, the central bank will steer market rates in line with its monetary policy objectives. Open market means literally at market conditions.

Marché monétaire. Marché sur lequel les organismes financiers échangent contre des titres leurs disponibilités en **monnaie centrale** à des taux libres. C'est un marché de titres courts. Il se compose de deux compartiments : le marché interbancaire, réservé aux banques et institutions assimilées, et le marché ouvert, sur lequel tous les agents peuvent venir emprunter ou prêter à court terme.

Marché interbancaire. Compartiment du marché monétaire réservé aux banques et à quelques organismes financiers. Les agents en déficit de trésorerie peuvent y emprunter aux agents en excédent de trésorerie.

Source : Banque de France

Money Market. The market in which short-term funds are raised, invested and traded, using instruments which generally have an original maturity of up to one year.

Interbank money market. The market for short-term lending between banks, usually involving the trading of funds with a maturity of between one day (overnight or even shorter) and one year. Exchanges between banks are at the interbank market rate: the price of money on a day-to-day basis. This price is calculated by averaging the rates charged during the day. This is the EONIA (Euro Overnight Index Average). For longer loans, EURIBOR (Euro Interbank Offered Rate) is calculated at different maturities (Euribor 1 month, Euribor 2 months, up to Euribor 12 months)

Source: the ECB.

**Figure 44. How an OMO modifies the CB balance sheet**

Actif	Passif
Titres	Monnaie fiduciaire

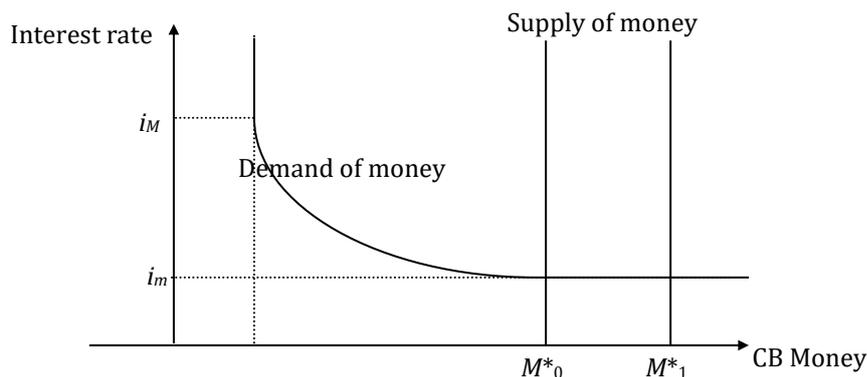
Actif	Passif
Titres détenus : + 1 million €	Monnaie supplémentaire : + 1 million €

### 3.3.2 Is monetary policy effective? The Keynesian point of view

Keynesian analysis shows how the monetary authorities have a means of influencing the interest rate, and hence investment and aggregate demand. However, it is not the preferred instrument for a stimulus policy because JMK and many Keynesians believe that the interest rate elasticity of investment demand is low and that the investment function is unstable. Rather, the economic policy recommendation is to recommend keeping the interest rate low. Moreover, the liquidity trap phenomenon illustrates the fact that an increase in liquidity does not lower interest rates. Based on a characteristic of the demand for money:

- If the demand for money is elastic to the interest rate, the extra money in the economy leads to a fall in the interest rate, and a rise in the price of securities because financial operators buy them.
- If the return on alternative assets to money is already low or if the risks are too high, then financial operators no longer buy securities, additional money in the economy leads to an increase in speculative cash holdings (Figure 45). In short, the liquidity trap opens when an increase in the money supply is captured, at the prevailing interest rate (threshold  $i_m$ ), by speculative money holdings, i.e. when one is in the infinitely elastic segment of money demand. The conventional transmission channel for movements in the key CB policy rate to other interest rates no longer works. Monetary policy is ineffective. The interest rate is  $i_m$ . It is often named as the zero lower bound.

**Figure 45. The liquidity trap**



At the threshold or "zero lower bound" interest rate  $i_m$ , an increase in the money supply is fully captured by speculative balances.

**Definition 44. The liquidity trap**

"A liquidity trap is defined as a situation in which the short-term nominal interest rate is zero. The old Keynesian literature emphasised that increasing money supply has no effect in a liquidity trap so that monetary policy is ineffective. The modern literature, in contrast, emphasises that, even if increasing the current money supply has no effect, monetary policy is far from ineffective at zero interest rates. What is important, however, is not the current money supply but managing expectations about the future money supply in states of the world in which interest rates are positive."

Source: Eggertsson (2008)

Une trappe à liquidité s'ouvre quand le taux d'intérêt nominal à court terme est nul. La littérature keynésienne traditionnelle a montré que l'augmentation de la masse monétaire est sans effet dans une trappe à liquidité et que la politique monétaire est inefficace. La littérature moderne, en revanche, souligne que, même si la hausse de la masse monétaire actuelle est sans effet, la politique monétaire est loin d'être inefficace. Ce qui est important, cependant, n'est pas la masse monétaire en cours, mais de gérer les attentes concernant l'offre future de monnaie dans les Etats du reste monde où les taux d'intérêt sont positifs.

**3.3.3 Unconventional monetary policy**

Voir aussi <http://www.economie.gouv.fr/facileco/bce-creation-monetaire-dette-publique>

CB can resort to unconventional measures when traditional channels of monetary transmission do not work. More : (Clerc, 2009). This has been the case in particular since the bankruptcy of Lehman Brothers in 2008. Non-conventional measures include quantitative easing. They aim to create a new channel for the transmission of monetary policy to the economy. How it works: the ECB purchases assets from commercial banks. The largest amounts concern public assets (government bonds, European institutions). In exchange, banks have significant liquidity, which they seek to leverage by financing the economy directly through lending and indirectly through the purchase of other securities.

This channel does not rely on the interest rate. It consists in:

- To inject money massively so that economic agents can use these excess cash balances. Why is not used in normal times? Instability of short-term money demand. In the short term, it is difficult to establish a link between the economic situation and demand for money. In exceptional situations, instability is less of a problem;
- To lend this money to an agent who is sure to spend it. The best candidate is the Gov that runs a fiscal deficit. In practical terms, central banks buy government debt bonds. These purchases are therefore one of the most commonly used forms of quantitative easing.

How it worked in the € zone?

- The Lisbon Treaty prohibits the monetary financing of public debt in the euro area. It is used by the U.S. Federal Reserve, the BoJ and the Bank of England. However, at the end of 2011, the ECB is making purchases of public debt (programme SMP – Securities Markets Programme). This has led to considerable dissension in the Board of the ECB (All, Autriche, PB, Lux).
- Mid-2014, the ECB launches the Asset Purchase Programme that is another part of a package of non-standard monetary policy measures. The ECB first repurchased EUR 80 billion a month and then reduces this amount to EUR 60 billion at the end of 2016. As it concerns nineteen countries using the same currency, the ECB's purchasing programme is more tightly controlled than that of the U.S. Federal Reserve, the Bank of England or the Bank of Japan. In particular, the ECB refrains from buying too many bonds from a targeted country to avoid being accused of financing its public debt. This programme is still operational, though the ECB decided to decrease the pace of monthly net purchases
- In the wake of the Covid 19 outbreak, the ECB's initiated a Pandemic Emergency Purchase Programme (PEPP) in March 2020. It is a reinforced quantitative easing that allowed the ECB to buy up private and public government securities. The ECB increased the initial €750 billion envelope for the PEPP by €600 billion on 4 June 2020 and by €500 billion on 10 December, for a new total of €1,850

billion. The PEPP is temporary: in December 2021, the Governing Council of the ECB decided to stop net asset purchases at the end of March 2022.

- The outcomes of the SMP and the PEPP are depicted on Figure 46 below. More pieces of explanation to be found there: <https://blocnotesdeleco.banque-france.fr/en/blog-entry/understanding-expansion-central-banks-balance-sheets>

#### Definition 45. Unconventional monetary policy

« On entend [...] par ‘politique monétaire non conventionnelle’ toutes les mesures visant à influencer directement le coût et la disponibilité du financement externe des banques, des particuliers et des sociétés non financières [...] ».

Source : (De Lucia, 2009)

« La création massive de monnaie vise à contourner l’obstacle du blocage des taux d’intérêt. La banque centrale tente de ‘saturer’ la demande de monnaie des agents économiques, en espérant que ceux-ci dépenseront directement leurs encaisses excédentaires. Il s’agit, en quelque sorte, de *créer un nouveau canal de transmission de la politique monétaire qui ne dépende pas du taux d’intérêt*. En temps ordinaire, ce canal direct par le biais de la masse monétaire ne peut être utilisé, car la demande de monnaie (la quantité de monnaie que souhaitent détenir les agents économiques) est instable à court terme : il n’existe pas de lien prévisible entre la quantité de monnaie et la situation économique. En période exceptionnelle, cette instabilité de court terme est moins gênante dès lors que la banque centrale est disposée à offrir la monnaie en quantité illimitée. Il n’est pas certain, toutefois, que même une offre illimitée suffise à relancer la dépense si la demande de monnaie est elle-même infinie. C’est pourquoi, très souvent, l’offre de monnaie est canalisée vers le seul agent dont on est certain qu’il dépensera : l’État via son déficit budgétaire. Les politiques d’achat de titres de la dette publique par les banques centrales représentent donc une des formes les plus utilisées de “quantitative easing” »

Source : (Clerc, 2009, p. 3)

Figure 46. Central Bank Balance Sheet in the Euro Area until February 2022, Million €



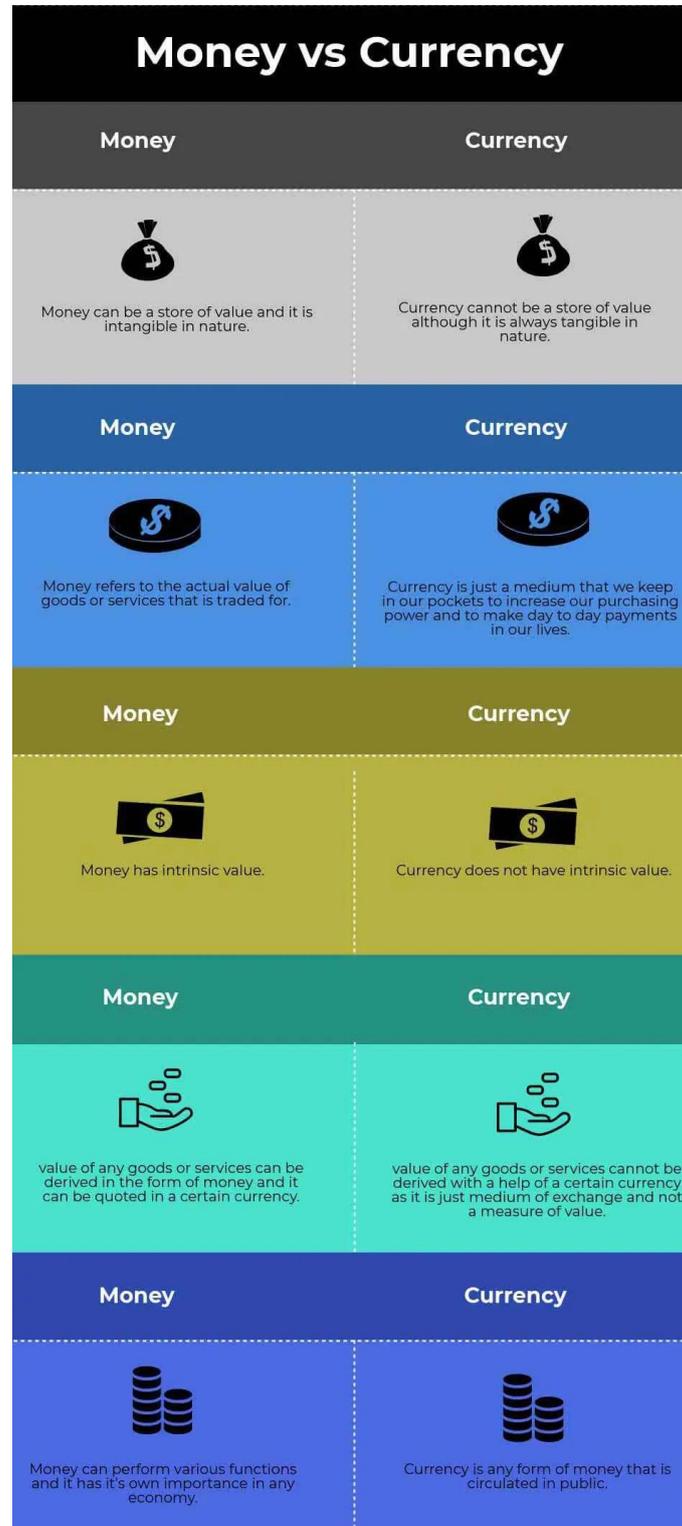
TRADINGECONOMICS.COM | EUROPEAN CENTRAL BANK

Source : <http://www.tradingeconomics.com/euro-area/central-bank-balance-sheet>. Updated February 9, 2022. Central Bank Balance Sheet in the € zone is 8,622,576 EUR Million ( $8.6 \cdot 10^{12}$  €) as of January 28, 2022.

The Asset Purchase Programmes were initiated in mid-2014 by the ECB. The Pandemic Emergency Purchase Programme (PEPP) started in March 2020.

## 4 CHAPTER 3 - APPENDIX

Figure 47. Money versus Currency



www.educba.com

Source: <https://www.educba.com/money-vs-currency/> acceded February 9, 2022.

**Table 23. The progress towards the Euro**

1962	Première proposition de la Commission européenne en vue de l'établissement d'une union économique et monétaire (Memorandum Marjolin).
Mai 1964	Création d'un Comité des gouverneurs des banques centrales des Etats membres de la Communauté économique européenne (CEE) afin d'institutionnaliser la coopération entre les banques centrales de la CEE.
1970	Le rapport Werner établit un plan destiné à réaliser une union économique et monétaire dans la Communauté à l'horizon de 1980.
Avril 1972	Mise en place d'un système (le « serpent ») destiné à réduire progressivement les marges de fluctuation des monnaies des Etats membres de la Communauté économique européenne.
Avril 1973	Création du Fonds européen de coopération monétaire afin d'assurer le bon fonctionnement du serpent.
Mars 1979	Création du Système monétaire européen (SME).
Février 1986	Signature de l'Acte unique européen (AUE).
Juin 1988	Le Conseil européen charge un comité d'experts, sous la présidence de Jacques Delors (le « Comité Delors »), d'élaborer des propositions en vue de la réalisation de l'UEM.
Mai 1989	Le « Rapport Delors » est soumis au Conseil européen.
Juin 1989	Le Conseil européen approuve la réalisation de l'UEM en trois phases.
Juillet 1990	Début de la première phase de l'UEM.
Décembre 1990	Début d'une conférence intergouvernementale chargée de préparer les deuxième et troisième phases de l'UEM.
Février 1992	Signature du traité sur l'Union européenne (Traité de Maastricht).
Octobre 1993	Francfort-sur-le-Main est la ville choisie pour accueillir le siège de l'Institut monétaire européen (IME) et de la BCE. Choix du président de l'IME.
Novembre 1993	Entrée en vigueur du traité sur l'Union européenne.
Décembre 1993	Alexandre Lamfalussy est nommé président de l'IME, qui sera établi le 1er janvier 1994.
Janvier 1994	Début de la deuxième phase de l'UEM. Mise en place de l'IME.
Décembre 1995	Le Conseil européen de Madrid adopte le nom de la future monnaie unique et définit le scénario de son adoption et du passage à l'euro fiduciaire.
Décembre 1996	L'IME présente au Conseil européen des spécimens des billets de banque.
Juin 1997	Le Conseil européen adopte un « Pacte de stabilité et de croissance ».
Mai 1998	La Belgique, l'Allemagne, l'Irlande, l'Espagne, la France, l'Italie, le Luxembourg, les Pays-Bas, l'Autriche, le Portugal et la Finlande sont considérés comme satisfaisant aux conditions nécessaires à l'adoption de l'euro en tant que monnaie unique. Nomination des membres du directoire de la BCE.
Juin 1998	Etablissement de la BCE et du SEBC.
Octobre 1998	La BCE annonce la stratégie et le cadre opérationnel de la politique monétaire unique qu'elle mettra en œuvre à partir de janvier 1999.
Janvier 1999	Début de la troisième phase de l'UEM : l'euro devient la monnaie unique de la zone euro. Fixation irrévocable des taux de conversion des anciennes monnaies des Etats membres participants. Mise en œuvre d'une politique monétaire unique au sein de la zone euro.
Janvier 2001	La Grèce devient le douzième Etat membre à intégrer la zone euro.
Janvier 2002	Passage à l'euro fiduciaire : introduction des billets et des pièces en euros qui ont seuls cours légal dans la zone euro à partir de la fin février 2002.
Mai 2004	Les BCN des dix nouveaux Etats membres de l'UE entrent dans le SEBC.
Janvier 2007	La Bulgarie et la Roumanie adhèrent à l'UE, ce qui porte le nombre total des Etats membres à vingt-sept, et leur banque centrale nationale devient membre du SEBC. La Slovénie adopte l'euro, devenant ainsi le treizième pays membre de la zone euro.
Janvier 2008	Chypre et Malte rejoignent la zone euro, qui compte dès lors quinze pays.
Janvier 2009	La Slovaquie entre dans la zone euro, qui comprend ainsi seize pays.

Source : Gerdesmeier (2009, chap.5)

## **Second Part. Short-run macroeconomics.**

### **Chapter 4. Aggregate demand (introduction to the macroeconomic equilibrium and fiscal policy)**

## 1 INTRODUCTION – JM KEYNES

<https://serc.carleton.edu/econ/tbl-econ/activities/196076.html>

His thought developed on the economic consequences of the First World War and the analysis of the financial and economic crisis that broke out in 1929.

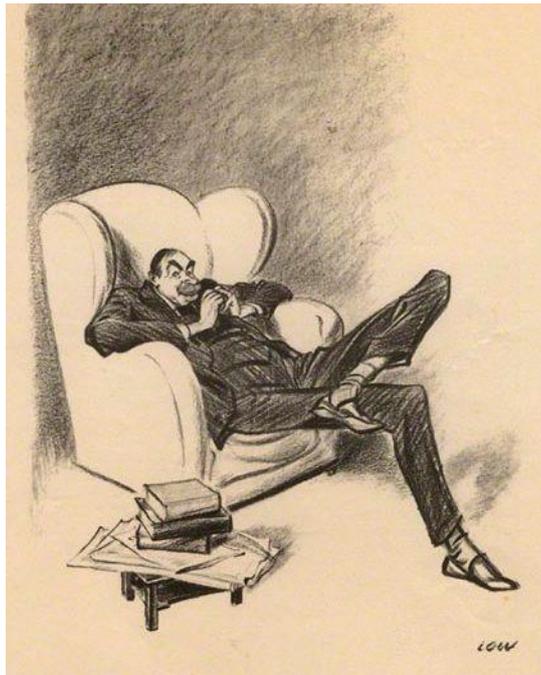
JMK severely criticizes political decisions taken in 1919 and the 1920s with pamphlets such as the “Economic Consequences of the peace” (1920) and the “Economic consequences of Mr Churchill (1925). He strongly opposed war reparations imposed to Germany.

Later, JMK supported the “New Deal” that he did not inspire. The intuition of JMK: 1929 crisis different from the economic crises of the 19th century. He diagnoses a saving glut, i.e. an excess of savings compared to investment. He takes the opposite view from F.A. Hayek, who explains the economic crisis by an excess of investment and a lack of savings. Both led to significant controversy in the 1930s in the UK. JMK supports the « Euthanasia of the rentier », which announces the emergence of social security systems after WWII. JMK had such profound influence on macroeconomics that even today, macroeconomic analysis's primary debates revolve around being (or not) a Keynesian (Definition 46).

Studying JMK is not outdated. In the final chapter of the GT, he puts forward wealth and income inequalities that are a critical issue nowadays (Box 27). He describes the case of a secular stagnation that has been recently put forward by several economists (Summers, 2014). The oversupply of saving characterizes secular stagnation.

This chapter aims to present short-run macroeconomics' main features that focus on aggregate demand, its main determinant (level of economic activity) and the role of fiscal policy in macroeconomic stabilization.

**Figure 48. JMK**



Source: <https://www.franceculture.fr/emissions/entendez-vous-leco/europe-frontieres-politiques-et-economiques-34-dans-la-peau-de-john-maynard-keynes> . For an in-depth study of the character, see (in French): (Gazier, 2014).

**Box 27. “Concluding notes on the social philosophy towards which the General Theory might lead”**

“The outstanding faults of the economic society in which we live are its failure to provide for full employment and its arbitrary and inequitable distribution of wealth and incomes.”

Source: (Keynes, 1936a, chap. 24)

#### Definition 46. Keynesian economics

“Keynesian economics is a theory of total spending in the economy (called aggregate demand) and its effects on output and inflation. Although the term has been used (and abused) to describe many things over the years, six principal tenets seem central to Keynesianism. The first three describe how the economy works.

1. A Keynesian believes that aggregate demand is influenced by a host of economic decisions—both public and private—and sometimes behaves erratically. The public decisions include, most prominently, those on monetary and fiscal (i.e., spending and tax) policies. [...]

2. According to Keynesian theory, changes in aggregate demand, whether anticipated or unanticipated, have their greatest short-run effect on real output and employment, not on prices. [...]. Keynesians believe that what is true about the short run cannot necessarily be inferred from what must happen in the long run, and we live in the short run. They often quote Keynes’s famous statement, “In the long run, we are all dead,” to make the point. [...]

Keynesian models of economic activity also include a so-called multiplier effect; that is, output increases by a multiple of the original change in spending that caused it. Thus, a ten-billion-dollar increase in government spending could cause total output to rise by fifteen billion dollars (a multiplier of 1.5) or by five billion (a multiplier of 0.5). Contrary to what many people believe, Keynesian analysis does not require that the multiplier exceed 1.0. For Keynesian economics to work, however, the multiplier must be greater than zero.

3. Keynesians believe that prices, and especially wages, respond slowly to changes in supply and demand, resulting in periodic shortages and surpluses, especially of labor.

No policy prescriptions follow from these three beliefs alone. And many economists who do not call themselves Keynesian would nevertheless accept the entire list. What distinguishes Keynesians from other economists is their belief in the following three tenets about economic policy.

4. Keynesians do not think that the typical level of unemployment is ideal [...]. In fact, Keynesians typically see unemployment as both too high on average and too variable, although they know that rigorous theoretical justification for these positions is hard to come by. Keynesians also feel certain that periods of recession or depression are economic maladies, not, as in real business cycle theory, efficient market responses to unattractive opportunities.

5. Many, but not all, Keynesians advocate activist stabilization policy to reduce the amplitude of the business cycle, which they rank among the most important of all economic problems.

6. Finally, and even less unanimously, some Keynesians are more concerned about combating unemployment than about conquering inflation. [...]. Needless to say, views on the relative importance of unemployment and inflation heavily influence the policy advice that economists give and that policymakers accept. Keynesians typically advocate more aggressively expansionist policies than non-Keynesians.”

Source: Blinder, <https://www.econlib.org/library/Enc/KeynesianEconomics.html> accessed March 8th 2019

### 1.1 The 1929 Crisis

The 1929 crisis became the "Great Depression" at the end of 1931. It was not a crisis similar to the economic crises of the 19th century. It is an entirely new episode in terms of its duration (about ten years: end in about 1939) and its scale (unemployment reached a massive 25% in 1933 in the United States). It was characterized by a fall in aggregate spending (which began before the 1929 crash), a contraction in money supply (nominal) and substantial deflation (Definition 47). For JMK, the Great Depression was

characterized by insufficient demand and not by excessive investment, as FA. Hayek thought.<sup>26</sup>

The economy as conceived by the classical economists and in particular the marginalists at the end of the 19th century is a powerful tool to explain market phenomena and individual behaviour. But it is powerless to explain changes in economic activity. The defenders of microeconomics advocate free competition; they deny the obvious crises of overproduction during the economic crisis born out of the crash of 1929. The economic crisis is accompanied by an intellectual crisis on the part of those who study economic fluctuations. This situation makes it conducive to the emergence of a new problem. Keynes is the architect of an academic breakthrough and allows the advent of modern macroeconomics.

When Roosevelt took office in 1933, JMK expressed his enthusiasm to the president about the proposals associated with the New Deal when JMK met FDR in 1934.<sup>27</sup> New Deal proposals correspond to Keynes' recommendations: fiscal stimulus policy, suspension of convertibility, legal protection for trade unions within companies, creation of a federal minimum wage to boost consumption by raising wages. Historians have shown that Keynes had no influence whatsoever on Roosevelt's politics. Two reasons. 1) the Roosevelt program did not wait for Keynes' recommendations to be activated. It is more of a pragmatic approach, and if it is necessary to find theoretical influences, these are more to be found on the side of American institutional economists - whose work Keynes appreciates - and even on the side of the Stockholm School. 2) Second, Roosevelt ignored Keynes' recommendations for speeding up reforms and pursuing a more ambitious public expenditure programme. Even though Keynes wrote to Roosevelt again four years later, inviting him to nationalize part of the American economy and increase public investment, FDR did not follow JMK's recommendations. More details: (Snowdon, Vane and Wynarczyk, 1997, p. 9; Ponsot and Rocca, 2013) and Galbraith the age of uncertainty

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<sup>26</sup> There was opposition in the 1930s between FAH, who teaches at the LSE and JMK at Cambridge. The opposition staged in the battle The Hayek vs Keynes Rap — "Fear the Boom and Bust". Lyrics available at <http://hayekcenter.org/?p=1954>

<sup>27</sup> It is interesting that FDR wanted to jointly address social progress to the emerging environmental issues. In that perspective, the New Deal promoted the creation of the Civilian Conservation Corps (CCC) that provided "green job" (forests, dams, etc.) to a total of 3 million unemployed from 1933 to 1942 (Laurent, 2020).

<http://www.cosmolearning.com/documentaries/the-age-of-uncertainty-by-john-kenneth-galbraith-1977/1/>

The characteristics of the crisis (1929 - 1932): deflation. The period witnessed a collapse in production: base 100 in 1929, the production index is 77 in France in 1932, 53 in Germany. Prices also collapsed: based on 100 in 1929, the price index for 20 foodstuffs in the world reached 43 in 1932. There was a sharp increase in unemployment (the United States, with an unemployment rate of 24% in 1932, and Germany, with 16%, were the most affected). International trade contracted sharply: between April 1929 and February 1933, the volume of trade fell by 69%. Table 24 gives the main figures for the USA.

Deflationary spiral. As prices fall, profits shrink, making the survival of businesses problematic. Firms then decide to lower prices further to sell more. But this measure has an impact on wages, which have to be reduced, or on capital redundancies, which increase. The economy then enters a vicious circle: production and consumption are reduced. Companies lay off workers. As unemployment rises, consumption falls again. Companies, competing with each other, lower their prices again, and so on. Moreover, consumers, anticipating a fall in prices, tend to postpone their purchases, which leads to a reduction in production. Another characteristic of the Great Depression is the contraction of the money supply. It illustrates monetary shocks have real effects. Fiscal austerity only reinforces the deflationary trend. Example of the Weimar Republic during the interwar period. Would be at the origin of the macro instability that led to the Nazi seizure of power (Caupin and Giraud, 2016). In summary, deflation is a situation in which a country's economic activity deteriorates in a cumulative way: falling prices lead to falling incomes, which in turn lead to falling demand, which leads producers to lower their prices (deflationary spiral - Definition 47).

**Table 24. The Great Depression in the US**

	1929	1933
GNP (index)	100	69
Unemployment rate (%)	3.2	24.9
Unemployment rate - Industry (%)	5.3	37.9
Investment / GNP (%)	15.6	2.5
Industrial production (index) (index)	100	63
Automotive production (units)	4.6 million	1.6 million
Steel production (index)	100	41
Wages (index, 1913 = 100)	224	173
Agricultural income (billion UDS)	11.3	5.5

Source: [http://brasseul.free.fr/crise\\_29.htm](http://brasseul.free.fr/crise_29.htm) from the Historical Statistics of the US. The NBER recorded a peak in August 1929 and a trough in March 1933.

### Definition 47. Inflation, deflation, and disinflation

“Deflation is an increase in a currency's purchasing power which leads to a general and lasting drop in prices; it is negative inflation. “

“Inflation is the loss of purchasing power of currency, expressed through a general and lasting increase in prices.

It must be distinguished from the increase in the cost of living. The loss of value of currency units is a phenomenon that affects the national economy, regardless of the different categories of agents. .

Most of the time, to evaluate the rate of inflation, we use the consumer price index. This measurement is not complete, the inflationary phenomenon covers a field wider than household consumption.”

Source: Insee

“A deflationary spiral is when a period of decreasing prices (deflation) leads to a situation whereby the economy cannot recover, which compounds over time leading to even lower prices in a vicious cycle.

Deflation occurs when the general price levels decline, as opposed to inflation which is when general prices levels rise. When deflation occurs, central banks and monetary authorities can enact expansionary monetary policies to spur demand and economic growth. If monetary policy efforts fail, however, due to greater than anticipated weakness in the economy or because target interest rates are already zero or close to zero, a deflationary spiral may occur even with an expansionary monetary policy in place.”

Source: Investopedia <http://www.investopedia.com/terms/d/deflationary-spiral.asp#ixzz4al3kSH3s>

#### Définition

L'inflation est une hausse continue et durable du niveau général des prix. Ce n'est pas un choc instantané, une hausse limitée à certains biens. C'est un processus permanent et général. L'inflation est alimentée par des anticipations : c'est parce que les salariés et les entreprises anticipent que les prix vont monter qu'ils ajustent eux-mêmes à la hausse leurs prix et leurs salaires. Symétriquement, la déflation est un processus permanent et général de baisse des prix. Il n'y a pas déflation si seulement certains prix baissent. Par exemple les prix des ordinateurs portables ou produits électroniques de haute fidélité peuvent baisser sous l'effet du progrès technique. Mais ce n'est pas une déflation. La désinflation est un ralentissement de l'inflation ou une baisse ponctuelle du niveau général des prix. Par exemple, si on passe de + 3 % par an à + 1 % par an, il y a désinflation. Si, par contre, on passe à une variation des prix négative de - 1 % par an et que cette baisse est anticipée comme durable, alors il y a déflation.

#### La spirale déflationniste

La désinflation est une bonne chose. Elle procure, notamment, du pouvoir d'achat aux ménages. Mais la déflation est particulièrement dangereuse pour une économie car elle déclenche des spirales qui peuvent provoquer ou accentuer une récession et dont il est très difficile de sortir.

Trois mécanismes sont à l'œuvre dans une spirale déflationniste :

(i) Anticipant une baisse continue des prix, les ménages sont incités à reporter leurs achats de biens durables, contribuant ainsi à réduire la demande agrégée adressée aux entreprises. En retour, anticipant une réduction de leurs débouchés et une baisse de leurs profits, les entreprises sont tentées de diminuer leur production et de réduire leur demande de travail, contribuant ainsi à l'augmentation du chômage, à la baisse des salaires et à celle du revenu disponible des ménages.

(ii) Un second enchaînement a été analysé, au lendemain du krach de 1929 par l'économiste américain Irving Fisher, qui a proposé en 1933 sa théorie de la 'déflation par la dette'. La déflation augmente en effet mécaniquement le coût réel de la dette, généralement non indexé sur l'évolution des prix. Cette hausse du coût de la dette dégrade la situation des emprunteurs, notamment les entreprises, ce qui peut les conduire à réduire leurs investissements, voire à la faillite. De même, l'alourdissement de la dette des ménages peut les conduire à augmenter leur épargne, ce qui accélère, par un mécanisme auto-entretenu, la baisse de la demande agrégée. Enfin, la dégradation des perspectives des entreprises conduit les banques à resserrer leurs conditions d'octroi de crédit. La déflation se combine ainsi avec un credit crunch, c'est-à-dire une baisse brutale de l'offre de crédit bancaire.

(iii) Enfin et surtout, la déflation peut paralyser la politique monétaire. Il est impossible, en effet, de baisser les taux d'intérêt en dessous de zéro. Mais, même à ce niveau, si les prix diminuent, par exemple, de 2 % par an, cela signifie que les taux d'intérêt réels supportés par l'économie sont fortement positifs (de 2 %), alors même que la situation (fort ralentissement de la croissance ou récession) justifierait au contraire des taux d'intérêt réels négatifs. La déflation impose à l'économie des taux d'intérêt réels très élevés par rapport à ce qui serait nécessaire. Elle contribue donc à créer et entretenir une spirale de récession dont il est très difficile de sortir : plus la croissance ralentit, plus les prix baissent, plus les taux d'intérêt réels sont élevés, ce qui accentue encore le ralentissement de la croissance. »

Source : Banque de France, Focus n°3, 22 janvier 2009. Disponible en ligne : <https://publications.banque-france.fr/deflation-ou-desinflation> consulté le 14 mars 18.

### (Krugman, 2014) **The Welfare State**

JMK analysis paved the road for the Welfare State. In UK, Keynes' views met those of Lord Beveridge. Beveridge is best known for its November 1942 Parliamentary Report to the Parliament on Social Insurance and Allied Services (Rapport sur les services sociaux et services connexes), better known as the "Beveridge Report", which provides the basis for reflection on the establishment of the welfare state by the post-war Labour government. Beveridge diagnosed "five evils" such as "want, disease, ignorance, squalor and idleness" (la misère, la maladie, l'ignorance, la misère et l'oisiveté".) to be eradicated by active government policies.

Active policies to solve social challenges as those enumerated by Beveridge, explain the rising share of public expenditures in GDP (Table 25). State intervention in the economy takes many forms. In addition to the traditional (sovereign) functions of the State, there is also the fiscal policy, which is considered to be effective. JMK also believes that the State has other responsibilities in terms of income redistribution, spatial planning, the environment or population policy.

Ironically, The Guardian published an article in 2017 on the 75th anniversary of the publication of the Beveridge report. This article argues that evils are back: "Want, disease, ignorance, squalor and idleness: are Beveridge's five evils back?" Tuesday, October 10, 2017 by Stephen Armstrong (« Le désir, la maladie, l'ignorance, la misère et l'oisiveté : les cinq maux de Beveridge sont-ils de retour ? »)

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<sup>28</sup> Summers is an American economist who notably served under Presidents B. Clinton and B. Obama's terms.

**Table 25. Central government spending, percentages of GDP**

Countries	Years	1870	1913	1920	1937	1960	1980	1990	1996	2002
France		12.6	17.0	27.6	29.0	34.6	46.1	49.8	55.0	53.6
UK		9.4	12.7	26.2	30.0	32.2	43.0	39.9	43.0	41.1
USA		7.3	7.5	12.1	19.7	27.0	31.4	32.8	32.4	34.1
OECD average		10.7	12.7	18.7	22.8	27.9	43.1	44.8	45.6	

Adapted from (Tanzi and Schuknecht, 2000, p. 6)

**Box 29. “Are Beveridge’s five evils back” in contemporary UK?**

“This November marks the 75th anniversary of the Beveridge report – the founding document of the modern welfare state and the answer to the question: what would Clement Attlee do? The Attlee government’s radical agenda, after all, basically enacted every recommendation made by eccentric patrician liberal reformer Sir William Beveridge, who exceeded his simple brief – to survey the country’s social insurance programmes – with a wide range of suggestions aimed at eradicating what he called **the five “giant evils”**: want, disease, ignorance, squalor and idleness.

Whatever Attlee thought of him, Beveridge was no socialist. He thought taking the burden of healthcare and pension costs away from corporations and individuals and giving them to the government would increase the competitiveness of British industry while producing healthier, wealthier, more motivated and more productive workers keen to buy British goods.

And he was right. The sustained post second-world-war period of economic growth and near full employment that lasted until the late 70s saw falling poverty, slum clearance, the founding of a free health service and education system alongside rising real incomes and falling inequality – which, in turn, led to higher tax revenues and helped the UK pay off its war debts. In 1950, Seebohm Rowntree – who had surveyed poverty in York in 1899 and 1936 – concluded that the problem had largely been erased.

Seventy-five years on, however, the good work done by the Beveridge Report is in grave danger of being entirely undone. The “five giants” creeping back into the mainstream of our daily life. As they do, our productivity crashes through the floor. Full-year figures for 2015 show the UK’s productivity gap with other countries standing at its worst since modern records began. What would Beveridge find if he were to report today?”

Source: Armstrong, The Guardian October 10, 2017. Available at: <https://www.theguardian.com/society/2017/oct/10/beveridge-five-evils-welfare-state>

## 2 THE EFFECTIVE DEMAND PRINCIPLE

Core concept of Keynesian macroeconomics: effective demand (Chapter 3 of the GT). Employment depends on aggregate demand (AD). The principle of effective demand makes a balance between AS and AD, without necessarily ensuring the full employment of factors of production, and in particular labour.

Keynes is a liberal, in the Anglo-Saxon meaning of the term. He believes in the possible harmonization of interests. But, he does not believe in the invisible hand guiding markets towards equilibrium and human passions (individual interest) towards collective wealth. The convergence of interests does not lie in prudent calculation but in confident action.

Keynes rejects Say's law ('Supply creates its own Demand') because if it were valid, there would be no obstacle to achieving full employment. Full employment is rather a special case than a general case. Unemployment is more likely than full employment. Employment depends in particular on the decision to invest. This is the responsibility of the businessman.

### 2.1 Definition<sup>29</sup>

It is the demand that determines the level of employment in the national economy. Currently, actual demand is assimilated to anticipated aggregate demand. In short, the principle of effective demand subordinates the level of employment and income to aggregate demand. The principle of effective demand reverses the causal relationship at work in Say's law. With the principle of effective demand, JMK rejects Say's law: entrepreneurs adapt jobs to the demand they anticipate.

“Demand”: JMK compares supply and demand conditions. The principle of ED is not a theory of demand versus supply because businessmen calculations take either the demand and the supply conditions as determined by production costs. JMK insists on expenditures (intermediate goods, final goods, and wages) as the driving force behind employment and thus the amount of work in the economy. See also Definition 46, point 2: “changes in aggregate demand, whether anticipated or unanticipated, have their greatest short-run effect on real output and employment”.

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<sup>29</sup> Voir en Annexe, paragraphe 6.1 p . 56 l'exposé de la DE tel qu'il est fait dans la TG.

“Effective”: JMK does not say that this demand will actually come true. It rather emphasises expectations and especially investment expectations. Is effective in the sense that determines the (effective) implementation of the means of production by firms. As long as expected firms’ earnings (aggregate demand) exceed costs (aggregate supply), the level of employment increases until ‘the entrepreneurs’ expectation of profits will be maximised’ (Box 42). ED leads to effective stability of the economic system though this macroeconomic equilibrium is an underemployment equilibrium.

## 2.2 Underemployment equilibrium

The Keynesian analysis underlines the inability of spontaneous market mechanisms (i. e. laissez-faire) to ensure stable growth and full employment: the notion of "involuntary unemployment" contradicts the liberal thesis of "voluntary unemployment" according to which refusal to lower real wages is the cause of unemployment.

The level of employment resulting from ED is unlikely to match the level of full employment or to be set at equilibrium unemployment because the behaviour of labour suppliers is not taken into account (Box 40. Full employment in Appendix). Amount of employment depends on the level of effective demand of people for goods and services. Unemployment is the consequence of the deficiency of effective demand. Look at Box 40 where JMK defines full employment as “a situation in which aggregate employment is inelastic in response to an increase in the effective demand for its output.” Hence, unemployment prevails if employment still reacts to an increase in ED.

Deficient demand can be considered as delivering a “subnormal activity” which is a situation characterized by pervasive unemployment though AD meets AS (Box 41 in Appendix). Hence, though we can have  $AD = AS$ , we can have unemployment: this is an underemployment equilibrium (Definition 48). This is a novel approach to macroeconomic imbalances as noticed by Alvin Hansen (Box 30).

### Box 30. Hansen's on Underemployment equilibrium

"[Keynes] criticizes the classical school [...] because they neglected to consider the determinants of the volume of employment and output as a whole. They assumed that there was but one equilibrium position - that of full employment. Keynes argues that this position is but a limiting point of a whole range of possible positions of equilibrium. It is the essential function, indeed, of his new book to show that in the actual conditions of the current economic order equilibrium is reached at a point far below full employment, and to elucidate the factors which determine at what level any one equilibrium position is reached. What is criticized, therefore, is not the theory of prices and distribution of the classical school, but the assumption that there is only one equilibrium point, and in particular the disastrous and misleading attempt to apply the characteristics of the special case of equilibrium at full employment to the quite different facts of experience in the economic society in which we actually live."

Source: (Hansen, 1936, p. 669)

### Definition 48. Underemployment equilibrium

L'équilibre de sous-emploi est une situation économique, où coexistent un équilibre sur le marché des biens, des capacités de production inemployées, et un déséquilibre sur le marché du travail, avec une insuffisance permanente du nombre d'emplois proposés au regard de la main d'œuvre disponible.

The underemployment equilibrium is an economic situation, where there is a balance on the goods market, unused production capacity and an imbalance on the labour market, with a permanent shortage of jobs offered in relation to the available labour force.

## 2.3 Implications

An economic crisis cannot be solved by cutting nominal wages. Wages are both a cost and an outlet (because they generate purchasing power), and investment (employment generator) is itself dependent on market expectations. Lowering wages can deepen the crisis rather than reduce it - and in no way does it ensure the restoration of full employment equilibrium. Lowering wages leads to a fall in the purchasing power of employees and a fall in final consumption. To compensate for the drop in consumption, investment would have to be increased, which is unlikely in a depressed economic environment. Potential investors compare the interest rate with the "marginal efficiency of investment" (like the anticipation of profits and opportunities associated with productive investment). If it is low, even low-interest rates will not ensure investment and therefore job creation.

The cause of unemployment is insufficient ED. According to JMK, there is involuntary unemployment (Box 31). Need to stimulate the ED. Households cannot do this because consumption depends on their current income; producers governed by animal spirits cannot coordinate investment decisions. Public authorities can resort to monetary and fiscal policy to support AD. Involuntary unemployment. Keynesian followers such as JE.

Stiglitz and C Shapiro developed efficiency-wage models that evidence how wages can rise above market equilibrium, whereby inducing involuntary unemployment.

**Box 31. Involuntary unemployment**

“We must now define the third category of unemployment, namely 'involuntary' unemployment in the strict sense, the possibility of which the classical theory does not admit.

Clearly we do not mean by 'involuntary' unemployment the mere existence of an unexhausted capacity to work. An eight-hour day does not constitute unemployment because it is not beyond human capacity to work ten hours. Nor should we regard as 'involuntary' unemployment the withdrawal of their labour by a body of workers because they do not choose to work for less than a certain real reward. Furthermore, it will be convenient to exclude 'frictional' unemployment from our definition of 'involuntary' unemployment. My definition is, therefore, as follows: Men are involuntarily unemployed If, in the event of a small rise in the price of wage-goods relatively to the money-wage, both the aggregate supply of labour willing to work for the current money-wage and the aggregate demand for it at that wage would be greater than the existing volume of employment.”

Source: (Keynes, 1936a, chap. 2) “The postulates of the Classical economics”.

“By involuntary unemployment we mean a situation where an unemployed worker is willing to work for less than the wage received by an equally skilled employed worker, yet no job offers are forthcoming.”.

Source: (Shapiro and Stiglitz, 1984).

### 3 45-DEGREE LINE DIAGRAM (OR KEYNESIAN CROSS DIAGRAM)

This section presents the Keynesian framework. It consists of an AD function that will help determine the income of the national economy. The latter is an equilibrium income : it satisfies the equality between the AD and the AS. This equilibrium income does not insure full employment since the ED is at work here. Workhorse model of Keynesian macroeconomics is the 45 degree line diagram. It results from an interpretation of the ED principle proposed by the prominent Keynesian macroeconomist P. Samuelson. It is not a price quantity diagram. Rather it an income (horizontal axis) – expenditure (vertical axis) diagram.

Next steps :

- Build the AD (para 3.1.);
- To graph it on the 45 degree line diagram (para 3.2) ;
- And determine the equilibrium income (para 3.3).

#### 3.1 Construction of the AD function

Stepwise approach :

- The starting point is an identity or accounting equation that defines the AD (para 3.1.1) ;
- then behavioural functions that partly rely on the content of chapters 1 and 2 (para 3.1.2). It allows defining endogenous and exogenous variables and parameters Table 26.

The sequence here is important because it shows how we depart from an identity namely the AD is the total demand for goods and services in given economy (the national economy) net of imports. It is a definition. Hence no theoretical debate. Then, it is transformed into a behavioural equation. It is subjected to theoretical discussion because the consumption function is a Keynesian one. This behavioural equation translates into an equilibrium equation when it allows determining the level of the national income denoted by  $Y^*$ , namely, the level of national income that equates the AD to the AS. Below are these three equations:

Accounting identity:

$$AD \equiv C + I + G + X - M$$

AD as a behavioural equation namely the AD function:

$$AD(Y) = C(Y^d) + I_0 + G_0 + X_0 - M(Y) \Leftrightarrow \begin{cases} AD(Y) = AD_0 + (c(1-t) - m)Y \\ AD_0 \equiv C_0 - cT_0 + I_0 + G_0 + X_0 - M_0 \end{cases}$$

Equilibrium equation that stipulates that there an equilibrium on the goods and service market:

$$\begin{aligned} Y^* &= AD(Y^*) \\ \Leftrightarrow Y^* &= AD_0 + (c(1-t) - m)Y^* \\ \Leftrightarrow Y^* &= \frac{AD_0}{1 - c(1-t) + m} \end{aligned}$$

### 3.1.1 Starting point: an accounting identity

Let us define the sum of final demands :

$$AD \equiv C + I + G + X - M$$

This identity is always true. Planned spending in the national economy is always equal to the sum of planned private final consumption, planned investment, planned gvt expenditures and net exports. The advantage of this definition is that it reflects the role of demand from institutional sectors in fluctuations in economic activity: in the short term, JMK in particular believed that fluctuations in aggregate demand were responsible for fluctuations in the national economy's income.

$C + I + G$  is the domestic final demand while  $X - M$  is the trade balance.

Below, this accounting identity is transformed into a behavioural function between linking AD to the income of the national economy. This implies defining endogenous and exogenous variables, as well as parameters.

### 3.1.2 Behavioural functions

In order to transform an accounting identity into a macroeconomic function, it is necessary to set up the hypotheses on the different macroeconomic functions of behaviour. We will consider an economy described by the following model:

$C(Y^d) = C_0 + cY^d$  with  $0 < c < 1$  and  $C_0 > 0$ : the HHs consumption function;

$Y^d \equiv Y - T$ ;  $T = T_0 + tY$  with  $0 < t < 1$  and  $T_0 > 0 \Rightarrow$  fiscal policy;

$I = I_0$ ;

$M(Y) = M_0 + mY$ ; with  $0 < m < 1$  and  $M_0 > 0$ : the import function;

$X = X_0$ ;

$G = G_0$ : government expenditure  $\Rightarrow$  fiscal policy.

Method. In any macroeconomic model, recall the meaning of the variables and parameters and the behavioural functions and identify endogenous and exogenous variables.

$Y$  is the national income, namely GDP of which value can be found in the Production account of the TIEA;

$Y^d$  is the national disposable (of which value can be found in the secondary distribution of income account);

$T$  represents NET transfers accruing to the government. Hence  $T$  includes employers' contributions, taxes on production and imports, current taxes on income and wealth, social contributions and benefits, and other transfers.  $T$  is net because it includes the tax burden (prélèvements obligatoires) net of payments, namely the social benefits.  $T$  is positive because the tax burden outweighs social benefits. It is further assumed that  $T$  is autonomous and GDP induced. Some transfers correlate with GDP whilst other transfers are disconnected.  $tY$  represents the induced net transfers because some transfers are pro-cyclical (e.g. the tax burden) whilst social benefits are counter-cyclical. Formally  $T = T_0 + tY$  where  $t$  is the marginal tax rate; it denotes the marginal effect of  $Y$  on  $T$ :  $t = \frac{\partial T}{\partial Y}$ . Interpretation: if  $\Delta Y = 100$ , then  $\Delta T = t \times 100$  hence it is the marginal tax rate. It is likely the case that  $\Delta T < \Delta Y$ : the increase of the net transfer is less than proportional to the increase in GDP. Hence  $0 < t < 1$ .

Note that aggregate savings are also endogenous:

$$S(Y) \equiv Y^d - C(Y^d) \Leftrightarrow S(Y) = -C_0 + (1 - c)Y^d$$

National economy income is the primary endogenous variable that is depicted on the 45-degree diagram. In turn, it determines private consumption and imports that are, by the way, endogenous variables (Table 26). Two behavioural functions link the national economy income to  $C$  and  $M$ :

$C = C_0 + cY^d$  is a Keynesian consumption function. Beware:  $C$  is the HHS' final consumption augmented by the NPIsh individual consumption expenditure.  $Y^d$  is the national disposable income and NOT the HHS' disposable income.  $C$  and  $Y^d$  are both endogenous variables.  $c$  is the MPC and  $C_0$  is the autonomous consumption (Chapter 1). Note that in Chapter 1, disposable income is an explanatory variable of the consumption function but there is no concern about how it is determined. In the study of macroeconomic equilibrium of chapter 4, which provides a representation of the overall functioning of the national economy, income becomes the main endogenous variable.

$M = M_0 + mY$  is an import function. It is the national economy's demand for goods and services produced by non-resident agents, i.e. the RoW. It depends positively on GDP because it is pro-cyclical. The relationship is linear with  $m$  the marginal propensity to import. However, imports can be independent of GDP hence  $M_0$ .

$I = I_0$  denotes investment. It is an exogenous variable. Theoretical justification? First, private investment (more than 50% of the total) negatively depends on the interest rate (chapter 2). Yet the interest rate does not play an explicit role in the 45-degree line diagram. Second, investment is partly public (public infrastructures) and under the control of the Gvt. Hence, a simplifying assumption is that investment does not depend on GDP, which gives  $I = I_0$ .

$G = G_0$  is the final public expenditure (individual + collective). See chapter 1. It represents how the gvt can directly support the AD. Hence it is a policy variable namely the fiscal policy.

$X = X_0$  is the exports. It is an exogenous variable because it depends on how much the RoW want to buy the goods and services produced by the national economy. Hence exports depend on the income of the RoW and not on the national economy's.

Consumption, imports, net transfers to the Gvt (tax burden net of redistribution) are endogenous variables because they depend on national economy's income. They are said

to be induced variables (Definition 49). Note that if net transfers to the Gvt are endogenous, it is only because they are partly induced. If this element disappears, net transfers to the state become a pure economic policy variable, and therefore exogenous (tax policy). Altogether,  $T_0$  and  $G_0$  are the tools of fiscal policy.

The indices do not refer to a period. They indicate that the variables are autonomous, i.e. independent of income, either because they have determinants outside the theoretical framework, or because they are policy variables, or because they are parameters of behavioural functions.

**Table 26. Components of the AD (behavioural) function**

Equations	Parameters	Endogenous variables	Exogenous variables
$C = C_0 + cY^d$ $Y^d \equiv Y - T$ $T = T_0 + tY$	$0 < c < 1$ : marginal propensity to consume $C_0 > 0$ : autonomous consumption  $0 \leq t < 1$ : marginal tax rate	$C$ $Y^d$ $Y$ $T$	$T_0 > 0$ : tax policy ( $\subset$ fiscal policy)
$I = I_0$			$I_0$
$G = G_0$			$G_0$ : fiscal policy
$X = X_0$			$X_0$ it depends on the GDP of RoW
$M = M_0 + mY$	$0 < m < 1$ : marginal propensity to import $M_0 > 0$ : autonomous imports	$M$ $Y$	

RoW: Rest of the World. This sector includes all institutions or individuals not resident in the national economy with economic interactions with resident units.

Source: own elaboration

### 3.2 The AD function

We transform the AD identity into a behavioural function namely the AD function using:

$C(Y^d) = C_0 + cY^d$  with  $0 < c < 1$  and  $C_0 > 0$ : the HHs consumption function

$Y^d \equiv Y - T$ ;  $T = T_0 + tY$  with  $0 < t < 1$  and  $T_0 > 0 \Rightarrow$  tax policy

$I = I(i) = I_0$ ;

$M(Y) = M_0 + mY$ ; with  $0 < m < 1$  and  $M_0 > 0$ : the import function

$X = X_0$ ;

$G = G_0$ : government expenditure  $\Rightarrow$  fiscal policy

In brief we transform  $AD \equiv C + I + G + X - M$  into  $AD(Y)$ . Two steps: we model first (para 3.2.1) and graph the AD function (para 3.2.2 p. 186)

### 3.2.1 Functional form

We represent aggregate demand net of imports, which depends on the behaviour of agents in the national economy who demand goods for final consumption (consumption function), imported goods (import function), and invest. The aggregate demand function is therefore the expression of the behaviour of all agents of the national economy: it expresses what they plan to spend, and is therefore anticipated (Definition 50).

We combine:

$$AD \equiv C + I + G + X - M$$

And

$$\begin{aligned} C(Y^d) &= C_0 + cY^d \\ \begin{cases} Y^d \equiv Y - T \\ T = T_0 + tY \end{cases} \\ I &= I_0 \\ M(Y) &= M_0 + mY \\ X &= X_0 \\ G &= G_0 \end{aligned}$$

To obtain  $AD(Y)$  :

$$\begin{aligned} AD(Y) &= C(Y^d) + I_0 + G_0 + X_0 - M(Y) \Leftrightarrow \\ AD(Y) &= C_0 + cY^d + I_0 + G_0 + X_0 - M_0 - mY \Leftrightarrow \\ AD(Y) &= C_0 + c(Y - T) + I_0 + G_0 + X_0 - M_0 - mY \Leftrightarrow \\ AD(Y) &= C_0 + c(Y - T_0 - tY) + I_0 + G_0 + X_0 - M_0 - mY \Leftrightarrow \\ AD(Y) &= C_0 + c(-T_0 + (1 - t)Y) + I_0 + G_0 + X_0 - M_0 - mY \end{aligned}$$

The right-hand side is made of parameters and exogenous variables, while elements depend on the national income. Hence the following grouping:

$$AD(Y) = C_0 - cT_0 + I_0 + G_0 + X_0 - M_0 + (c(1 - t) - m)Y$$

Or:

$$\begin{cases} AD(Y) = AD_0 + (c(1 - t) - m)Y \\ AD_0 \equiv C_0 - cT_0 + I_0 + G_0 + X_0 - M_0 \end{cases}$$

The aggregate demand function is made up of two elements (Definition 49):

- The autonomous demand  $AD_0$  is, by its very definition, independent of the income of the national economy. It is marked with an index 0 and is made up of parameters and exogenous variables.

- The induced demand depends on income and is therefore endogenous by nature.

Remarks:

The AD function sketch planned expenditures i.e. expected aggregate expenditures

Definition 50;

The reasoning is short-term, which explains the absence of prices from the behavioural functions, including the exchange rate. Csq: national income can be considered as a real i.e. real GDP.

**Definition 49. Autonomous and induced demand**

In the GT, JMK distinguishes between the induced and autonomous components of the effective demand, which is referred to here as aggregate demand (AD). The induced demand is the component of the AD that depends on the level of activity or aggregate income  $Y$ . The autonomous demand refers to the AD's component that is independent of the level of economic activity.

Dans la TG, JMK distingue les composantes induites et autonomes de la demande effective que l'on appelle ici demande globale (DG). La composante induite de la DG est un élément de la DG qui dépend du niveau d'activité ou de revenu agrégé. La composante autonome de la DG désigne quant à elle l'élément de la DG qui est indépendante du niveau d'activité.

**Definition 50. Expected or desired (aggregate) demand function**

“The groundwork having been laid, we can proceed to study equilibrium in the goods market. We know how much consumers want to buy, how much firms want to invest in productive equipment, and the government’s spending intentions. In addition, we have characterized how much of all that should fall on domestic and foreign goods and the intentions of foreign customers. Adding up the various demand functions according to the national income identity, we obtain the planned or desired demand function [...].

Why is this called ‘desired’ not actual demand? In short, because a number of the factors that drive aggregate demand – real GDP, the real interest rate, [...] depend on demand, as we shall see. For instance, real income  $Y$  affects demand, but at the same time it represents aggregate supply which, according to the Keynesian assumption, adjusts to the demand. So [the AD equation] describes what aggregate demand would be – what the economy would desire to spend – given particular values of these endogenous variables, not necessarily what it will be in fact. Indeed, we need to ascertain that the values of these endogenous variables are compatible with each other.

While this may seem like a bad case of circular reasoning, it illustrates the fundamentally simultaneous nature of general equilibrium in economics. It simply corresponds to the circular flow diagram [...]. This diagram shows that what is spent must be earned so that the GDP measures both total income and total output. The point of the desired demand function is to cut through the circularity. It tells us what demand should be *given GDP*, which is total income. At the same time, GDP also measures output, which is determined by demand schedule (or curve). But demand increases less than the GDP, which explains why the AD demand schedule is flatter than the 45° line.

The goods market is in equilibrium when GDP interpreted as output, is equal to GDP interpreted as spending [...] Graphically, it means that equilibrium must occur along the 45° line. The AD schedule describes how much people want to spend, given their income, which they can freely choose. [...] at the intersection of both schedules, [we have] the situation where desired aggregate demand is met, i.e. is equal to output. This state is called goods market equilibrium and the corresponding output level,  $Y$ , is equilibrium GDP.”

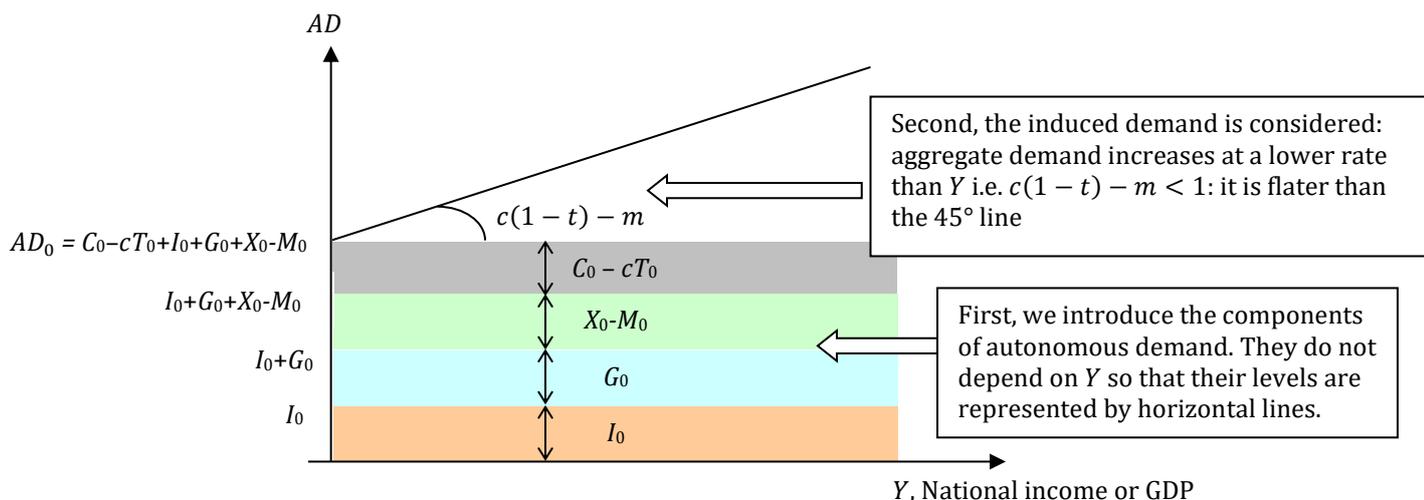
Source: (Burda and Wyplosz, 2013, chap. 10)

3.2.2 Graphical representation

The AD line on the income-expenditure diagram is a line with the following characteristics:

- The slope of the AD line is  $c(1 - t) - m < 1$ . It measures the increase in AD when the income of the national economy increases by €1. Formally:  $\frac{\partial AD}{\partial Y} = c(1 - t) - m < 1$ ;
- The intercept with the vertical axis is the sum of all income-independent components of AD, namely the autonomous demand  $AD_0$ . All income-independent elements are represented by horizontal lines that are stacked up.

Figure 49. How to graph the AD function?



$Y$  national income (or GDP) ;  $I$  investment with  $I(i) = I_0$ ;  $G$  are government expenses (fiscal policy, exogenous variable so that  $G = G_0$ ) ;  $X$  are exports (exogenous variable);  $M$  are imports with  $M = M_0 + mY$  and  $0 < m < 1$  which says that imports rise with absorption ;  $C$  is private final consumption with  $C = C_0 + c(Y - T)$  with  $0 < c < 1$  ;  $T = tY + T_0$  with  $0 < t < 1$  which says that nets transfers rise with  $Y$ : nets transfers are procyclical.

### 3.3 Equilibrium income

The 45° diagram allows a representation of macroeconomic equilibrium by the equality between aggregate supply and demand.<sup>30</sup> The latter is summarised by the first bisector (Figure 50) :

- Above (below) the 45° line, AD is greater (lower) than the AS denoted by  $Y$ ;
- The equilibrium occurs along the 45° line. It is a “situation where desired aggregate demand is met, i.e. is equal to output. This state is called goods market equilibrium and the corresponding output level,  $Y^*$ , is equilibrium GDP.” (Definition 5).
- According to the principle of effective demand, equilibrium income  $Y^*$  does not necessarily imply full employment. It is an underemployment equilibrium (Definition 48, p. 177).

<sup>30</sup> The 45° diagram transforms Keynes' initial presentation in the General Theory. The interest of this transformation of the ED diagram into a 45° diagram is practical: the only element that can vary the equilibrium comes from a change in the GD, whereas in the original effective demand diagram, a change in behaviour affects the OG and the GD. To some extent the 45° diagram impoverishes the original diagram, especially with regard to the behaviour of entrepreneurs.

The final step is now the equilibrium equation that allows determining  $Y^*$ . It writes as:

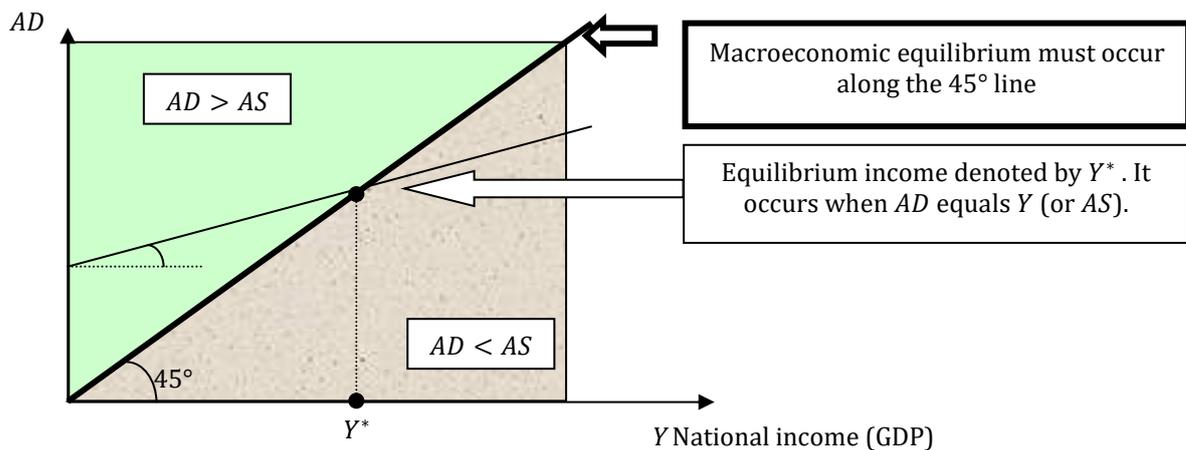
$$Y^* = AD(Y^*)$$

Then, from this equilibrium equation, we can proceed with computing  $Y^*$ :

$$\begin{aligned}
 Y^* = AD(Y^*) &\Leftrightarrow \\
 \begin{cases} Y^* = AD_0 + (c(1-t) - m)Y^* \\ AD_0 \equiv C_0 - cT_0 + I_0 + G_0 + X_0 - M_0 \end{cases} &\Leftrightarrow \\
 \begin{cases} Y^*(1 - c(1-t) + m) = AD_0 \\ AD_0 \equiv C_0 - cT_0 + I_0 + G_0 + X_0 - M_0 \end{cases} &\Leftrightarrow \\
 \begin{cases} Y^* = \frac{AD_0}{1 - c(1-t) + m} \\ AD_0 \equiv C_0 - cT_0 + I_0 + G_0 + X_0 - M_0 \end{cases} &
 \end{aligned}$$

$Y^*$  depends on parameters and exogenous variables only.

Figure 50. Equilibrium income on the 45° diagram

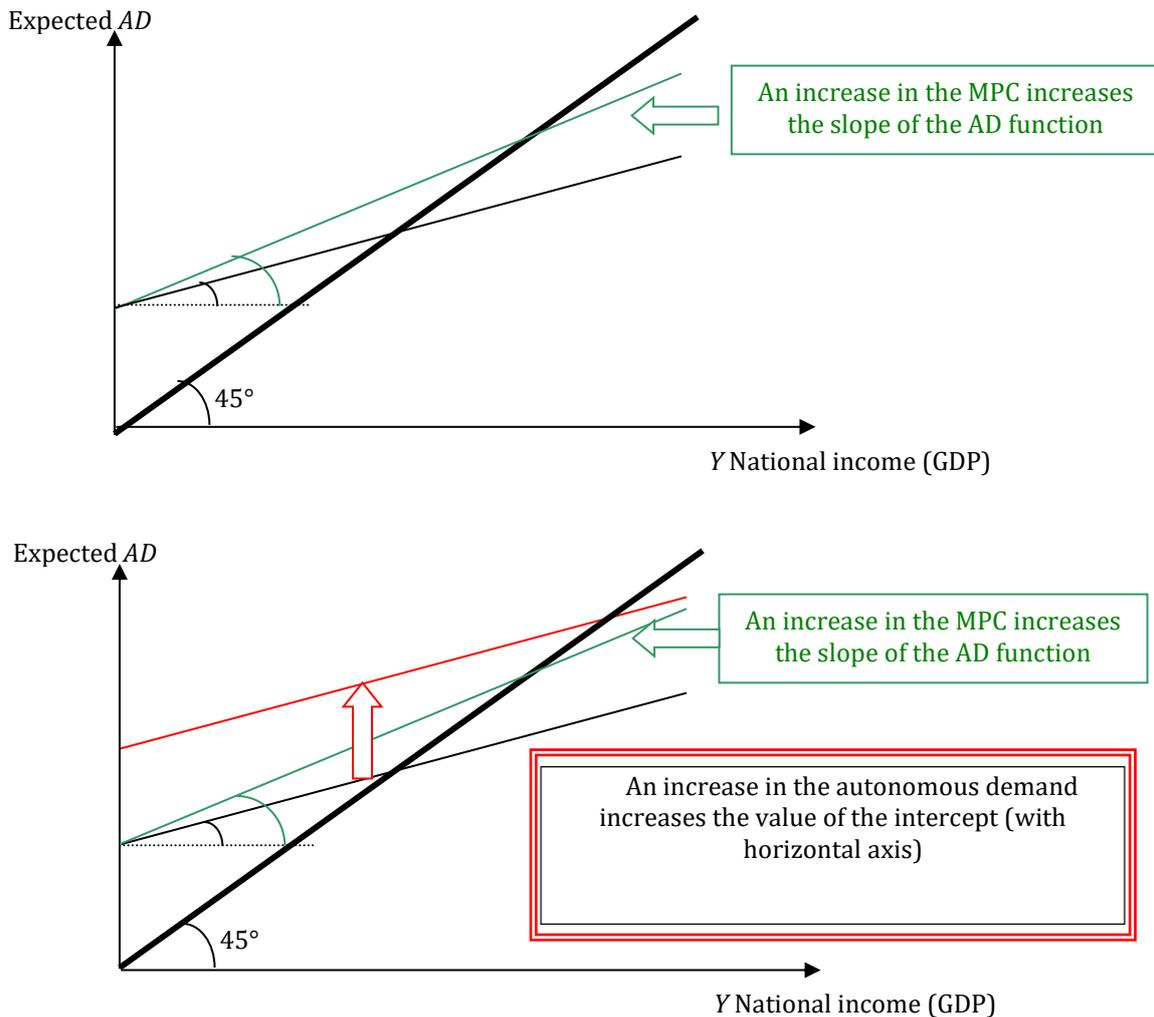


If aggregate supply ( $AS$ ) exceeds aggregate demand ( $AD$ ), firms will be left with unsold finished goods. They will in turn decide to invest less:  $Y$  converges downwards towards  $Y^*$  which is a stable equilibrium. On the contrary, if  $AD$  exceeds  $AS$  then firms inventories are depleted unexpectedly. Firms decide to invest more:  $Y$  increases until  $Y^*$  is reached. Note that according to the principle of effective demand, equilibrium income  $Y^*$  does not necessarily imply full employment. It is an underemployment equilibrium (Definition 48, p. 177).

### 3.3.1 Sensitivity of aggregate demand to a change in parameters

Before taking numerical examples, we qualitatively assess the sensitivity of the equilibrium income to parameters or exogenous variables. We make a distinction between the factors that affect the slope of the  $AD$  function (induced demand) and those that affect the autonomous demand. The former induces a parallel shift of the function and a multiplier effect (*cf.* paragraphe 4) ;

**Figure 51. How does the AD function react to changes in parameters or exogenous (autonomous) variables ?**



### 3.3.2 Numerical example

Let us take the example of an open economy where the Government runs a balanced budget such that  $G_0 = T_0$  which means that  $t = 0$  ( $t$  is the marginal propensity to tax). It is a simplified version of the AD function presented above.

#### 3.3.2.1 Hypotheses

We depart from the set of equations shown in para 3.1.2 p. 181. Running a numerical example consists of giving specific values to parameters and exogenous variables:

**Table 27. It is Table 26 with values assigned to parameters and exogenous variables**

Equations	Parameters	Endogenous variables	Exogenous variables
$C(Y) = 100 + 0.8Y^d$	$c = 0.8$	$C$	
$Y^d \equiv Y - 100$	$C_0 = 100$	$Y^d$	
$T = 100$	$t = 0$	$Y$	$T_0 = 100$
$I = I_0$			$I_0 = 200$
$G = G_0$			$G_0 = 100$
$X = X_0$			$X_0 = 60$
$M = 20 + 0.2Y$	$m = 0.2$	$M$	
	$M_0 = 20$	$Y$	

Note :  $S(Y) = -C_0 + (1 - c)Y^d \Leftrightarrow S(Y) = -100 + 0.2Y^d \Leftrightarrow S = -100 + 0.2(Y - 100) = -100 + 0.2 \times 800 = 60$ .

Remarks:

- The Gvt budget is balanced:<sup>31</sup>

$$G_0 = T_0 = 100$$

- The consumption function writes:

$$C(Y) = 100 + 0.8Y^d \Leftrightarrow C = 100 + 0.8(Y - 100) \Leftrightarrow C(Y) = 20 + 0.8Y$$

The aggregate demand function is:

$$AD(Y) = C_0 - cT_0 + I_0 + G_0 + X_0 - M_0 + (c(1 - t) - m)Y$$

With values:

$$\begin{aligned} AD(Y) &= 100 - 0.8 \times 100 + 200 + 100 + 60 - 20 + (0.8 - 0.2m)Y \Leftrightarrow \\ AD(Y) &= 100 - 0.8 \times 100 + 200 + 100 + 60 - 20 + 0.6Y \Leftrightarrow \\ AD(Y) &= 360 + 0.6Y \end{aligned}$$

Note that:

$$AD_0 = 360$$

and

$$\begin{aligned} S(Y) &\equiv -C_0 + (1 - c)Y^d \Leftrightarrow \\ S(Y) &= -100 + 0.2Y^d \Leftrightarrow \\ S(Y) &= -100 + 0.2(Y - T) \Leftrightarrow \end{aligned}$$

<sup>31</sup> Ceci est bien sûr une hypothèse irréaliste. Elle peut être levée en prenant en compte un élément induit dans les transferts nets vers l'Etat. Dans cette hypothèse, on ne peut juger *a priori* du caractère excédentaire ou déficitaire du solde public  $T - G$ .

$$\begin{aligned} S(Y) &= -100 + 0.2(Y - 100) \Leftrightarrow \\ S(Y) &= 0.2Y - 120 \end{aligned}$$

It is an aggregate savings function in that it depends on the disposable income of the national economy. In line with the Keynesian view, it is independent of the interest rate: there is no price mechanism to match the investment planned by firms with savings.

### 3.3.2.2 Equilibrium income

It is defined as:

$$\begin{cases} Y^* = \frac{AD_0}{1 - c(1 - t) + m} \\ AD_0 \equiv C_0 - cT_0 + I_0 + G_0 + X_0 - M_0 \end{cases}$$

With values:

$$\begin{aligned} \begin{cases} Y^* = \frac{360}{1 - 0.6} \\ AD_0 \equiv 100 - 0.8 \times 100 + 200 + 100 + 60 - 20 \end{cases} \\ \Leftrightarrow \begin{cases} Y^* = \frac{360}{0.4} \\ AD_0 \equiv 100 - 0.8 \times 100 + 200 + 100 + 60 - 20 \end{cases} \Leftrightarrow Y^* = 900 \end{aligned}$$

### 3.3.2.3 Financing needs or requirements

We can go further the aggregate demand function. To start with we depart from the saving function :

$$S(Y) = Y - T(Y) - C(Y)$$

Assuming equilibrium :  $Y = Y^*$

$$\begin{aligned} S(Y^*) &= Y^* - T(Y^*) - C(Y^*) \Leftrightarrow \\ S(Y^*) &= AD(Y^*) - T(Y^*) - C(Y^*) \Leftrightarrow \\ S(Y^*) &= C(Y^*) + I_0 + G_0 + X_0 - M(Y^*) - T(Y^*) - C(Y^*) \Leftrightarrow \\ S(Y^*) &= I_0 + G_0 + X_0 - M(Y^*) - T(Y^*) \Leftrightarrow \\ [S(Y^*) - I_0] &+ [T(Y^*) - G_0] = [X_0 - M(Y^*)] \end{aligned}$$

$[S(Y^*) - I_0]$  is the private saving - investment balance;

$[T(Y^*) - G_0]$  is the fiscal surplus;

$[X_0 - M(Y^*)]$  is the trade balance.

With numbers we obtain the saving deficit  $S(Y^*) - I_0 = -140$  that is mirrored by a trade deficit  $X_0 - M(Y^*) = -140$ . Note that this is an equilibrium namely, it is ex post. We can have a disequilibrium ex ante.

$$\begin{array}{rcccl} S(Y^*) - I_0 & + & T_0 - G_0 & \equiv & X_0 - M(Y^*) \\ -140 & & 0 & & -140 \end{array}$$

Table 29 summarises the different steps in the study of equilibrium income under different assumptions.

**Table 28. Table 27 with final results (endogenous variables)**

Equations	Parameters	Endogenous variables	Exogenous variables
$C(Y) = 100 + 0.8Y^d$	$c = 0.8$	$C = 100 + 0.8 \times 800$	
	$C_0 = 100$	$= 740$	
$Y^d \equiv Y - 100$		$Y^d = 900 - 100 = 800$	
$T = 100$	$t = 0$	$Y^* = 900$	$T_0 = 100$
$I = I_0$			$I_0 = 200$
$G = G_0$			$G_0 = 100$
$X = X_0$			$X_0 = 60$
$M = 20 + 0.2Y$	$m = 0.2$	$M = 20 + 0.2 \times 900$	
	$M_0 = 20$	$= 200$	

Note :  $S(Y) = -C_0 + (1 - c)Y^d \Leftrightarrow S(Y) = -100 + 0.2Y^d \Leftrightarrow S = -100 + 0.2(Y - 100) = -100 + 0.2 \times 800 = 60$ .

**Table 29. Summary: equilibrium income and financing capacity / requirement of the national economy**

Hypotheses	Open economy ; Gvt net transfers are autonomous	Open economy; net transfers to the Gvt are partly autonomous
Endogenous / exogenous (autonomous) variables $Y^* : AS = AD$	$C = c.Y^d + C_0 ; 0 < c < 1, C_0 > 0 ;$ $I = I_0 ; G = G_0 ;$ $Y^d \equiv Y - T ; T = T_0 > 0 ;$ $X = X_0 ; M = M_0 + m.Y ; 0 < m < 1, M_0 > 0$ $Y^* = AD_0 + (c - m)Y^* ; AD_0 = C_0 - cT_0 + I_0 + G_0 + X_0 - M_0$ Hence $Y^* = \frac{DA}{1-c+m}$	$C = c.Y^d + C_0 ; 0 < c < 1, C_0 > 0 ; I = I_0$ $I = I_0 ; G = G_0 ;$ $Y^d \equiv Y - T ; T = T_0 + tY, 0 < t < 1 ;$ $X = X_0 ; M = M_0 + m.Y ; 0 < m < 1, M_0 > 0$ $Y^* = AD_0 + (c(1 - t) - m)Y^* ; AD_0 = C_0 - cT_0 + I_0 + G_0 + X_0 - M_0$ Hence $Y^* = \frac{DA}{1-c(1-t)+m}$
Financing capacity / requirement of the national economy	$(S(Y^* - T_0) - I_0) + (T_0 - G_0)$ $\equiv (X_0 - M(Y^*))$	$(S(Y^* - T(Y^*)) - I_0) + (T(Y^*) - G_0)$ $\equiv (X_0 - M(Y^*))$

## 4 AN INTRODUCTION TO FISCAL POLICY

Until the 1930s, the main purpose of public finances was to ensure the financing of sovereign public services, pay for past wars and foresee future conflicts. This view is inherited from Adam Smith's who defined three main "duties of the Sovereign" Box 32:

"Protect the country from foreign invasion";

"Protect people from injustice from within the country";

"Provide culturally positive efforts from public works to schools"

The first one is related to wars the country could be engaged in, to secure foreign boundaries. The Government prepares the "military force in time of peace, and employs it in time of war". The second consists of providing good institutions that ensure domestic security and justice. The third duty consists of providing (public) goods that are undersupplied or not spontaneously produced by private agents.

All these duties exclude spending public resources to achieve economic goals. Consequently, the fiscal policy is not considered as an economic variable that influences growth or smooth business fluctuations. JMK's analysis changes this view: it proposes a different use of fiscal policy to stabilize the level of economic activity. This conception inspired economic policies until the 1970s in developed countries.

The crisis of the 1970s calls into question this conception of economic policy. Neo-classical economists (monetarists, new classics) repeat the classic tradition of challenging the effectiveness of economic policy and highlight the negative effects of public deficits.

Friedman who is a monetarist describes how macroeconomists can agree and disagree about the major goals of economic policy (Box 33). Kaldor gave a concrete content to major goals of economic policy. They are known as the magic square (Box 34).

Currently, economic policy is based on monetary and fiscal policy namely the policy mix:

- Monetary policy entrusted to an independent institution (ECB in Europe) whose main objective is price stability;

- Fiscal policy oriented towards consolidation of public finances and reduction of public debt and the search for a better "quality" of spending.

This paragraph examines the arguments in favor of an active economic policy in accordance with the Keynesian framework. The American economist R.A. Musgrave defines the 3 functions of fiscal policy (Musgrave, 1959) – see Box 35 :

- Macroeconomic stabilisation. Unstable economic activity generates risk that is costly in terms of well-being i.e. economic agents do not like risk and seek to get rid of it. The government can reduce this risk by changing macroeconomic balances in the short term using the fiscal balance. Fiscal policy can therefore influence aggregate demand in the short term. This influence can be described through the 45° diagram and the effect of public multipliers. This is the subject of this section;
- Allocation of productive resources. Public expenditure influences the allocation of factors of production in the economy. It therefore affects the structure and level of production, i.e. the aggregate supply. The justification for this function lies in the existence of market failures (externalities, public goods, information asymmetries, imperfect competition) ;<sup>32</sup>
- Redistribution of income. Through taxation and public expenditure, the State modifies the distribution of income and assets, i.e. has an influence on the sharing of the "spoils of economic growth" or on making growth more inclusive. Effective redistribution should reduce income inequalities (primary / secondary). A recent study issued by the IMF reports that the last three decades have shown increasing inequalities in most developed and emerging countries. This puts the distributional effects of fiscal policies at the heart of the public debate, as JMK already foresaw it (Box 27 p. 167). The current pandemic has not reversed the trend despite a surge in public debt (International Monetary Fund, 2017, chap. 1): currently the public amounts to 112% of GDP in France (2021).

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<sup>32</sup> Pour plus de développements : (Bozio and Grenet, 2010)

Historical studies show that the 1918 influenza pandemic also triggered long lasting distributional effects (Galletta and Giommoni, 2020).

**Box 32. The three duties of the sovereign according to Adam Smith**

“THE FIRST duty of the sovereign, that of protecting the society from the the violence and invasion of other independent societies, can be performed only by means of a military force. But the expence both of preparing this military force in time of peace, and of employing it in time of war, is very different in the different states of society, in the different periods of improvement [...]

The first duty of the sovereign, therefore, that of defending the society from the violence and injustice of other independent societies, grows gradually more and more expensive, as the society advances in civilization. The military force of the society, which originally cost the sovereign no expence either in time of peace or in time of war, must, in the progress of improvement, first be maintained by him in time of war, and afterwards even in time of peace [...]

THE SECOND duty of the sovereign, that of protecting, as far as possible, every member of the society from the injustice or oppression of every other member of it, or the duty of establishing an exact administration of justice requires too very different degrees of expence in the different periods of society [...]

THE THIRD and last duty of the sovereign or commonwealth is that of erecting and maintaining those public institutions and those public works, which, though they may be in the highest degree advantageous to a great society, are, however, of such a nature, that the profit could never repay the expence to any individual or small number of individuals, and which it therefore cannot be expected that any individual or small number of individuals should erect or maintain. The performance of this duty requires too very different degrees of expence in the different periods of society.

After the public institutions and public works necessary for the defence of the society, and for the administration of justice, both of which have already been mentioned, the other works and institutions of this kind are chiefly those for facilitating the commerce of the society, and those for promoting the instruction of the people. The institutions for instruction are of two kinds; those for the education of the youth, and those for the instruction of people of all ages. The consideration of the manner in which the expence of those different sorts of public works and institutions may be most properly defrayed, will divide this third part of the present chapter into three different articles.”

Source: (Smith, 1776a). Book V. Of the Expences of the Sovereign or Commonwealth

**Box 33. The major goals of economic policy according to Friedman (1912 - 2006)**

“There is wide agreement about the major goals of economic policy: high employment, stable prices, and rapid growth. There is less agreement that these goals are mutually compatible, or among those who regard them as incompatible, about the terms at which they can and should be substituted for one another. There is least agreement about the role that various policy instruments of policy can and should play in achieving the several goals”

Source : (Friedman, 1968)

« Les objectifs majeurs de la politique économique font l’objet d’un vaste consensus : plein emploi, stabilité des prix et croissance rapide. L’accord est moindre quand il s’agit de savoir si ces objectifs sont compatibles ou, pour ceux qui les considèrent comme incompatibles, dans quelle mesure ils pourraient et devraient être substitués l’un à l’autre ou, quel rôle les différents instruments de politique économique devraient jouer dans la réalisation de ces divers objectifs. »

**Box 34. The major goals of economic policy according to Kaldor (1908 – 1986)**

Economic policy is the set of actions adopted to stabilize the economy, whether through fiscal policy, monetary policy, or any instrument that could influence income, production and employment. Its objectives are summarized by the so-called "magic square" formula (stated by the economist Kaldor): price stability, full employment, expansion and external balance.

"Since that time the notion of 'economic policy objectives' has acquired a new precision-one could almost say a new meaning-and governments have come to be judged by performance criteria which they would have strongly disclaimed in earlier days. The best evidence for this is that policy objectives have come to be expressed in quantitative terms-as 'targets.' Successive post-war Chancellors have announced a *full-employment* target, expressed in terms of an average percentage of unemployment which is not to be exceeded (3 % by Mr. Gaitskell in 1950): a *balance of payments* target, expressed in terms of a current surplus of so many millions (such as the £300 million put forward by Mr.-now Lord-Butler in 1952); a *growth* target (4% by Mr. Maudling in 1964 and in the National Plan of 1965) and a *wage-increase or incomes policy* target (by Sir Stafford Cripps in 1949; by Mr. Selwyn Lloyd in 1962; Mr. Maudling in 1964; Mr. Brown in 1965; by legislation in 1966, etc.)."

Source: (Kaldor, 1971)

**Box 35. The "three branches" of public finance according to Richard Abel Musgrave (1910 - 2007)**

"A key feature of Musgrave's Theory of Public Finance was the division of the problem of public finance into what Musgrave called three "branches." **One** "branch" was devoted to the problem of achieving full employment. Here Musgrave applied the ideas of Keynesian fiscal policy to using tax reductions and government spending to increasing aggregate demand. A **second** "branch" focused on economic efficiency, i.e., on the design of taxes that would raise revenue with the least distortion to incentives and therefore the least loss of real incomes. The **third** "branch" then dealt with issues of redistribution to achieve a politically acceptable distribution of income. These branches were of course just pedagogical devices and not a way of organizing the actual making of policy."

Source: The Harvard Gazette 2008. Available at : <https://news.harvard.edu/gazette/story/2008/06/richard-musgrave/> Accessed March 30, 2022

## 4.1 Investment multiplier

This multiplier effect illustrates the role of the Government in macroeconomic stabilization. In periods of economic slowdown when the economic activity does not ensure full employment, the Government can support economic activity by relying on the multiplier effect exerted by the components of the aggregate demand (AD). The idea is that if the aggregate demand increases (decreases) by 1€, the national income will also increase (decrease). Put differently, aggregate demand variations and national income variations are positively correlated. We also expect that if aggregate demand increases by 1€ national income will increase by more than 1€, but this is not warranted (Definition 46 p. 168). This is what it usually meant by the multiplier effect (Figure 52): it is a positive feedback effect generated by any increase in the AD.

JMK did not coin the term “multiplier”. The principle of the multiplier is borrowed from Richard F. Kahn who is a precursor of the analysis of economic fluctuations and defined the “employment multiplier” (Kahn, 1931).

JMK focuses on investment because it is unstable and subjected to “animal spirits” (see Chapter 2) and Box 36. Investment increases when the interest rate decreases. Lowering the interest rate through monetary policy measures contributes to the “euthanasia of the rentier” and has a positive effect on aggregate investment. This latter effect is however indirect. JMK rather recommends that the Government has an active role and directly supports public investments: the Government supports the AD and reduces investment instability. Multiplier effects of investment have a long history dating back to Pericles (Box 37).

Yet, this multiplier effect can be applied to other elements of aggregate demand such as public expenditure (see paragraph 4.2 p. 204). The interest of the Keynesian cross diagram is that it makes it possible to represent the multiplier effects of an active fiscal policy.

Figure 52. Raisonement à la marge. Si l’investissement, ou tout autre élément de la demande autonome, augmente de 1 €, alors la droite représentant la DG anticipée se déplace vers le haut : l’ordonnée à l’origine du graphe augmente de 1 €. Le revenu de l’économie augmente d’une quantité  $\Delta Y$  supérieure à 1 en raison de l’effet multiplicateur. Le mécanisme sous-jacent à cet effet multiplicateur, vient de ce que la dépense supplémentaire d’investissement de 1 € engendre un revenu supplémentaire de 1 € (point  $E'$ ) aux entreprises. Mais ensuite cet € de revenu supplémentaire permet de consommer et d’importer plus : cela ajoute  $(1-t)c-m < 1$  € de plus au revenu. Ce supplément de revenu engendre lui-même une dépense supplémentaire qui engendre  $((1-t)c-m)^2 < (1-t)c-m$  € de revenu. Et ainsi de suite : ces revenus supplémentaires s’ajoutent. Il s’agit d’un effet de rétroaction qui va s’amenuisant. L’effet total en termes de revenu d’une augmentation de 1€ de l’investissement est égal à  $k$ € avec  $k > 1$  et  $k$  est appelé le multiplicateur de l’investissement :

$$1 + (1-t)c-m + ((1-t)c-m)^2 + ((1-t)c-m)^3 + \dots + ((1-t)c-m)^n = 1/(1-c(1-t)+m) = k$$

Plus généralement, si l'investissement augmente de  $\Delta I$  alors le revenu augmente de  $\Delta Y = k\Delta I$ . Pour établir l'effet multiplicateur, il faut partir du revenu d'équilibre :

$$Y^* = \frac{DA}{1 - c(1 - t) + m}$$

L'investissement étant entièrement autonome, une modification de celui-ci toutes choses égales par ailleurs, permet d'établir l'effet multiplicateur :

$$\Delta Y^* = k_I \Delta I_0 \text{ avec } k_I \equiv \frac{1}{1 - c(1 - t) + m} \text{ le multiplicateur étant supérieur à 1.}$$

Dans l'exemple précédent une augmentation de l'investissement de 100 entraîne une augmentation du revenu de  $k \cdot 100 = 100 \cdot 1 / (1 - 0,8 + 0,2) = 250$ . Remarques :

1. Ne pas confondre l'effet multiplicateur et l'effet accélérateur. Les 2 concernent l'investissement, mais dans le premier cas est décrit l'effet sur le revenu d'une modification autonome de l'investissement ; dans le second cas, c'est la variation anticipée de la demande qui impacte l'investissement. Autrement dit, dans le premier cas, l'investissement est endogène, dans le second il est autonome c'est-à-dire exogène ;
2. Le multiplicateur  $k$  dépend des hypothèses faites sur l'économie : ouverte / fermée, avec ou sans Etat, transferts proportionnels ou forfaitaires ;
3. Dans le cas étudié ici d'une économie ouverte, plus la propension à importer est élevée, moins l'effet multiplicateur est important au final (cf. conditions d'efficacité *infra*).
4. L'effet multiplicateur fonctionne aussi bien à la hausse comme à la baisse : mécanisme symétrique. Toute fuite du circuit économique entraîne une baisse du revenu d'équilibre dont l'ampleur dépend du multiplicateur
5. L'effet multiplicateur est ponctuel : la hausse de l'investissement entraîne une hausse permanente du revenu que si la dépense supplémentaire d'investissement est elle-même permanente ;
6. Quand on le combine avec l'effet accélérateur de l'investissement alors on obtient l'oscillateur de Samuelson (cf. chapitre II de la première partie)

Quand l'investissement augmente pour engendrer un effet multiplicateur, l'épargne s'ajuste passivement : un investissement engendre toujours le montant d'épargne nécessaire au financement de l'investissement supplémentaire. Dans une économie fermée la dépense supplémentaire d'investissement engendre une augmentation équivalente de l'épargne. Dans une économie ouverte cela n'est plus vrai dans la mesure où le supplément d'investissement entraîne également une augmentation des importations.

Sous réserve. En effet considérons la fonction d'épargne établie dans l'exemple ci-dessus ( $t = 0$ ) :

$$S(Y) = 0,2Y - 120$$

Ce qui peut faire varier l'épargne est le revenu : l'épargne agrégée est une fonction croissante du revenu de l'économie nationale. Si le revenu augmente, l'épargne s'ajustera automatiquement. Une modification du revenu, toutes choses égales par ailleurs modifie l'épargne de la manière suivante :

$$\begin{aligned} \Delta S(Y) &= 0,2\Delta Y \text{ si on rapproche cela de l'effet multiplicateur de la dépense d'investissement :} \\ \Delta Y &= \Delta I / (1-c+m) = \Delta I / 0,4 \text{ d'où } \Delta S(Y) = 0,2 \cdot \Delta I / 0,4 = \Delta I / 2 \\ \Delta M &= 0,2\Delta Y \end{aligned}$$

De l'égalité comptable  $S^* - I + T - G = X - M^*$  on déduit que pour un investissement supplémentaire de 100, l'épargne et les importations s'ajustent automatiquement :

$$\underbrace{\Delta S + \Delta M}_{50+50} = \Delta I \quad +100$$

Le supplément d'investissement a engendré un supplément d'épargne et d'importation dans une économie ouverte.

Mais si le « désir » d'épargne augmente (rupture de la clause toutes choses égales par ailleurs), la fonction d'épargne se déplace vers le haut et diminue le revenu d'équilibre. (Cf. Volume d'épargne et désir d'épargne, (Bailly *et al.*, 2006, p. 152)). Ce désir d'épargne illustre pour JMK le paradoxe de l'épargne : l'épargne souhaitable au niveau individuel devient un « vice » au niveau macro ( page 173) ; ce paradoxe rejoint celui de la frugalité au sein de l'abondance.

### Box 36. The government's role in investment

"For my own part I am now somewhat sceptical of the success of a merely monetary policy directed towards influencing the rate of interest. I expect to see the State, which is in a position to calculate the marginal efficiency of capital-goods on long views and on the basis of the general social advantage, taking an ever greater responsibility for directly organising investment; since it seems likely that the fluctuations in the market estimation of the marginal efficiency of different types of capital, calculated on the principles I have described above, will be too great to be offset by any practicable changes in the rate of interest."

« Pour notre part, nous sommes aujourd'hui assez sceptique sur les chances de succès d'une politique purement monétaire consistant à agir sur le taux de l'intérêt. L'État étant en mesure de calculer l'efficacité marginale des capitaux avec des vues lointaines et sur la base des intérêts sociaux de la communauté, nous nous attendons à le voir prendre une responsabilité sans cesse croissante dans l'organisation directe de l'investissement. Car l'estimation de l'efficacité marginale des divers types de capitaux, telle qu'elle est faite sur le marché d'après les principes précédemment indiqués, semble appelée à subir des fluctuations d'une ampleur trop considérable pour qu'on puisse la compenser par les variations pratiquement possibles du taux de l'intérêt. »

Source : (Keynes, 1936b) Book IV The Inducement to Invest, Chapitre XI The marginal efficiency of capital.

### Box 37. How Pericles anticipated the Keynesian multiplier effect

"Sir, Joseph Stiglitz's suggestion that quantitative easing may not be the best route out of the present economic doldrums and that a mixture of investment in capital projects and extended unemployment benefits offers quicker and more lasting improvements bears comparison with an earlier precedent than he cites ("It is folly to put all our trust in the Fed ", Comment, October 19).

If my schoolboy ancient history still serves me well, in the middle of the fifth century BC, Pericles made a valiant and successful attempt to stimulate the Athenian economy by embarking on a vast programme of public works, resulting in some of the monuments we see today, as well as transport and military projects (compare Germany in the 1930s).

Pericles thus anticipated the Keynesian multiplier effect by providing work for masons, labourers, quarry owners, shipbuilders and other manufacturers and suppliers.

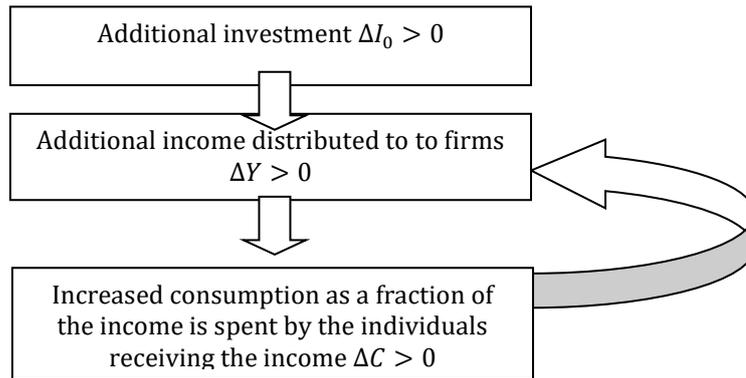
However, in contrast to Prof Stiglitz's prescription, Pericles resisted the temptation to make transfer payments to support the no doubt needy but disenfranchised slave population, and in due course taxed the trade arising from the stimulated economy.

Western economies are in urgent need of capital projects to combat the consequences of climate change, ageing infrastructure and social needs such as housing, hospitals and schools, but these are the very projects (with a few exceptions) that are being axed, postponed or not contemplated in favour of gratuitously boosting, in a rather inefficient and roundabout way, the balance sheets of banks by subsidising their profit margins.

It is easier to axe a capital project than to have a serious impact on social security costs and pension payments that are the real excess in the system. In this respect Pericles had an easier ride, pensions liabilities and social payments not being to the fore in his time (and even if they had been, the mortality tables would have been the stuff of dreams for today's pension fund managers)."

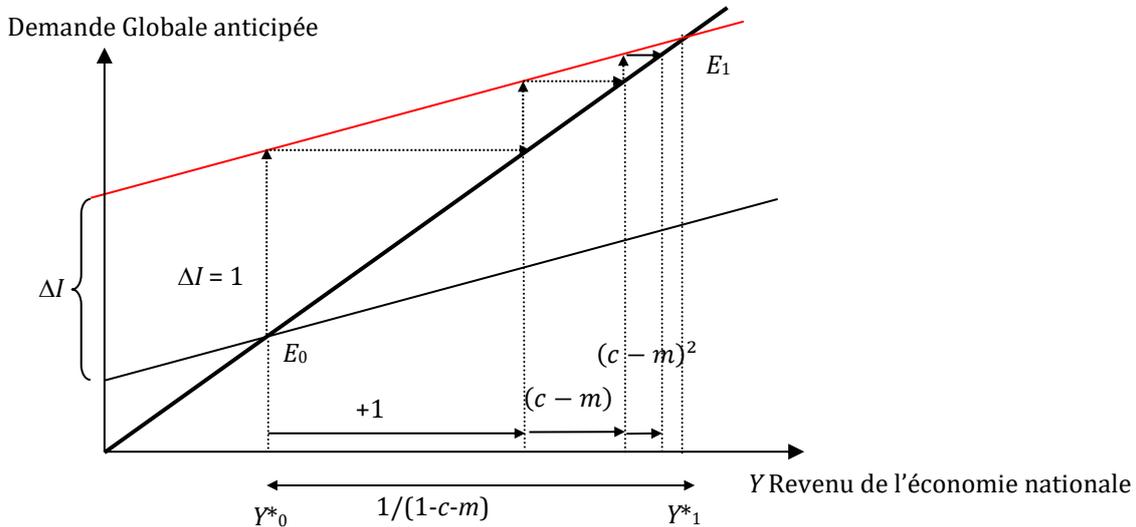
Source : Derham O'Neill, 2010, Letters to the Editor, *Financial Times* <https://www.ft.com/content/36e740fa-e878-11df-b32f-00144feab49a> Accessed Feb. 22<sup>nd</sup>, 17.

Figure 52. Investment multiplier



4.1.1 A provisional summary (tbc)

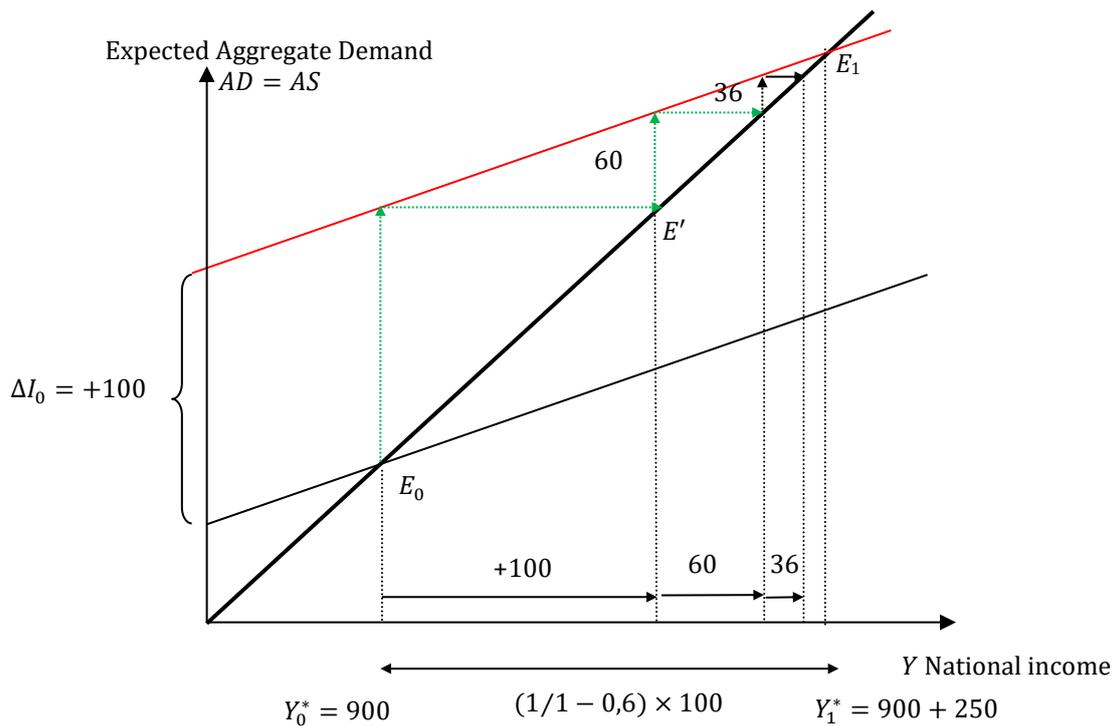
Figure 53. Le multiplicateur d'investissement sur le diagramme à 45°



$Y^*_0$ : revenu d'équilibre avant l'accroissement de l'investissement ;  $Y^*_1$ : revenu d'équilibre après l'accroissement de l'investissement ; Hypothèses de la fonction de DG :  $C = C_0 + cY^d$  avec  $0 < c < 1$  et  $C_0 > 0$  ;  $Y^d \equiv Y - T$  ;  $T = T_0$  avec  $T_0 > 0$  ;  $I = I_0$  ;  $M = M_0 + mY$  ; avec  $0 < m < 1$  et  $M_0 > 0$  ;  $X = X_0$  ;  $G = G_0$ .

Lors de la première vague le revenu augmente de 1 ; lors de la deuxième vague, le revenu augmente de  $(c - m)$  ; lors de la troisième vague, le revenu augmente de  $(c - m)^2$ . Au final l'accroissement du revenu d'équilibre  $Y^*_1 - Y^*_0 \equiv \Delta Y^* = (1 + (c - m) + (c - m)^2 + \dots + (c - m)^n)\Delta I_0 = \frac{1}{1 - (c - m)}\Delta I_0$

Figure 54. The investment multiplier using the Keynesian cross diagram



$AD(Y) = 360 + 0,6Y$ .  $Y_0^*$  is the equilibrium income before the increase in investment.  $E_0$  is located where the first bisecting line crosses the graph of the AD function when  $Y = Y_0^*$ .  $Y_1^*$  is the equilibrium income after the increase in investment. Similarly,  $E_1$  is located where the first bisecting line crosses the graph of the AD function when  $Y = Y_1^*$ .

$\Delta I_0 = +100$  is the exogenous variation in investment. The decomposition of its effect is depicted with green arrows.

$\Delta I_0 = +100$  generates a first wave increase in income: income increases by 100. See the horizontal increase on the graph i.e.  $\Delta Y = +100$ . From a graphical point of view, the vertical increase  $\Delta I_0 = +100$  has translated into an horizontal increase  $\Delta Y = +100$ . The corresponding demand is therefore  $AD(1000) = 460 + 0,6 \times 1000 = 1060$  while income is  $Y = 900 + 100 = 1000$ . This is not an equilibrium situation since AD is greater than Y in  $E'$ .

In the second wave, AD increases by  $(c - m) \times \Delta Y = (c - m) \times \Delta I_0 = 0,6 \times 100 = 60$  (vertical increase) which transforms into an income increase of  $\Delta Y = 60$ . What about the levels? The new value for AD is:  $AD(960) = 460 + 0,6 \times 960 = 1036$  while  $Y = 900 + 60 = 960$ . Still this is not an equilibrium situation.

In the third wave, AD increases by  $(c - m)^2 \times \Delta I_0 = 0,36 \times 100 = 36$ . It is represented by a vertical increase of 36 that transforms into an income increase of 36. What about the levels? Up to you to answer. We still have a disequilibrium between AD and AS.

It is important to notice that income increases in each wave are getting lower and lower:  $\Delta Y = +100$ , then  $\Delta Y = +60$ , then  $\Delta Y = +36$  and so forth. Each income increase is lower compared to the previous wave because of savings and imports: savings and imports are not domestic expenditures. Income increases vanish up to the new equilibrium in  $E_1$ . The total income increase is  $\Delta Y = +100 + 60 + 36 + \dots$ . It is calculated using the appropriate investment multiplier as follows:

$$k_I \times \Delta I_0 = \frac{1}{1 - 0,6} \times 100 = 250$$

And  $\Delta Y^* = Y_1^* - Y_0^*$  then:

$$Y_1^* = Y_0^* + 250 = 900 + 250 = 1150$$

We can evaluate the leakages generated by additional savings and imports generated by the increase in income. Remember that imports and savings depend on the national income as follows:

$$\begin{aligned} M &= 0,2Y + 20 \\ S &= 0,2Y^d - 100 \end{aligned}$$

With  $Y^d = Y - T_0$ , we have:

$$S = 0,2Y - 120$$

Taking values (beware of the variation that cancels out the autonomous term):

$$\begin{aligned} \Delta M &= 0,2\Delta Y = 0,2 \times 250 = 50 \\ \Delta S &= 0,2\Delta Y = 0,2 \times 250 = 50 \end{aligned}$$

Interpretation. While the national income is increasing by 250, leakages amount to  $50 + 50 = 100$  because they escape the domestic expenditure. Imports actually boost the RoW income.

**Box 38. Fiscal multipliers: a summary**

“No matter what exogenous variation triggers the process, and no matter whether it is negative or positive, equilibrium income  $Y^*$  always responds to aggregate demand, sometimes by more than the initial variation. The multiplier effect corresponds to the basic message of the economic circuit: every expenditure of one economic agent is the income of another. By increasing income, an exogenous increase in demand induces an additional desired expenditure, leading to an increase in both income and expenditure. This is an endless process, although at each stage the effect diminishes and eventually wears off. The economic circuit shows where the leakage occurs. They take the form of taxes, savings and imports. These three leakages correspond to income that is not automatically re-spent on domestic goods and services.”

Source: (Burda and Wyplosz, 2014, p. 278)

## 4.2 Fiscal multipliers

According to JMK, market mechanisms do not work properly and cannot spontaneously achieve full employment of factors of production: the national economy can be trapped in an underemployment equilibrium (Definition 48 p. 177). To direct the economy towards full employment, public authorities must first identify the nature of the imbalance. To do this, it is necessary to define a "target" that is the full employment income  $Y_{FE}$ . Full employment is one of the targets of the magic square proposed by Kaldor (Box 34). Fiscal policy tools (Definition 51) can achieve this target while generating fiscal multiplier effects. It is, however, important to notice that reaching  $Y_{FE}$  can be detrimental to other targets as put forward by Friedman (Box 33).

To direct the economy towards full employment income, public authorities must first identify the nature of the balance namely whether the economy is in a deflationary or inflationary situation (para. 4.2.1 p. 205). Then they carry out the macroeconomic stabilization using fiscal policy (Definition 51). The transmission channel of fiscal policy to GDP is based on fiscal multipliers that that are many: the gvt spending multiplier (para 4.2.2 p. 207), the tax multiplier (4.2.3 p. 210) and eventually the balanced budget multiplier (para 4.2.4 p. 212).

### Definition 51. Fiscal policy

**"Fiscal policy is the use of government spending and taxation to influence the economy.** When the government decides on the goods and services it purchases, the transfer payments it distributes, or the taxes it collects, it is engaging in fiscal policy. The primary economic impact of any change in the government budget is felt by particular groups--a tax cut for families with children, for example, raises their disposable income. Discussions of fiscal policy, however, generally focus on the effect of changes in the government budget on the overall economy. Although changes in taxes or spending that are 'revenue neutral' may be construed as fiscal policy--and may affect the aggregate level of output by changing the incentives that firms or individuals face--the term "fiscal policy" is usually used to describe the effect on the aggregate economy of the overall levels of spending and taxation, and more particularly, the gap between them.

Fiscal policy is said to be tight or contractionary when revenue is higher than spending (i.e., the government budget is in surplus) and loose or expansionary when spending is higher than revenue (i.e., the budget is in deficit). Often, the focus is not on the level of the deficit, but on the change in the deficit. Thus, a reduction of the deficit from \$200 billion to \$100 billion is said to be contractionary fiscal policy, even though the budget is still in deficit...."

Source: <http://www.econlib.org/library/Topics/College/fiscalpolicy.html> accessed March 20, 2017.

#### 4.2.1 Equilibrium typology

According to JMK, full employment is "of rare and short-lived occurrence". Market mechanisms do not ensure that the equilibrium income denoted by  $Y^*$  will converge towards  $Y_{FE}$ . It is very difficult to define full employment. But it is not a nil unemployment rate. See e.g. The Economist 29 Jan 17 paper at <https://www.economist.com/the-economist-explains/2017/01/29/what-full-employment-really-means>.

Two imbalances (disequilibria) can occur:

$Y^* < Y_{FE}$  that opens a deflationary gap;

$Y^* > Y_{FE}$  that corresponds to an inflationary gap.

The first case is more likely because it entails (labour) unemployment and/or idle productive capacities. This is a deflationary situation because if prices were fully flexible, a fall in prices could boost aggregate demand and, therefore, national income. Prices are, however, rigid or sticky. Market mechanisms are ineffective and the underemployment equilibrium prevails.

##### 4.2.1.1 Deflationary gap (*sous-emploi*)

Consider below the definition (Definition 52) and the diagrammatic representation (Figure 55) of the deflationary gap.

**Definition 52. Deflationary gap – Ecart déflationniste**

It shows the amount by which aggregate demand must be increased so that the equilibrium level of national income  $Y^*$  is increased to the full employment level  $Y^{FE}$ . It is measured by the distance between the first bisecting line and the aggregate demand when  $Y = Y^{FE}$ .

Il représente la quantité dont il faudrait majorer la demande globale pour obtenir le plein emploi. Sur le diagramme à 45° cela est représenté par la distance verticale entre la 1<sup>ère</sup> bissectrice et la DG anticipée, mesurée au revenu de plein emploi.

4.2.1.2 *Inflationary gap*

Full employment income is lower than the equilibrium income. This situation is, however, more unlikely except in exceptional situations such as World War II in England. In 1940, JMK published an essay on the UK war effort *How to pay for the war: a radical plan for the chancellor of the Exchequer* (Keynes, 1940). The question asked was: how can England carry out its war effort without generating inflation? See the definition (Definition 53) and the graphical representation (Figure 55).

**Definition 53. Inflationary gap**

Lipsey “The inflationary gap is the amount by which aggregate expenditure would exceed aggregate output at the full employment level of income”.

Il représente la quantité dont il faudrait diminuer la demande globale pour revenir au plein emploi. Sur le diagramme à 45° cela est représenté par la distance verticale entre la 1<sup>ère</sup> bissectrice et la DG anticipée, mesurée au revenu de plein emploi.

4.2.1.3 *Numerical examples*

Take the AD function:  $AD = 360 + 0,6Y$  that gave  $Y^* = 900$ .

If  $Y_{FE} = 750$ , the AD function is depicted by  $AD_1$ . The AD is :  $AD(Y = 750) = 360 + 0,6 \times 750 = 810$ . There is an excess demand and therefore an inflationary gap. It is calculated as follows:  $AD(Y = 750) - Y_{FE} = 810 - 750$ . The gap is 60.

If  $Y_{FE} = 1100$ , the AD function is  $AD_0$ . The AD is  $AD = 360 + 0,6 \times 1100 = 1020$ . The deflationary gap is  $Y_{FE} - DG(Y = 1100) = 1100 - 1020 = 80$ . This can be checked by increasing the autonomous demand by the amount of the gap. The AD function becomes  $DA' = 360 + 80 + 0,6Y$ . The equilibrium income is such that  $AD' = 360 + 80 + 0,6Y^* = Y^*$ . Then  $440 = (1 - 0,6)Y^* = 0,4Y^*$  and  $Y^* = \frac{440}{0,4} = 1100$  that is equal to the full employment equilibrium.

Figure 55. Inflationary gap on the 45 degree line diagram

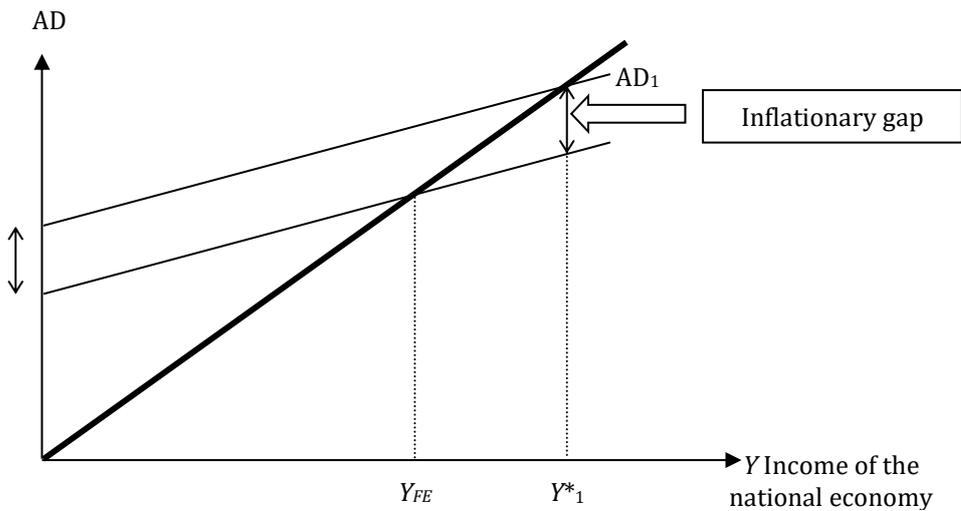
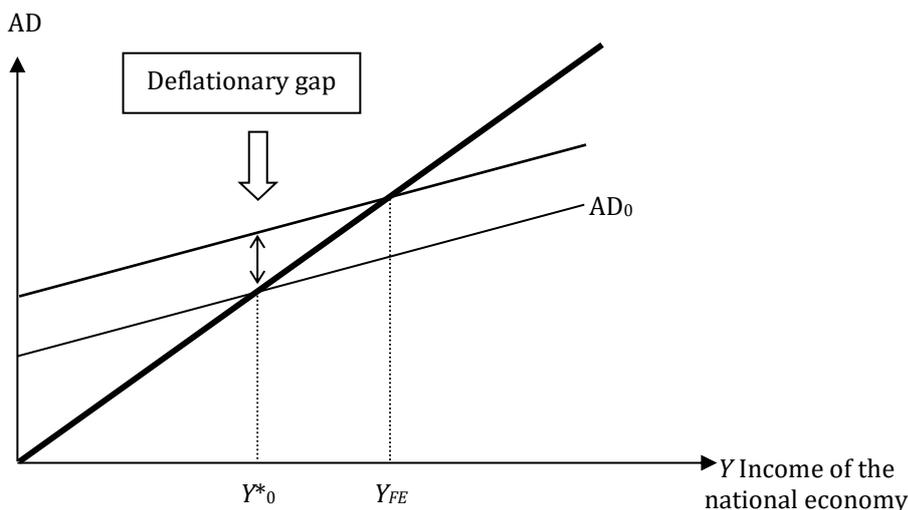


Figure 56. Deflationary gap on the 45 degree line diagram



#### 4.2.2 Government spending multiplier - Definition 54

Keynes pays attention to public expenditure, which can be financed by the public debt generated by the government's budget deficit. The public expenditure multiplier illustrates the impact of this expenditure on the national income.

Public expenditure generates a certain amount of income (salaries paid to employees, profits made by companies, interest received, etc.). Part of this income will be spent in a proportion equal to the marginal propensity to consume denoted by  $c$ . The other part will be saved in a proportion equal to  $1 - c$ . Expenditure on consumption is an additional demand which in turn generates income. There is an iterative process of consumption and

income generation, triggered by public expenditure, similar to that resulting from increased investment (Figure 52).

Below, the formal derivation of the government spending multiplier is developed. Let us take the following aggregate demand function:

$$\begin{cases} AD(Y) = AD_0 + (c(1-t) - m)Y \\ AD_0 = C_0 - cT_0 + G_0 + I_0 + X_0 - M_0 \end{cases}$$

The equilibrium income is such that the aggregate demand is equal to the income of the national economy. It is an ex post equilibrium:

$$\begin{aligned} Y^* &= AD(Y^*) \Leftrightarrow \\ Y^* &= AD_0 + (c(1-t) - m)Y^* \Leftrightarrow \\ Y^* &= C_0 - cT_0 + G_0 + I_0 + X_0 - M_0 + (c(1-t) - m)Y^* \Leftrightarrow \\ Y^*(1 - c(1-t) + m) &= C_0 - cT_0 + G_0 + I_0 + X_0 - M_0 \Leftrightarrow \\ Y^* &= \frac{C_0 - cT_0 + G_0 + I_0 + X_0 - M_0}{1 - c(1-t) + m} = \frac{AD_0}{1 - c(1-t) + m} \end{aligned}$$

Notice that we have an equality entailing the levels of the different variables and parameters.

The multiplier effect induced by additional public expenditures departs from a positive variation in public expenditures denoted by  $\Delta G_0$ . It is important to note that increased public expenditure is the only component of autonomous aggregate demand that changes. Formally, we have:  $\Delta G_0 = \Delta AD_0$ . The effect on the equilibrium income writes as:

$$\begin{aligned} \Delta Y^* &= \frac{\Delta G_0}{1 - c(1-t) + m} = \frac{\Delta AD_0}{1 - c(1-t) + m} \\ k_G &\equiv \frac{\Delta Y^*}{\Delta G_0} = \frac{1}{1 - c(1-t) + m} \end{aligned}$$

Note that the multiplier effect highlights the effect of a variation of one of the components of autonomous demand on the equilibrium income of the national economy.

#### 4.2.2.1 Numerical example

Let us use  $AD(Y) = 360 + 0,6Y$  i.e.  $AD_0 = 360$  and  $c(1-t) - m = 0,6$ . Under the assumption that no other element of the AD changes except public expenditures, we have:

$$\Delta Y^* = \frac{\Delta G_0}{1 - 0,6} = \frac{\Delta G_0}{0,4} = 2,5 \times \Delta G_0$$

The government spending multiplier is:

$$\frac{\Delta Y^*}{\Delta G_0} = \frac{1}{1 - c(1 - t) + m} = \frac{1}{0,4} = 2,5$$

It is denoted by:

$$k_G \equiv \frac{1}{1 - c(1 - t) + m}$$

The general definition is given by Definition 54 below.

#### 4.2.2.2 Food for thought

Represent the effect of an increase in public expenditure. You can have a look at (Mankiw, 2010a, p. 292). The book is available on the Moodle platform.

Think about the consequences of a higher marginal propensity to consume or a lower marginal propensity to income on the multipliers.

Think about the effect of an increase in public expenditures on  $T - G$ . See below (in French)

Dans l'hypothèse de transferts nets vers l'Etat proportionnels au revenu de l'économie nationale, l'effet multiplicateur engendre un accroissement des transferts nets induits vers l'Etat, les transferts autonomes étant constants :

$$\Delta T = \Delta T_0 + t\Delta Y$$

d'où :

$$\Delta T = t \frac{1}{1 - c(1 - t) + m} \Delta G_0 > 0$$

donc le solde budgétaire évolue de la façon suivante :

$$\Delta T - \Delta G = \left( t \frac{1}{1 - c(1 - t) + m} - \frac{1}{1 - c(1 - t) + m} \right) \Delta G_0 = \frac{-1 + t}{1 - c(1 - t) + m} \Delta G_0 < 0$$

Si le budget public était à l'équilibre ou en déficit, la dette publique augmente.

**Definition 54. The Government spending multiplier**

It expresses the increase in income and production resulting from an increase in public expenditure while net transfers to the government are held constant:

$$\Delta Y = \frac{1}{1 - c(1 - t) + m} \Delta G_0 ; \Delta G_0 > 0 \text{ and } \Delta T_0 = 0$$

$$k_G \equiv \frac{1}{1 - c(1 - t) + m} > 0$$

The same multiplier effect as investment is achieved through public spending. Under the assumption of a closed economy we can have:

$$k_G \equiv \frac{1}{1 - c(1 - t)}$$

4.2.3 Tax multiplier - Definition 55

Rather than increasing public expenditure, the government can reduce taxes or increase social benefits paid to households. The tax multiplier expresses the effect of a decrease in taxes on income for an unchanged level of public expenditure (and any other element of autonomous demand). In our theoretical framework, the decrease in taxes and social security contributions is represented by a decrease in autonomous net transfers to government denoted by  $T_0$ .

It can be shown that the absolute value of the tax multiplier is lower than that of the budget multiplier. Let us depart from the equilibrium income expression:

$$Y^* = \frac{C_0 - cT_0 + G_0 + I_0 + X_0 - M_0}{1 - c(1 - t) + m} = \frac{AD_0}{1 - c(1 - t) + m}$$

Assume now that autonomous net transfers decrease  $\Delta T_0 < 0$ , other elements of the autonomous demand held constant. We have:

$$\Delta Y^* = \frac{\Delta AD_0}{1 - c(1 - t) + m} = \frac{-c\Delta T_0}{1 - c(1 - t) + m}$$

$\Delta Y^*$  is positive because  $-c\Delta T_0$  is positive.

The tax multiplier is denoted by:

$$|k_T| \equiv -\frac{\Delta Y^*}{\Delta T_0} = \frac{c}{1 - c(1 - t) + m} < k_G$$

We notice that fiscal multipliers are not equal: the tax multiplier is equal to the government spending multiplier times the marginal propensity to consume:

$$|k_T| = c \times k_G$$

Since the marginal propensity to consume is lower than 1, we conclude that:

$$|k_T| < k_G$$

Policy implications: Lowering taxes is less effective in combating recessions than increasing public spending. Increasing government spending has a direct effect on national income, whereas reducing net transfers has an indirect effect. Reducing net transfers to the government first results in an increase in disposable income which is not fully spent. Disposable income is shared between consumption and savings which is a leakage.

#### 4.2.3.1 Numerical example

Numerical example. We use  $AD(Y) = 360 + 0,6Y$  i.e.  $AD_0 = 360$  and  $c(1 - t) - m = 0,6$  with  $c = 0,8$ . Under the assumption that no other element of the AD changes except net transfers to the government, we have:

$$\Delta Y^* = \frac{-0,8 \times \Delta T_0}{1 - 0,6} = \frac{-0,8 \times \Delta T_0}{0,4} = -2 \times \Delta T_0$$

Since  $\Delta T_0 < 0$ , the tax multiplier is positive:

$$\frac{\Delta Y^*}{|\Delta T_0|} = 2$$

#### 4.2.3.2 Food for thought

Try to graphically represent the effect of a decrease in net transfers to the Government. See (Mankiw, 2010a, p. 294). The book is available on the Moodle platform.

Try to find out examples of active fiscal policies implemented in France within the last 50 years.

Think about the effect of a decrease in net transfers to the gvt on  $T - G$ . See below (in French)

Dans l'hypothèse de transferts nets vers l'Etat proportionnels au revenu de l'économie nationale, l'effet multiplicateur d'une baisse de  $T_0$  engendre un accroissement des transferts nets induits vers l'Etat, les transferts autonomes étant constants :

$$\Delta T = \Delta T_0 + t\Delta Y$$

d'où

$$\Delta T = \Delta T_0 + t \frac{-c}{1 - c(1 - t) + m} \Delta T_0 = \frac{1 - c(1 - t) + m - ct}{1 - c(1 - t) + m} \Delta T_0 = \frac{1 - c + m}{1 - c(1 - t) + m} \Delta T_0 < 0$$

donc le solde budgétaire évolue de la façon suivante :

$$\Delta T - \Delta G = \Delta T = \frac{1 - c + m}{1 - c(1 - t) + m} \Delta T_0 < 0$$

Si le budget public était initialement en équilibre et en déficit, la dette publique augmente.

**Definition 55. The Tax multiplier**

It expresses the increase in income and production resulting from a reduction in net transfers to the government while public expenditures are held constant:

$$\Delta Y = \frac{-c}{1 - c(1 - t) + m} \Delta T_0 ; \Delta T_0 < 0 \text{ and } \Delta G_0 = 0$$

$$k_T \equiv \frac{-c}{1 - c(1 - t) + m} < 0$$

Or, equivalently:

$$|k_T| \equiv \frac{c}{1 - c(1 - t) + m} > 0$$

4.2.4 Balanced budget multiplier

Fiscal and fiscal multipliers are detrimental to the public balance and thus potentially increase public debt. But this effect on the public accounts is transitory: an increase in public debt stimulates the economy in the short run by making households feel richer and start consuming again.

But, it can also be shown that it is possible to use a balanced budget and obtain an increase in the national income. The government can increase expenditure and net

transfers by the same amount. The consequences of this economic stimulus without increasing the budget deficit have been described by the Norwegian economist Trygve Haavelmo (1911-1999). The result is known as Haavelmo's theorem (Haavelmo, 1945). He states that a balanced budget is not neutral but has a positive impact on the income of the national economy. Its magnitude is different depending on the assumptions made about the economy.

The balanced budget multiplier denoted by  $k_{eq}$  is established by adding both previous multipliers. We assume that:

$$\Delta G_0 = \Delta T_0$$

Then:

$$\left\{ \begin{array}{l} \Delta Y^* = \frac{\Delta G_0 - c\Delta T_0}{1 - c(1 - t) + m} = \frac{\Delta G_0 - c\Delta G_0}{1 - c(1 - t) + m} = \frac{1 - c}{1 - c(1 - t) + m} \times \Delta G_0 \\ \Delta G_0 = \Delta T_0 \end{array} \right.$$

The balanced budget multiplier is :

$$k_{balanced} \equiv k_G + k_T = \frac{1 - c}{1 - c(1 - t) + m}$$

#### 4.2.4.1 Numerical example

Numerical example. We use  $AD(Y) = 360 + 0,6Y$  i.e.  $AD_0 = 360$  and  $c(1 - t) - m = 0,6$  with  $c = 0,8$ . Under the assumption that  $\Delta G_0 = \Delta T_0$  while the other elements of the autonomous demand are kept constant, we have:

$$\Delta Y^* = \frac{\Delta G_0 - 0,8 \times \Delta T_0}{1 - 0,6} = \frac{\Delta G_0 - 0,8 \times \Delta G_0}{0,4} = \frac{1 - 0,8}{0,4} \times \Delta G_0 = \frac{0,2}{0,4} \times \Delta G_0 = 0,5 \times \Delta G_0$$

In short:

$$k_{balanced} = 0,5$$

It is positive but lower than the government spending and tax multipliers.

#### 4.2.4.2 Food for thought

If  $\Delta G_0 = \Delta T_0$  can we have  $\Delta G_0 = \Delta T^*$  with  $T = T_0 + tY$ ?

More on the theorem with Lepage 2004 (Text in French available on the Moodle platform).

**Definition 56. The theorem of Haavelmo – The Balanced budget multiplier**

The state budget is not neutral; even when public expenditure is entirely financed by taxes, it has a stimulating effect on economic activity. It can be expressed by the balanced budget multiplier:

$$\Delta Y = \frac{1 - c}{1 - c(1 - t) + m} \Delta T_0 ; \Delta T_0 = \Delta G_0 > 0$$

$$k_{balanced} = \frac{1 - c}{1 - c(1 - t) + m} > 0$$

### 4.3 Discussion

The discussion revolves around an analysis of successful fiscal policies (para 4.3.1). Most of the time, expansionary fiscal policies have an effect on public indebtedness (para 4.3.2 p. 216). Lastly, we pay attention to past experiences of expansionary fiscal policies while paying a specific attention to the 2008-2009 crisis (para 4.3.3 p. 219).

#### 4.3.1 Fiscal Policy Effectiveness

We discuss here the conditions under which expansionary fiscal policy are successful. We focus on parameters making the multipliers.<sup>33</sup>

##### 4.3.1.1 Idle production capacities

Macroeconomic equilibrium is an underemployment one whenever labor or capital are underutilized. Need to identify a deflationary equilibrium in order to justify an expansionary fiscal policy. Fiscal stimulus => labor demand ↑ => ↓ unemployment rate to full employment. In modern macroeconomics, full employment is NOT zero unemployment rate. It is rather a NAIRU (Non Accelerating Inflation Rate of

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<sup>33</sup> For complements, see e.g. (Cornia, 2020, p. 93)

Unemployment).<sup>34</sup> Similarly, a fiscal stimulus => ↑ increase in the utilization rate of capital.

#### 4.3.1.2 The marginal propensities

They condition the size of the multipliers; they are namely  $c$ ,  $m$  and  $t$ . Let us take the gvt spending multiplier:

$$k_G = \frac{1}{1 - c(1 - t) + m}$$

The marginal propensity to consume net of marginal tax rate must exceed the marginal propensity to import:  $1 - c(1 - t) + m > 0$ . This was not alluded before, but this condition is not always met. Let us assume that  $c = 0.7$ ,  $t = 0.4$  (quite high) and great openness  $m = 0.5$ . Then  $1 - c(1 - t) + m = 0.7 \times 0.6 - 0.5 = 0.42 - 0.5 = -0.08$ . According to Cornia, this is not uncommon in developing countries where they are no substitutes for imported goods.

Put differently, the higher the MPC, the higher the multiplier:

$$\frac{\partial k_G}{\partial c} = \frac{(1 - t)}{(1 - c(1 - t) + m)^2} > 0$$

Policy-makers can try to have  $c$  as high as possible through income redistribution policies from wealthier HHs to poorer ones who supposedly have a higher MPC. Increasing aggregate consumption is, above all, a policy of income redistribution in favour of the poorest, whose propensity to consume is highest. This was the guiding principle of the tax reforms carried out in the 1940s and 1950s in Western countries. See <https://www.frbsf.org/economic-research/publications/economic-letter/2015/june/income-redistribution-policy-economic-stimulus/>

The increase in public spending in 1981 had a multiplier effect, but this "injection" probably generated "leakage" from the circuit via the marginal propensity to import.

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<sup>34</sup> Wikipedia: "Non-accelerating inflation rate of unemployment (NAIRU) is a theoretical level of unemployment below which inflation would be expected to rise. It was first introduced as NIRU (non-inflationary rate of unemployment) by Franco Modigliani and Lucas Papademos in 1975, as an improvement over the "natural rate of unemployment" concept, which was proposed earlier by Milton Friedman. In the United States, estimates of NAIRU typically range between 5 and 6%." Source: Wikipedia, <https://en.wikipedia.org/wiki/NAIRU> acceded on May 1st, 2021.

Indeed, imports, defined as the demand by resident units for B&S manufactured in the RoW, depend, among other things, on the income of the economy and especially on GDP. A stimulus policy that increases output simultaneously stimulates imports and decreases the trade balance. The higher the propensity to import, the greater the negative effect on the trade balance. The multiplier is weaker in an open economy than in a closed economy:

$$\frac{\partial k_G}{\partial m} = \frac{-1}{(1 - c(1 - t) + m)^2} < 0$$

#### 4.3.1.3 Stability of propensities

Successful expansionary fiscal policies depends on  $c$  not to decrease and  $m$  not to increase. This can be the case when there are interactions between the policy-maker and the economic agents. The latter can change their behaviour when the policy-maker introduces a new measure. Japan entered a low-growth period in the decade of the 90s that was dubbed the lost decade. It was evidenced that an increase in public expenditures generated a decrease in the MPC whereby reducing the effect of fiscal multipliers. HHs increases their precautionary savings to cover potential asset losses incurred by default of domestic banks. The latter accumulated low-performing loans in the aftermath of a financial bubble in the real estate sector. Their solvency was under pressure (Cornia, 2020, p. 94).

#### 4.3.2 Public debt

The effect of fiscal policies on macro balances is another salient aspect of the discussion on the conditions of their success. More development in (Cornia, 2020, chap. 3.4).

Les multiplicateurs publics entraînent une dégradation des comptes publics. Cet effet est traditionnellement mis en avant par les opposants aux politiques d'inspiration keynésienne. Fiscal Contractions Be Expansionary according to (Giavazzi and Pagano, 1990)

##### 4.3.2.1 Crowding out effects

En effet si la dette publique augmente, celle-ci entre en concurrence avec la dette privée sur le marché des fonds prêtables car un emprunteur souverain offre plus de garanties – sauf dans le cas de pays fortement endettés. En csq, un emprunteur souverain lève plus

facilement des capitaux qu'un emprunteur privé (effet quantité). La dette publique nourrit la demande de fonds prêtables. Les taux d'intérêt sont donc entraînés à la hausse (effet prix). La composition de la production est changée : l'investissement privé est évincé ce qui pénalise la croissance à long terme.

On parle alors d'effet d'éviction (*crowding out effect*) c'est-à-dire du rationnement de la demande de fonds prêtables par les emprunteurs privés au profit des emprunteurs souverains. Cet effet peut contrecarrer les effets d'une relance financée par la dette publique. JMK et notamment ses suiveurs nient l'existence d'un effet d'éviction notamment en raison de la nature du taux d'intérêt qui est monétaire et non réel : le taux d'intérêt est le résultat de la politique monétaire. Les keynésiens actuels pensent même que le déficit public a impact positif sur les profits des entreprises (Lavoie, 2004, p. 81). Au contraire, certains auteurs pensent qu'une réduction du déficit peut stimuler l'économie Table 30, Box 39.

#### 4.3.2.2 *Equivalence ricardienne*

L'effet d'éviction passe essentiellement par l'investissement. La notion d'équivalence ricardienne passe par les décisions d'épargne des agents privés. Dans les années 70, à la suite notamment des travaux de Barro (Barro, 1974).

Importance de la dette détenue par les agents résidents. Figure 60

**Definition 57. The Ricardo equivalence proposition - La proposition de l'équivalence ricardienne**

“Where traditional theory attributes to an increase in the deficit a short-term stimulus to output and employment, a rise in interest rates, and a crowding out of private investment, ‘Ricardian equivalence,’ as the revived theory has come to be called, attributes no effects at all. According to Ricardian equivalence, government purchases and marginal tax rates matter, but the debt/tax mix is irrelevant. The reason is actually quite simple. Debt implies future taxes with a present value equal to the value of the debt; rational agents, recognizing this equivalence, will proceed as if the debt did not exist, resulting in the debt having no effects on economic activity.”

Source: (Seater, 1993, p. 142)

Le mode de financement des dépenses publiques est sans impact sur les dépenses de consommation des ménages parce qu'elle ne modifie pas la somme de ses revenus futurs actualisés bien qu'elle affecte ses revenus disponibles aux différentes périodes. La principale conséquence est que les titres de la dette publique ne sont pas considérés comme une richesse par les ménages.

Là où les théories traditionnelles attribuent à un accroissement de la dette publique, un effet positif sur la production et l'emploi à court terme à la production et l'emploi, ou bien une hausse des taux d'intérêt, et une éviction de l'investissement privé, 'l'équivalence ricardienne' indique qu'aucun de ces deux effets ne se produit. Selon l'équivalence ricardienne, la dette publique implique que les impôts futurs ont une valeur actualisée égale à la valeur de la dette. Des agents rationnels se comporteront comme si la dette n'existait pas. Au final, la dette n'a pas d'effets sur l'activité économique.

**Table 30. Expansionary Fiscal Contractions, Denmark in the 80s**

	1979-82	1983-86
<i>G</i>	+4.0	0.0
<i>T</i>	-0.03	+1.3
<i>(G - T)</i>	+1.8	-1.8
<i>Δ debt</i>	+10.2	0.0
<i>ΔY disponible</i>	+2.6	-0.3
<i>C</i>	-0.8	+3.7
<i>I</i>	-2.9	+12.7
<i>GDP</i>	+1.3	+3.2

Numbers are average yearly growth rates over the period indicated. Source : Giavazzi, F. Notes on Fiscal Policy April 2014 and (Giavazzi and Pagano, 1990)

**Box 39. Expansionary Fiscal Contractions**

“We started this paper by asking whether the European exercise in fiscal rectitude in the 1980s sheds any light on two contending views about the effects of a fiscal contraction: the Keynesian view, that focuses on its direct effects on aggregate demand, and the "expectations" view-also known in Europe as the German view-that stresses the role of current changes in taxes or government spending as signals of possible future changes. We have learned that there are cases in which the German view has a serious claim to empirical relevance. The Danish experience shows that cuts in government spending can be associated with increases in consumption even after controlling for wealth and income, and even in the presence of a substantial increase in current taxes. The Irish case, however, highlights the potential importance of liquidity constraints for the operation of this mechanism. When current disposable income effectively constrains consumption, Keynesian textbook propositions seem to recover their predictive power, as witnessed by the 7% drop in real consumption in 1982 during the first Irish stabilization.”

Source: (Giavazzi and Pagano, 1990, p. 105)

### 4.3.3 Experience of fiscal stimuli and fiscal multipliers

#### 4.3.3.1 20<sup>th</sup> century examples

En France : 3 plans de relance budgétaire au cours des 30 dernières années.

- 1966-1968 (De Gaulle, Pompidou) : baisse des impôts (aides fiscales à l'investissement), augmentation des dépenses (plans sectoriels de soutien à l'informatique et à la sidérurgie). Le budget passe d'une situation équilibrée en 1965 à un déficit de 1,9% du PIB en 1968.
- 1975 (VGE, Chirac) : premier choc pétrolier. Augmentation des I publics notamment dans entreprises nationales, dépenses supplémentaires consenties par l'Etat. Excédent budgétaire de 0,5% du PIB en 1974, déficit budgétaire de 2,6% du PIB en 1976.
- 1981-1982 : plan de relance massif (Mitterrand, Mauroy). Déficit passe de 0,9% du PIB en 1980 à 2,6% du PIB en 1982.

On peut également trouver des exemples d'effets multiplicateurs des impôts :

- Aux EU, la réforme fiscale de R. Reagan en septembre 1986 a engendré un processus pouvant être interprété comme l'effet d'un multiplicateur fiscal. Réduction des taux marginaux d'imposition (sont passés de 50% à 28%), baisse de l'impôt sur les sociétés (sont passés de 46% à 34%). Contribution de cet allègement fiscal à l'activité : taux de croissance économique passe de 2,7% en 1986 à 4,4% en 1988.
- A l'inverse, l'alourdissement de l'impôt sur les sociétés et l'accroissement de la TVA (de 18,6% à 20,6% pour le taux moyen) par le gouvernement Juppé en 1995 a certainement agi comme un multiplicateur fiscal à l'envers.

#### 4.3.3.2 Fiscal stimuli and austerity in the aftermath of the 2008-2009 crisis

The 2008-2009 crisis began with the collapse of big financial institutions and turned into a global and a financial crisis. Interestingly, G20 countries undertook a coordinated and immediate policy response. Coordinated monetary policy by leading CBs = QE + emergency fiscal stimulus packages stopped the economic turmoil. However, little

progress achieved in tackling the “financialization” of commodity markets or reforming the international monetary system for curbing volatile short-term capital flows. We focus here on the fiscal stimulus announced in several countries and the associated fiscal multipliers (UNCTAD, 2011, p. i).

#### 4.3.3.2.1 *Fiscal stimuli in the aftermath of the crisis*

Heterogeneous fiscal responses to the crisis in terms of magnitudes, composition and timing Table 31. Developed countries, the US => largest stimulus package (nominal + share of GDP), then Germany and Japan. Tax cuts were favored. Countries that announced multiple waves of stimulus packages, underwent an increasing spending component. In several developing countries, fiscal packages were more ambitious. Case of China and the Republic of Korea (about 10% of GDP). Overall stimulus packages in developing Asia were made of higher spending (infrastructure investment).

#### 4.3.3.2.2 *IMF's underestimates of fiscal multipliers*

The second phase of the crisis saw the implementation of austerity policies, especially in the EU (2010 to 2013/2014). There has been an intense debate about the magnitude of fiscal multipliers. It happened that the International Monetary Fund underestimated them. Consequence, the fiscal consolidation i.e. government spending cuts or tax hikes induced greater than expected decreases in GDP in the short-run. The IMF expected government multipliers of around 0.5. It appeared they were rather about 1.

The fiscal multipliers used by the IMF in its analyses of fiscal adjustment policies during the crisis, particularly in Europe, are said to be too high. Blanchard, reportedly made his *mea culpa* (Spilimbergo, Symansky and Schindler, 2009; McKenzie, 2012) see notably (Blanchard and Leigh, 2013). In times of crisis, when there is little room for monetary policy (with low nominal interest rates that can even be negative, synchronization of austerity policies), public multipliers become more important. The IMF expected public multipliers to be around 0.5; they are probably higher than 1 (International Monetary Fund, 2012). See also (Colletis, 2013; Müller, 2014). According to the latter: fiscal consolidation namely austerity that was opted by many indebted countries after 2010 was deemed to be self-defeating because of bigger than expected fiscal multipliers. Fiscal multipliers tend to be large during financial crises and/or if monetary policy is constrained by the zero lower bound. The case of Greece is instructive.

Austerity measures turned into widened budget deficits and rounds of public expenditures cuts severely depressed the economy. The Greek parliament approved 14 austerity packages between 2010 and 2017.

**Table 31. Extent of fiscal stimulus packages during the 2008-2009 crisis**

**FISCAL STIMULUS PACKAGES, AS ANNOUNCED IN SELECTED ECONOMIES, 2008–2010**

(Billions of dollars and percentages)

	Total amount (\$ billion)	GDP (Per cent)	Tax cut share	Spending share
<b>Developed economies</b>				
Australia	23	2.4	45.2	54.8
Canada	24	1.8	52.4	47.6
France	21	0.8	6.5	93.5
Germany	47	1.4	68.0	32.0
Italy	6	0.3	33.3	66.7
Japan	117	2.3	30.0	70.0
Spain	35	2.4	58.4	41.6
United Kingdom	35	1.5	56.0	44.0
United States <sup>a</sup>	821	5.7	36.5	63.5
Total	1129	3.3	38.3	61.7
<i>Unweighted average</i>		2.1	42.9	57.1
<b>Developing and transition economies</b>				
Argentina	17	6.0	8.5	91.5
Brazil	45	3.6	15.0	85.0
China	568	13.1	0.0	100.0
Chile	4	2.8	46.0	54.0
India	43	3.4	0.0	100.0
Indonesia	8	1.5	76.9	23.1
Mexico	21	2.4	0.0	100.0
Republic of Korea	95	10.2	2.9	97.1
Russian Federation	80	6.4	31.3	68.7
Saudi Arabia	50	9.4	0.0	100.0
South Africa	8	2.6	0.0	100.0
Total	937	8.0	4.7	95.3
<i>Unweighted average</i>		5.6	16.4	83.6

**Source:** UNCTAD secretariat calculations, based on European Commission, 2009; ECLAC, 2009; CBO, 2011; OECD, 2009; Hur et al., 2010; Ponomarenko and Vlasov, 2010; Prasad and Sorkin, 2009; and United States Government, 2011.

<sup>a</sup> The amount reported for the United States refers only to the stimulus package provided under the American Recovery and Reinvestment Act (ARRA) of 2009; it excludes the cost of industry bailouts and capital infusions that were components of the Troubled Asset Relief Program (TARP).

Source: (UNCTAD, 2011, p. 43)

## 5 AN INEVITABLE BUT TEMPORARY CONCLUSION ON FISCAL POLICY DURING THE COVID-19 PANDEMIC

Unprecedented fiscal response worldwide to support health systems and provide relief to vulnerable households and firms. As of September 11, 2020: fiscal measures amounted to \$11.7 trillion globally = 12 % world GDP. Fiscal measures are made of:

- additional spending or forgone revenue, including temporary tax cuts,
- liquidity support, including loans, guarantees, and equity injections by the public sector.

Highly diverse magnitudes and composition of fiscal support throughout countries. Figure 57. Advanced economies and large emerging markets have been playing a prominent role. 3 reasons:

- They were hit earlier and harder by the health crisis. Developing countries were hit later. They relied on their own budgets and face tighter financial constraints.
- CBs more prone to provide massive monetary injections (QE). Why? They benefit from a high credibility, which enables them to issue massive monetary stimulus without losing their ability to deliver low inflation.
- Larger deficits financed at low interest rates. The fiscal response in low-income developing countries, which were hit later by the health crisis, has largely been on budget and smaller because of tighter financing constraints. Example with the French public debt Figure 60. Striking features: interest rates on loans are negative.

Fiscal response (G) + sharp decline in output and government revenue (T) => larger deficits => public debt reaches 100 percent of GDP in 2020 globally, the highest ever recorded Figure 58. CBs have facilitated the fiscal response by purchasing a significant share of their gvts' debts Figure 59.

Sovereign debt building up adds to the global debt vulnerabilities that existed before the pandemic. Total private + public debt in the Group of Twenty (G20) has increased over the past two decades 240 percent of GDP. Which characteristics of this debt?

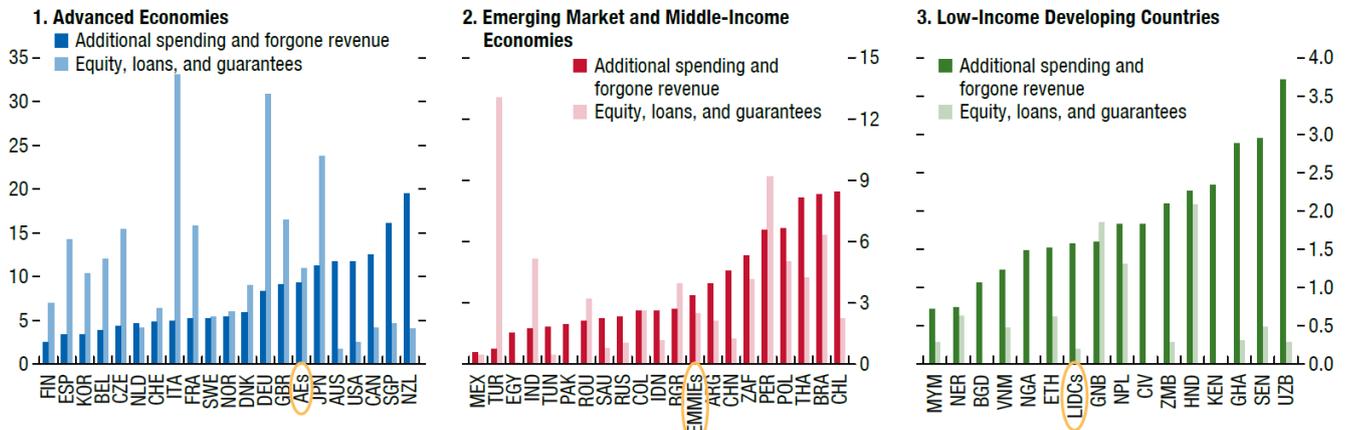
- low expected interest rates => higher indebtedness but moderate effect on debt-service burdens relative to GDP
- extended maturity of government bonds i.e. longer repayment periods.

Which risks in the LR?

- Current subsidies may slow the reallocation of factors during the recovery
- Tax cuts could become permanent to the detriment of the public finances
- High levels of public debt leave narrow room for further active fiscal policies / need to tackle further rising inequalities.

**Figure 57. Discretionary Fiscal Response to the COVID-19 Crisis in Selected Economies**

(Announced measures as of September 11, 2020, in percent of GDP)



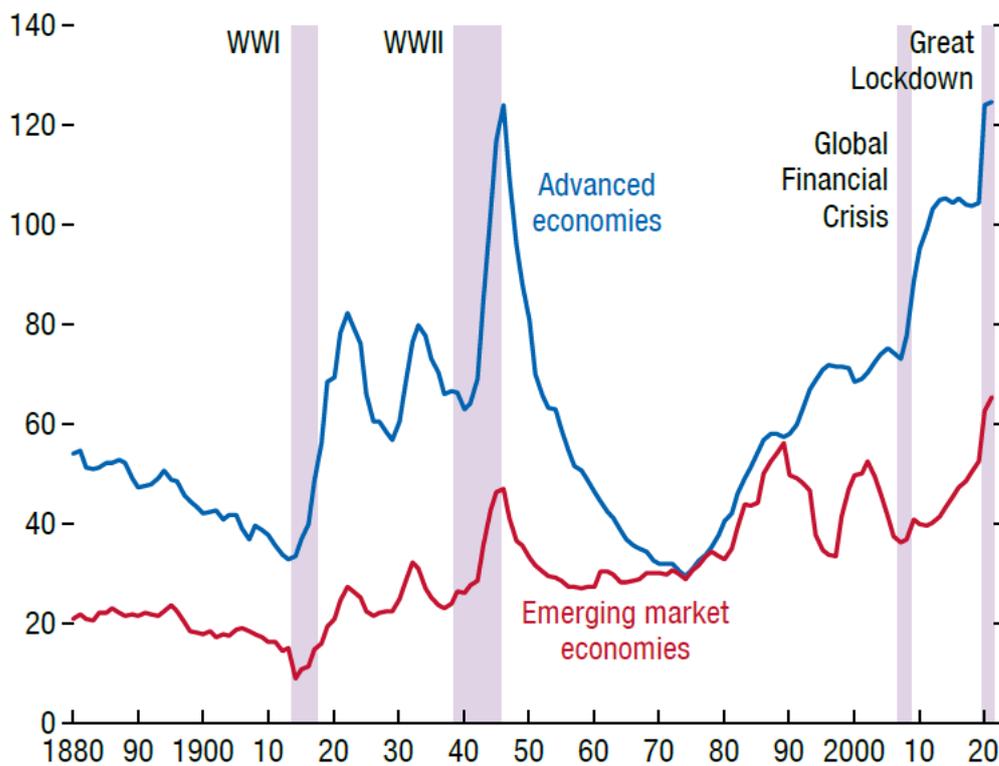
Sources: *Fiscal Monitor* Database of Country Fiscal Measures in Response to the COVID-19 Pandemic (<https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19>); and IMF staff estimates.

Note: The timeframe for the announced measures is country specific, but the bulk of the measures announced so far are short-term crisis-response measures to be implemented in 2020–21. Country group averages are weighted by GDP in US dollars adjusted by purchasing power parity. Data labels use International Organization for Standardization country codes. AEs = advanced economies; COVID-19 = coronavirus disease 2019; EMMIEs = emerging market and middle-income economies; LIDCs = low-income developing countries.

Source: IMF 2020 Fiscal Monitor. Policies for recovery. Available at:

<https://www.imf.org/en/Publications/FM/Issues/2020/09/30/october-2020-fiscal-monitor>

Figure 58. Historical Patterns of General Government Debt, Percent of GDP.



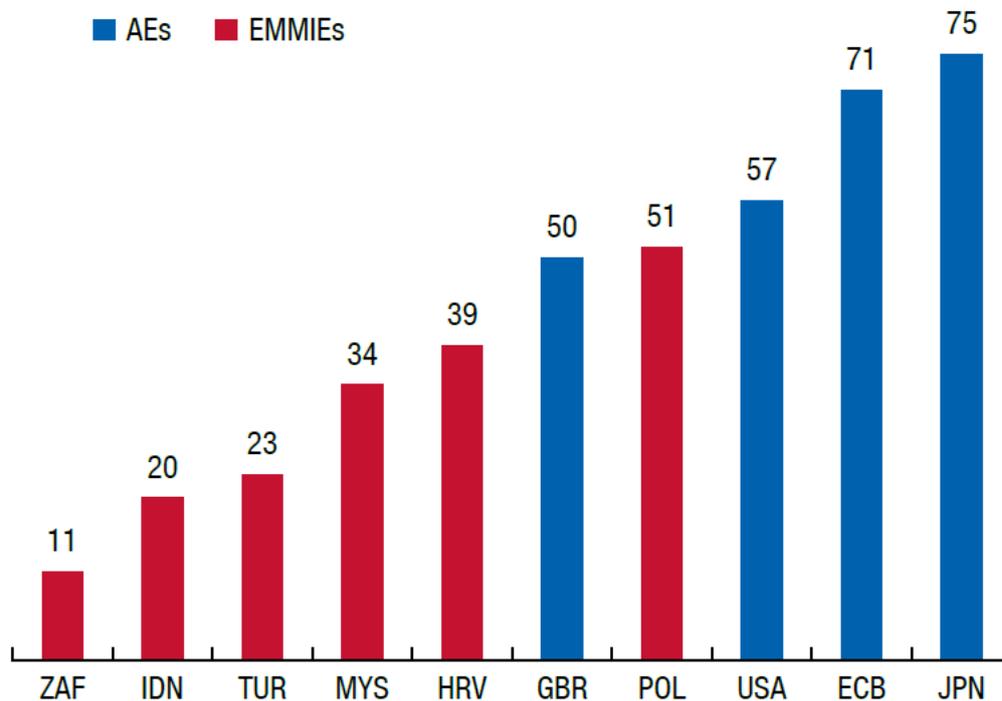
Sources: IMF, Historical Public Debt Database; IMF, World Economic Outlook database; Maddison Database Project; and IMF staff calculations.

Note: The aggregate public-debt-to-GDP series for advanced economies and emerging market economies is based on a constant sample of 25 and 27 countries, respectively, weighted by GDP in purchasing-power-parity terms. WWI = World War I; WWII = World War II.

Source: IMF 2020 Fiscal Monitor. Policies for recovery. Available at:

<https://www.imf.org/en/Publications/FM/Issues/2020/09/30/october-2020-fiscal-monitor>

**Figure 59. Central Bank Purchases of Government Debt, Percent of central government marketable securities or debt issued since February 2020**



Sources: Country authorities; US Federal Reserve Economic Data; Haver Analytics; and IMF staff calculations.

Note: Data labels use International Organization for Standardization country codes. AEs = advanced economies; EMMIEs = emerging market and middle-income economies.

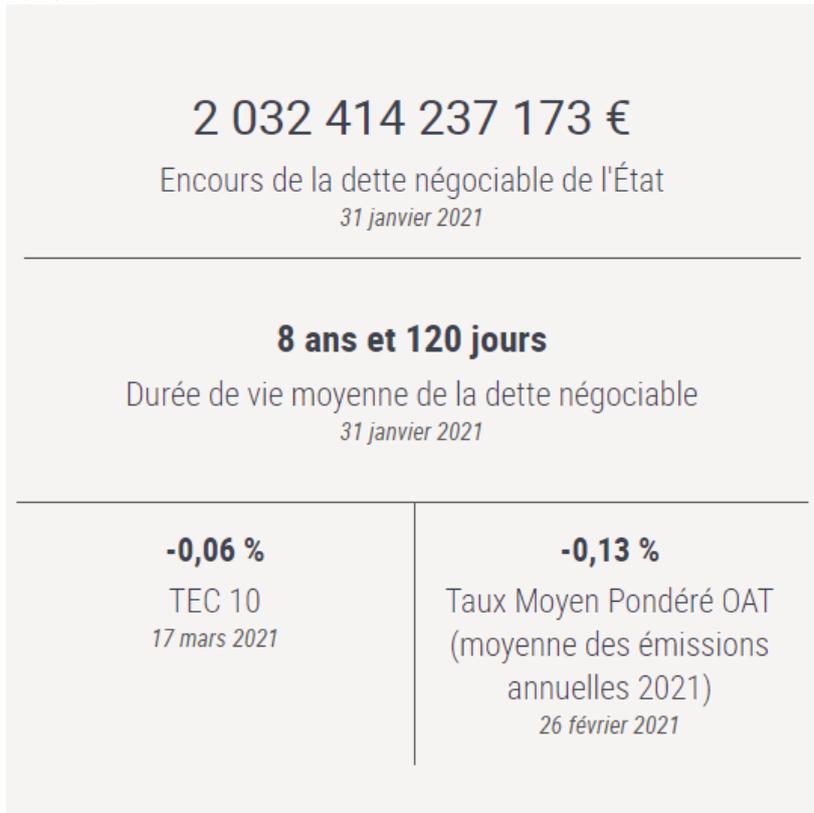
Source: IMF 2020 Fiscal Monitor. Policies for recovery. Available at:

<https://www.imf.org/en/Publications/FM/Issues/2020/09/30/october-2020-fiscal-monitor>

ZAF: South Africa, IDN: Indonesia, TUR: Turkey, MYS: Malaysia, HRV: Croatia, GBR: Great Britain, POL: Poland, ECB: European Central Bank, JPN: Japan.

**Figure 60. A quick view on the current state of the French public debt**

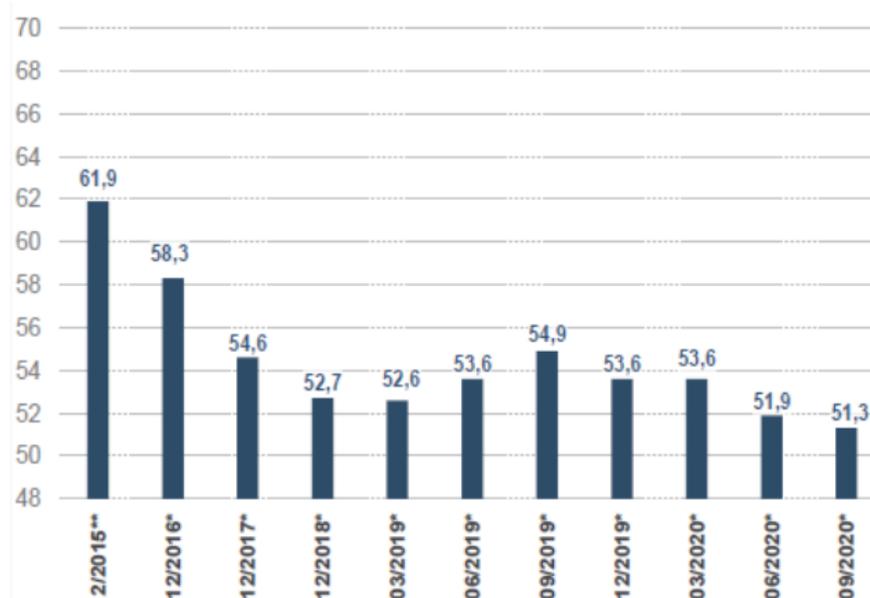
Panel A



Panel B

**Détention par les non-résidents des titres de la dette négociable de l'État au 2<sup>ème</sup> 2020**

en % de la dette négociable



(\*) Chiffres établis avec les positions titres trimestrielles

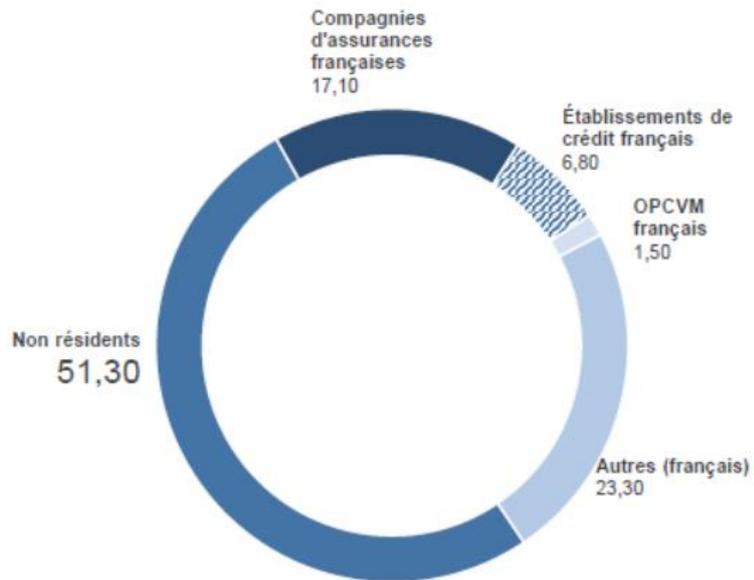
(\*\*) Chiffres révisés avec la position titres du dernier rapport annuel

source : Banque de France  
[Bulletin mensuel de l'Agence France Trésor]

Panel C

### Détention des titres de la dette négociable de l'État par groupe de porteurs au 2<sup>ème</sup> trimestre 2020

structure exprimée en valeur de marché



Source : Banque de France  
[Bulletin mensuel de l'Agence France Trésor]

Source: Agence France Trésor. Available at <https://www.aft.gouv.fr/> as of March 18, 2021

## 6 CHAPTER 4. APPENDIX

### Box 40. Full employment

“In the previous chapter we have given a definition of full employment in terms of the behaviour of labour. An alternative, though equivalent, criterion is that at which we have now arrived, namely a situation in which **aggregate employment is inelastic in response to an increase in the effective demand for its output.** Thus Say's law, that the aggregate demand price of output as a whole is equal to its aggregate supply price for all volumes of output, is equivalent to the proposition that there is no obstacle to full employment. If, however, this is not the true law relating the aggregate demand and supply functions, there is a vitally important chapter of economic theory which remains to be written and without which all discussions concerning the volume of aggregate employment are futile.”

« ... le plein emploi est atteint lorsque l'emploi global cesse de réagir élastiquement aux accroissements de la demande effective des produits qui en résultent. Ainsi la loi de J. B. Say qui veut que, pour tout volume de la production considérée dans son ensemble, le prix de la demande globale soit égal au prix de l'offre globale, équivaut à la proposition d'après laquelle il n'existe pas d'obstacle à l'instauration du plein emploi. »

Source : (Keynes, 1936a) Book 1 Chapter III et (Keynes, 1936b)

Le chômage involontaire trouve son origine dans une insuffisance de la demande globale. La solution est dans une politique budgétaire et monétaire expansionniste. Le plein emploi apparaît alors comme une situation où le chômage involontaire est nul. Le chômage est alors réduit à sa composante frictionnelle.

D'après (Béraud, 2011)

### Box 41. Underemployment equilibrium in the GT

In particular, it is an outstanding characteristic of the economic system in which we live that, whilst it is subject to severe fluctuations in respect of output and employment, it is not violently unstable. **Indeed it seems capable of remaining in a chronic condition of subnormal activity for a considerable period without any marked tendency either towards recovery or towards complete collapse.** Moreover, the evidence indicates that **full, or even approximately full, employment is of rare and short-lived occurrence.** Fluctuations may start briskly but seem to wear themselves out before they have proceeded to great extremes, and an intermediate situation which is neither desperate nor satisfactory is our normal lot. It is upon the fact that fluctuations tend to wear themselves out before proceeding to extremes and eventually to reverse themselves, that the theory of business cycles having a regular phase has been founded. The same thing is true of prices, which; in response to an initiating cause of disturbance, seem to be able to find a level at which they can remain, for the time being, moderately stable.’

« En particulier, c'est une des propriétés essentielles du système économique où nous vivons de ne pas être violemment instable, tout en étant sujet en ce qui concerne la production et l'emploi à des fluctuations sévères. A la vérité, ce système paraît apte à rester pendant un temps considérable dans **un état d'activité chroniquement inférieur à la normale**, sans qu'il y ait de tendance marquée à la reprise ou à l'effondrement complet. En outre il apparaît clairement que **le plein emploi ou même une situation voisine du plein emploi est rare autant qu'éphémère.** Les fluctuations peuvent s'amorcer brusquement, mais elles semblent s'amortir avant d'avoir pris une ampleur extrême; et notre sort normal consiste en une situation intermédiaire qui n'est ni désespérée ni satisfaisante. C'est sur le fait que les fluctuations tendent à s'amortir avant d'avoir atteint des limites extrêmes et qu'elles tendent finalement à s'inverser, qu'on a fondé la théorie des cycles économiques de phase régulière. La situation est la même en ce qui concerne les prix ; lorsqu'ils sont soumis à une action perturbatrice nouvelle, ils semblent aptes à trouver un niveau où ils peuvent demeurer pour un temps relativement stables. »

Source : (Keynes, 1936a) (Keynes, 1936b) Book IV Chapter XVIII The general theory of employment re-stated Para III.

## 6.1 Exposé du principe de la demande effective

### Box 42. The Effective Demand principle – Le principe de la Demande Effective

“Let  $Z$  be the aggregate supply price of the output from employing  $N$  men, the relationship between  $Z$  and  $N$  being written  $Z = \varphi(N)$ , which can be called the aggregate supply function. Similarly, let  $D$  be the proceeds which entrepreneurs expect to receive from the employment of  $N$  men, the relationship between  $D$  and  $N$  being written  $D = f(N)$ , which can be called the aggregate demand function.

Now if for a given value of  $N$  the expected proceeds are greater than the aggregate supply price, i.e. if  $D$  is greater than  $Z$ , there will be an incentive to entrepreneurs to increase employment beyond  $N$  and, if necessary, to raise costs by competing with one another for the factors of production, up to the value of  $N$  for which  $Z$  has become equal to  $D$ . Thus the volume of employment is given by the point of intersection between the aggregate demand function and the aggregate supply function; for it is at this point that the entrepreneurs' expectation of profits will be maximised. The value of  $D$  at the point of the aggregate demand function, where it is intersected by the aggregate supply function, will be called the effective demand. Since this is the substance of the General Theory of Employment, which it will be our object to expound, the succeeding chapters will be largely occupied with examining the various factors upon which these two functions depend.”

« Soit  $Z$  le prix de l'offre globale du volume de production qui correspond à l'emploi de  $N$  personnes ; la relation entre  $Z$  et  $N$ , que nous appellerons la *Fonction ou Courbe de l'Offre Globale*, étant représentée par  $Z = \varphi(N)$ . De même, soit  $D$  le 'produit' que les entrepreneurs espèrent tirer de l'emploi de  $N$  personnes ; la relation entre  $D$  et  $N$ , que nous appellerons la *Fonction ou Courbe de la Demande Globale*, étant représentée par  $D = f(N)$

Ceci étant, si pour un certain volume de l'emploi  $N$  le 'produit' attendu est supérieur au prix de l'offre globale, c'est-à-dire si  $D$  est supérieur à  $Z$ , il y aura un mobile qui incitera les entrepreneurs à accroître l'emploi et, s'il le faut, à élever les coûts en se disputant les uns aux autres les facteurs de production, jusqu'à ce que l'emploi ait atteint le volume qui rétablit l'égalité entre  $Z$  et  $D$ . Ainsi le volume de l'emploi est déterminé par le point d'intersection de la courbe de la demande globale et de la courbe de l'offre globale ; car c'est à ce point que la prévision de profit des entrepreneurs est maximum. Nous appellerons *demande effective* le montant du 'produit' attendu  $D$  au point de la courbe de la demande globale où elle est coupée par celle de l'offre globale. »

Source : (Keynes, 1936a, chap. 3) English version ; Keynes (1936, liv.I, III. Le principe de la demande effective) version française

JMK définit une fonction d'offre et de demande globale de biens :

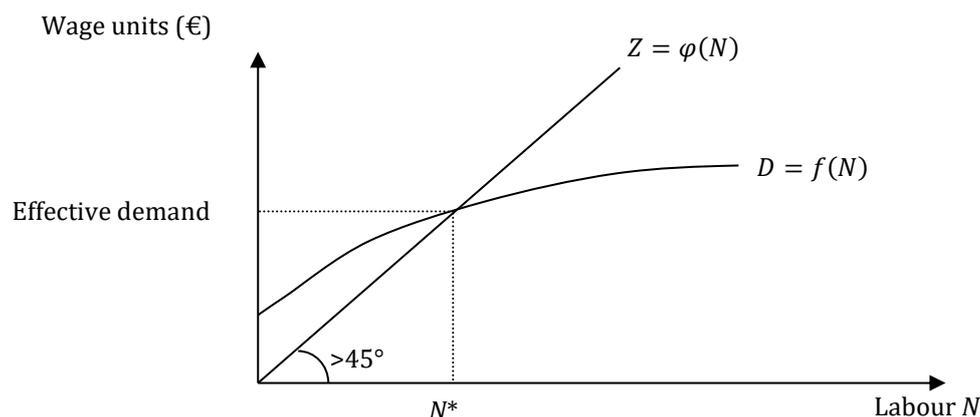
- La fonction d'OG traduit le coût correspondant à niveau d'emploi. Celui-ci représente le coût supporté par les entrepreneurs, lié à la mise en œuvre d'un certain volume d'emploi et de production. Ce coût inclut la rémunération du travail et celle de l'entrepreneur (rémunération du capital). La rémunération du travail dépend du taux de salaire et la rémunération de l'entrepreneur est une marge.<sup>35</sup>

<sup>35</sup> Ce raisonnement s'appuie sur une hypothèse implicite de concurrence imparfaite. Dans cette hypothèse les entrepreneurs prélèvent une marge (application d'un taux de marge ou *mark-up*) et réalisent un profit.

- La fonction de DG est croissante qui relie les niveaux d'emploi aux recettes (les 'produits') que les entrepreneurs espèrent en tirer. Ces recettes anticipées sont notamment influencées par la demande de consommation et l'investissement. La consommation dépend du volume d'emploi via la fonction de consommation ce qui explique la relation croissante entre la fonction de DG et l'emploi. L'investissement est indépendant du volume d'emploi (« esprits animaux » et « tempérament sanguin »).<sup>36</sup>

En résumé, l'OG est une fonction croissante de l'emploi, ici linéaire, de pente supérieure à l'unité. La DG est également une fonction croissante de l'emploi car dépend des revenus du travail. Les entrepreneurs sont incités à augmenter l'emploi jusqu'à l'égalité de l'OG et de la DG. Ce niveau correspond à l'*effective demand* de JMK, notion traduite par demande effective et qui serait selon certains auteurs mieux traduite par « demande efficace ». Il s'agit de la demande qui détermine le niveau d'emploi dans l'économie nationale. Actuellement, on assimile demande effective à demande agrégée. En bref, le principe de la demande effective qui subordonne le niveau d'emploi et de revenu à la demande agrégée inverse la relation de causalité à l'œuvre dans la loi de Say. Avec le principe de la demande effective JMK rejette bien la loi de Say : les entrepreneurs adaptent l'emploi à la demande qu'ils anticipent.

Figure 61. The effective demand diagram



Source:

<sup>36</sup> JMK ne retient pas une relation du type accélérateur qui entraînerait une relation de causalité emploi – production → demande de capital → investissement induit. Fait, au contraire, l'hypothèse de capacités de production inutilisées qui seront une des conditions d'efficacité du multiplicateur.

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