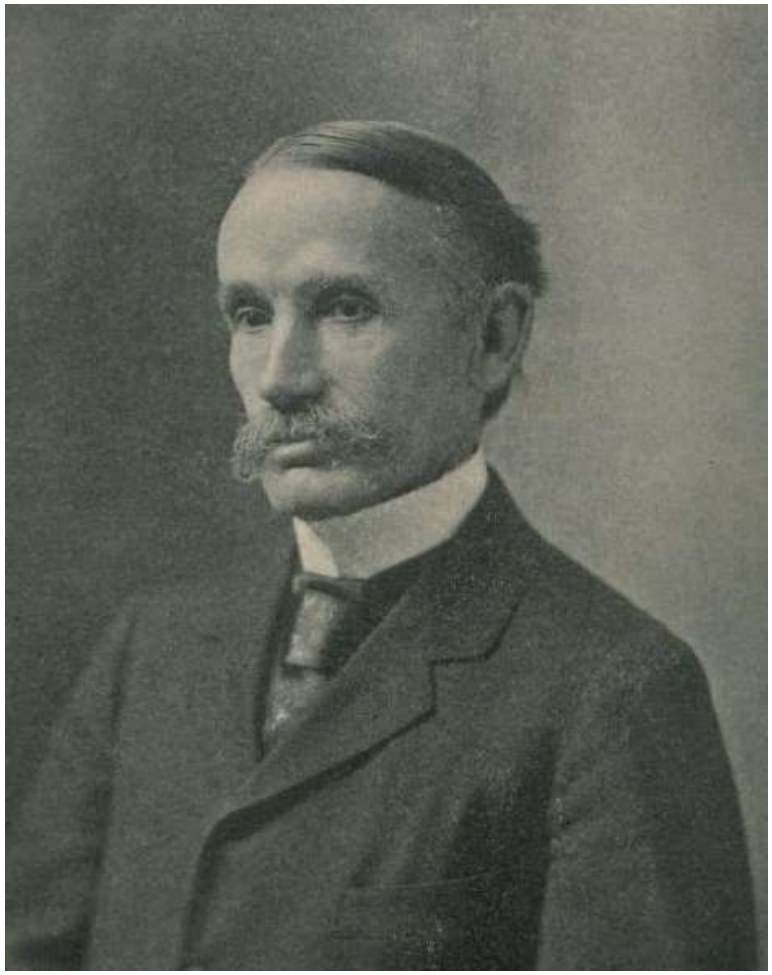

The marginalist theory of distribution
John Bates Clark

Outline

- 1 – The marginalist revolution

- 2 – John Bates Clark's theory of distribution

    2.1. Biographical elements

    2.2. Clark's thesis (*The distribution of Wealth,* 1899)

    2.3. Clark's demonstration: the distribution of wealth according to *The Essentials of Economic Theory* (1907)

The marginalist revolution

- The **neoclassical** school encompasses a broad and relatively heterogeneous body of theory (much like the classical tradition).

- It refers to the **mainstream** or dominant paradigm in economics and is grounded, notably, in the following principles:

  - **Methodological individualism and deductivism**

  - An emphasis on **rational behaviour** from a microeconomic perspective

  - Providing microeconomic foundations for macroeconomic analysis (notably through the concept of the *representative agent*)

  - The use of mathematics and a **high degree of abstraction**

  - A general reliance on market mechanisms

The marginalist revolution

- It constitutes the dominant framework through which economic phenomena are conceptualized, modeled, and analyzed. As such, it cannot be ignored, insofar as it defines the mainstream of the discipline, and most economic theorists position themselves in relation to it, either in support of it or in opposition to it.

- The **marginalist school** is generally regarded as the origin of this new way of representing economics.

The marginalist revolution

- The **marginalist school** is generally regarded as the origin of this new way of representing economics.

- It is commonly considered to have three “founding fathers,” who simultaneously revolutionized the discipline in the early 1870s, while remaining unaware of each other’s work:

  - William Stanley Jevons (1835–1882), with *The Theory of Political Economy* (1871)

  - Carl Menger (1840–1921), who published *Principles of Economics* (*Grundsätze der Volkswirtschaftslehre*, 1871)

  - Léon Walras (1834–1910), for *Elements of Pure Economics* (1874)

The marginalist revolution

- The terms **“marginalism”** and **“neoclassical”** were assigned retrospectively (as was the case with the “classical” school).

- The term **“marginalism”** refers to the introduction, by the three aforementioned authors, of the principle of **diminishing marginal utility**.

  ⇒ This idea holds that the last unit of a good consumed always provides less satisfaction than the previous one; in other words, **additional utility decreases as the quantity consumed increases**.

- This principle remains central today in **microeconomic consumer choice theory** is mirrored in **producer theory** by the assumption of **diminishing marginal productivity**.

The marginalist revolution

- The term **“neoclassical,”** by contrast, is potentially **misleading**, since it may give the impression of a continuation of the lines of reasoning developed by the “classical” economists.

- While the two traditions share a general presumption in favor of market economy, and although David Ricardo, as we have seen, anticipated marginal reasoning, the **differences between these two schools of thought are in fact profound**.

The marginalist revolution

Classical economics	Neoclassical economics
Analysis in terms of **social classes**	**Methodological Individualism**
Natural prices (determined by **costs of production**)	**Market prices** (determined by the interaction of **supply and demand**)
Dynamic analysis → consideration of the **sequential dimension** of economic activity	**Static** analysis ("time suspended") → **equilibrium**
Aim to explain the economic world as it is (a **realist** approach)	Abstract point of departure: **perfect competition** (an **idealized** representation)

The marginalist revolution

- **Reminder:** we have seen that Marx, through **his theory of exploitation**, undermined the traditional justifications of capitalist profit.

- Is marginalism a response to Marx's critique of political economy?

- Yes, but an indirect one.

  ⇒ It involves a **radical shift in perspective**.

  ⇒ With the marginalist revolution, **the object of economic analysis itself is redefined**. Economic analysis shifts away from social relations of production towards individual choice and allocation of rare resources**.**

The marginalist revolution

- With the marginalist revolution, the **object of economics changes**.

- **Classical** political economy: **an analysis of wealth and social relations**, aimed at elucidating the conditions of capital accumulation.

- **Marginalism**: **a theory of individual choice under conditions of scarcity**, or, equivalently, a theory of the allocation of scarce resources among alternative uses.

The marginalist revolution

- **Marginalism**: **a theory of individual choice under conditions of scarcity**, or, equivalently, a theory of the allocation of scarce resources among alternative uses.

- "Economics is the science which studies **human behaviour as a relationship between ends and scarce means which have alternative uses.**"
  Lionel Robbins, *An Essay on the Nature and Significance of Economic Science* (1932)

  $\Rightarrow$ Emphasis is placed on the concepts of **choice and scarcity**.

The marginalist revolution

"But **when time and means for achieving ends are limited and capable of alternative application**, and the ends are capable of being distinguished in order of importance, then **behaviour necessarily assumes the form of choice**. Every act which involves time and scarce means for the achievement of one end involves the relinquishment of their use for the achievement of another. **It has an economic aspect**." (Lionel Robbins, 1932)

The marginalist revolution

- Marginalist analysis therefore does not extend the classical approach.

- Rather, it represents a **break**:

  ⇒ a break in both the **object of analysis** and the **method**;

  ⇒ above all, a break in the way the two issued that have served as our central thread throughout the semester are conceptualized: **value and distribution**.

The marginalist revolution

- **Value** ⇒ abandonment of the labour theory of value.

- Marx showed that the **labour theory of value** logically leads to the recognition of **exploitation**.

- For marginalists, **exploitation does not exist**, since value does not stem exclusively from labour, but from the interaction, in supposedly competitive markets, between supply and demand:

  → Supply depends on costs of production;

  → **Demand depends on utility** — *subjectively perceived* by individuals — and on their purchasing power (initial endowments).

The marginalist revolution

- "We might as reasonably dispute whether it is the upper or the under blade of a pair of scissors that cuts a piece of paper, as whether value is governed by utility or by cost of production."
  — **Alfred Marshall**, *Principles of Economics* (1890)

  ⇒ The marginalist theory of prices is centred on the notion of **market price**, as opposed to natural price, which refers solely to costs of production, that is, ultimately, to labour.

The marginalist revolution

- In the same spirit, the variables of income distribution are no longer determined outside the functioning of the market, according to a logic of reproduction.

- There is no longer any notion of a natural subsistence wage towards which actual wages would tend.

⇒ There exists only a **market price of labour**, and of the "services" provided by capital, **determined like those of any other commodity by the interaction of supply and demand** in competitive markets.

Issues of distribution are dissolved within market mechanisms.

The marginalist revolution

- Léon Walras does not, strictly speaking, develop a theory of distribution, but rather a **general theory of prices that encompasses issues of distribution**.

  "The whole world may be looked upon as a vast general market made up of diverse special markets where social wealth is bought and sold. Our task then is to discover the laws to which these purchases and sales tend to conform automatically."
  — **Léon Walras**, *Elements of Pure Economics* (1874), Lesson 5

- **Note:** the "**services**" provided by capital and by workers are included in what Walras refers to as **"social wealth."**

The marginalist revolution

- **Note:** the "**services**" provided by capital and by workers are included in what Walras refers to as **"social wealth."**

- Indeed, Walras challenges the distinction between material commodities and immaterial services introduced by the classical economist:

"By social wealth I mean all things, material or immaterial (it does not matter which in this context), that are **scarce**, that is to say, on the one hand, **useful** to us and, on the other hand, only available to us in **limited quantity**. "
— **Léon Walras**, *Elements of Pure Economics* (1874), Lesson 3

The marginalist revolution

- **John Bates Clark's theory of distribution** is close to that of Walras.

- Clark is one of the few marginalist economists to **address the issue of exploitation explicitly**. He seeks to demonstrate, "scientifically," that exploitation does not exist.

- Clark aims to show that remuneration in the capitalist system is "just", in the sense that in the sense that **competition tends to reward each factor of production according to its contribution to output**.

John Bates Clark: contextual elements

- The late nineteenth century was a period of **crisis and intense social unrest** in the United States, marked by violent conflicts between workers and employers.
- Working-class conditions were characterised by low wages, dangerous working conditions, and long working hours.
- The Antitrust legislation — notably the **Sherman Antitrust Act of 1890** — was diverted from its original purpose and used against trade unions and labour organisations, which were prosecuted and convicted on grounds of “conspiracy to restrain trade”.
- **Strikes and boycotts were harshly repressed**, often through police, private militias (notably the Pinkerton Detective Agency), or federal intervention:

  - Mussel Slough tragedy (1880) — 7 deaths
  - Haymarket Square riot (1886) — approximately 11 deaths
  - Homestead Strike (1892) — at least 10 deaths
  - Pullman Strike (1894) — around 30 deaths

John Bates Clark: biographical elements

- **26 January 1847:** John Bates Clark was born in **Providence, Rhode Island (USA)**.
- In the **1870s**, he was part of a group of **"radical" economists**, sympathetic to **socialist ideas and favourable to state intervention**.
- Most of these economists had pursued their higher education in Germany, under the influence of the **German Historical School**.
- During this period, **Clark condemned economic inequalities and the working conditions suffered by workers** in the United States.
- However, he did not adhere to Marx's revolutionary theses.
- Clark believed that existing institutions would ultimately lead to a genuine form of socialism, articulated around the notions of cooperation, fraternity, and equality.

John Bates Clark: biographical elements

- **Late 1880s:** John Bates Clark **moves away from socialism**.
- He **embraces marginalism**, which emerges in Europe (he introduces the principle of **diminishing marginal utility** at roughly the same time as the 3 ”founders” of marginalism).
- His objective now becomes to **legitimise capitalism** on theoretical grounds.
- **From 1895 to 1923**, he teaches at **Columbia University**, and becomes one of the first American economists to acquire an international reputation.
- **21 March 1938:** death in **New York City**.
- **Since 1947:** an award granted by the **American Economic Association** bears his name — the **John Bates Clark Medal**.
- His son, **John Maurice Clark** (1884–1963) is generally associated with Institutional economics.

Clark's thesis (The distribution of Wealth, 1899)

- The project of John Bates Clark, as it appears in 1899, is therefore to legitimise capitalist society.

- Opening sentence of chapter 1:"For practical men, and hence for students, **supreme importance attaches to one economic problem - that of the distribution of wealth** among different claimants."

  → to reopen the **question of distribution** on new grounds.

  → to respond indirectly to Marx by demonstrating that **incomes resulting from competition are just**.

Clark's thesis (The distribution of Wealth, 1899)

- "The right of society to exist in its present form, and the probability that it will continue so to exist, are at stake. These facts lend to this problem of distribution its measureless importance.

  The welfare of the laboring classes depends on whether they get much or little; but their attitude toward other classes - and, therefore, **the stability of the social state - depends chiefly on the question, whether the amount that they get, be it large or small, is what they produce**. (...) if it were to appear that they produce an ample amount and get only a part of it, many of them would become revolutionists, and all would have the right to do so. **The indictment that hangs over society is that of "exploiting labor."** (...) **If this charge were proved, every right-minded man should become a socialist**; and his zeal in transforming the industrial system would then measure and express his sense of justice. If we are to test the charge, however, we must enter the realm of production."

Clark's thesis (The distribution of Wealth, 1899)

- How does J. B. Clark seek to demonstrate that there is no exploitation?

  → by adopting a perspective on value that differs from that of the classical economists.
  Clark's demonstration necessarily involves the **abandonment of the labour theory of value**.

  → **for marginalist economists**, **prices are** not determined on the production side — that is, by labour — but are **revealed through exchange, by the interaction of supply and demand in *"competitive"* markets**.

Clark's thesis (The distribution of Wealth, 1899)

- But this is not sufficient. It is still necessary to demonstrate that the **remunerations of capital and labour are just**.

- **Just in what sense**?

  Reminder: "if it were to appear that they [*the laboring classes*] produce an ample amount and get only a part of it, many of them would become revolutionists, and all would have the right to do so."

  $\Rightarrow$ Just in the sense that — precisely — according to J. B. Clark, **workers receive the whole of what they actually produce**.

Clark's thesis (The distribution of Wealth, 1899)

- **Just in what sense**?

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  ⇒ Just in the sense that — precisely — according to J. B. Clark, **workers receive the whole of what they actually produce**.

- According to J. B. Clark, **such justice is ensured by competition**. Competition is just in the sense that it tends to **reward each factor of production — and thus labour — according to its own contribution to the creation of wealth**.

Clark's thesis (The distribution of Wealth, 1899)

- In this first text, J. B. Clark therefore does two things:

- **1 — He defines a criterion of justice.**

  *"**To each according to his contribution**"*: each individual receives what he has contributed to create.

  → Aristotle's (*Nicomachean Ethics*) and Thomas Aquinas's (*Summa Theologica*) concept of distributive justice.

  Commutative justice (which Aristotle calls *corrective justice*) primarily governs exchange and is based on the equality of persons.

  Distributive justice concerns distribution and holds that those who contribute more to the common good should receive a larger share of it.

- **2 —** He puts forward his general thesis, according to which **distribution under a regime of free competition satisfies** this predefined criterion of **distributive justice**.

Clark's thesis (The distribution of Wealth, 1899)

2 — He puts forward his general thesis, according to which **distribution under a regime of free competition satisfies** this predefined criterion of **distributive justice**.

"We may now advance the more general thesis - **later to be proved** - that, where natural laws have their way, the share of income that attaches to any productive function is gauged by the actual product of it. In other words**, free competition tends to give to labor what labor creates, to capitalists what capital creates, and to entrepreneurs what the coordinating function creates**.

The entire study of distribution is, in this view, a study of specific production. It is an analysis of the wealth-creating operation, and a tracing to each of the three agencies that together bring wealth into existence of the part which it separately contributes composite to the joint result. **To each agent a distinguishable share in production, and to each a corresponding reward - such is the natural law of distribution**."

Clark's thesis (The distribution of Wealth, 1899)

- **NB** — Clark presents this mechanism as a **natural law.**
  *"*There is, in short, a deep-acting natural law at work amid the confusing struggles of the labour market*."*

- Why is this important?
  → Because a ***"natural law"*** **is something that escapes individual wills**, like the laws of gravitation or meteorological phenomena. It cannot be acted against.

- **Market prices** — including the prices of the "factors of production" (that is, incomes) — thus **impose themselves on everyone as natural phenomena**.
  The market rate of wages, Clark writes, is generally *"*controlled by ulterior [*i.e. hidden*] and positive forces*"*.

- **These forces are those of competition**.

Clark's thesis (The distribution of Wealth, 1899)

- There are therefore — according to J. B. Clark — **not, on the one hand, malicious employers deliberately exploiting benevolent workers on the other**. Things are simply so, and no one has decided them.

- Because **competition** prevails, **economic agents are assumed to stand on an equal footing in their economic relations** (thus satisfying the criterion of **commutative justice**), and to be equally subject to the laws of the market.

- Competition therefore fulfils **both the criteria of commutative justice and distributive justice**.

  Léon Walras shares the same view on this issue.

Clark's thesis (The distribution of Wealth, 1899)

- Competition therefore fulfils **both the criteria of commutative justice and distributive justice**.

  Léon Walras shares the same view on this issue.

- "Commutative justice is that which governs exchanges and is represented as holding a pair of scales: it requires that, in a race, all runners be assigned the same starting point. Distributive justice is that which governs competitions and is represented as holding a crown in its hand; it requires that the runners be ranked according to their agility, that is, according to the order in which they have reached their goal."
  (Walras, *Études d'économie sociale*, 1896)

Clark's demonstration*: The Essentials of Economic Theory (1907)*

- **2.3.1. The introduction of the entrepreneur**
- **2.3.2. The Equilibrium according to Clark**
- **2.3.3. Clark's demonstration: an "imaginary experiment"**
- **2.3.4. Weaknesses of Clark's analysis**

Clark's demonstration: the introduction of the entrepreneur

- In an excerpt from *The Distribution of Wealth* seen above, JBC mentioned a character who was less highlighted by the classics.

  "Free competition tends to give to labor what labor creates, to capitalists what capital creates, and to entrepreneurs what the coordinating function creates. The entire study of distribution is (...) an analysis of the wealth-creating operation, and a tracing to each of the three agencies that together bring wealth into existence of the part which it separately contributes composite to the joint result." (Clark 1899)

- This character is the entrepreneur. The introduction of the entrepreneur is a fundamental element of Clark's argument.

Clark's demonstration: the introduction of the entrepreneur

- In Clark's analysis, there are indeed **three economic agents and three corresponding incomes**. However, his trilogy differs from that of the classical economists:

- Workers receive **wages** in return for their labour.

- Capital is remunerated by **interest**.

 The terminology changes here: capital is *lent* (or hired) in return for interest, in order to be invested with a view to earning profit. 

- Profit, according to J. B. Clark, is the remuneration of a **third economic agent, the entrepreneur**, who performs a **coordinating function** within the economy.

Clark's demonstration: the introduction of the entrepreneur

- **Profit**, according to J. B. Clark, is the remuneration of a third economic agent, **the entrepreneur**, who performs a **coordinating function** within the economy**.**

- **The role of the entrepreneur is** to bring the factors of production into relation with one another, **to coordinate labour and capital in order to carry out production** (Clark states that "it consists entirely in the establishing and maintaining of efficient relations between the agents of production"), and his objective is to earn a profit.

- The entrepreneur **buys labour and capital** on markets and sells products on those same markets.
  It is in this respect that **he unwittingly ensures the "just" remuneration of the factors of production**.

Clark's demonstration: the introduction of the entrepreneur

- **Remark 1.** Walras uses a representation of the entrepreneur that is fairly similar.

- **Remark 2.** What becomes of landowners and rent?
  → For J. B. Clark, landowners can be assimilated to capitalists and can therefore be neglected in the analysis.

- **Remark 3. The status of the entrepreneur as introduced by Clark raises problems** (as it does in Walras's framework as well), as we shall see at the end of this section.

Clark's demonstration: the equilibrium

- The notion of **equilibrium** is also essential to Clark's demonstration: **it is at equilibrium that the remuneration of capital and labour is "just".**

- As noted in the introduction, there is no longer any question here of market prices gravitating towards natural prices. Nor is there any longer any notion of "natural" profits or wages, determined outside the process of exchange.

  - For the classical economists, labour has a *"natural price"*, governed by a logic of reproduction and subsistence
  $\Rightarrow$ a **dynamic** perspective.

  - For Clark, labour has a **market price**, governed by a competitive logic
  $\Rightarrow$ a **static** perspective: the market price is an **equilibrium price**.

Clark's demonstration: the equilibrium

- Clark in fact defines **equilibrium** as a **static state**:
  "**a condition of perfect mobility without motion**."

- **Explanation**

  - *"Perfect mobility"* means **(perfect) competition**, that is, the freedom for each owner of a "factor" to hire out his capital or his labour to whomever he chooses (to the entrepreneur of his choice).

  - The **motive for the movement of factors** (labour and capital) **is gain**, that is, income.

  - As long as income differentials exist (apart from wage differentials linked to skills), factors have an incentive to move.

  - But **when incomes are equal everywhere, factors no longer have any incentive to change employment** (or entrepreneur).

  - This is the case **at equilibrium**: factors always retain the freedom to move (*"perfect mobility"*), but no longer have any motive to do so (*"without motion"*).

Clark's demonstration: the equilibrium

- According to Clark, **it is competition itself that naturally leads to equilibrium**:

  "it is the ideally perfect mobility which has existed in the past which positively excludes motion in the present."

- Because competition — that is, freedom of movement — was perfect, **labour and capital**, repelled by low returns and attracted by high ones, **moved until all income differentials between employments disappeared**.

- We thus recover the idea, already theorised by the classical economists, that **competition tends to equalise the rewards to labour and capital**.

Clark's demonstration: the equilibrium

- **Semantic remark.** The vocabulary used by Clark is revealing.

- **Competition is identified with mobility and fluidity**.
  Clark uses the metaphor of water in a pool, which is motionless precisely because it is unobstructed.

- **By contrast, obstacles to competition are described as "rigidities" and "frictions"**.
  Even though Clark does not state this explicitly, it is clear that these obstacles are trade unions and the state, that is, legislation (minimum wages, restrictions on dismissals).

- Problem: this metaphor is not necessarily appropriate (counter-examples include a bathtub or a dam).

Clark's demonstration: the equilibrium

- Clark acknowledges that this is an **ideal situation**.

- According to him, however, the functioning of real markets tends towards that of the ideal market, and **the gap between reality and the ideal is precisely due to the obstacles** just discussed.

- Be that as it may, **it is in this ideal equilibrium state that the remuneration of the factors is just**, and that each factor is remunerated in proportion to its contribution to the creation of wealth.

- At this stage, we may therefore retain the idea that **perfect competition is supposed to lead to "just" remunerations**.
  We shall now see how, according to Clark, such remunerations are determined

Clark’s demonstration: an "imaginary experiment"

- We have just seen that Clark’s reasoning is hypothetical.
  Clark explicitly claims this feature: in order to measure the share of product created by each factor, he invites us to carry out an **“imaginary experiment.”**

- Let us therefore assume, as Clark does, that:

  - the **total capital of a society** is a **fixed amount**;

  - the **entire labour force is divided into ten homogeneous groups** (*“as nearly alike as possible”*), or **“units of labour”**;

  - these **units of labour** are employed **one after another** with the **total capital of the society**.

Clark’s demonstration: an "imaginary experiment"

- *1st stage of the experiment:*

  - A **single unit of labour is employed** and therefore uses **all the capital** available in the society.

  - Having at its disposal a large quantity of capital, this first unit produces a **very large amount of wealth**.

.

- *2nd stage of the experiment:*

  - A **second unit of labour** is employed and produces jointly with the first. The two units therefore **share the total capital** that was used by a single unit in the first stage.

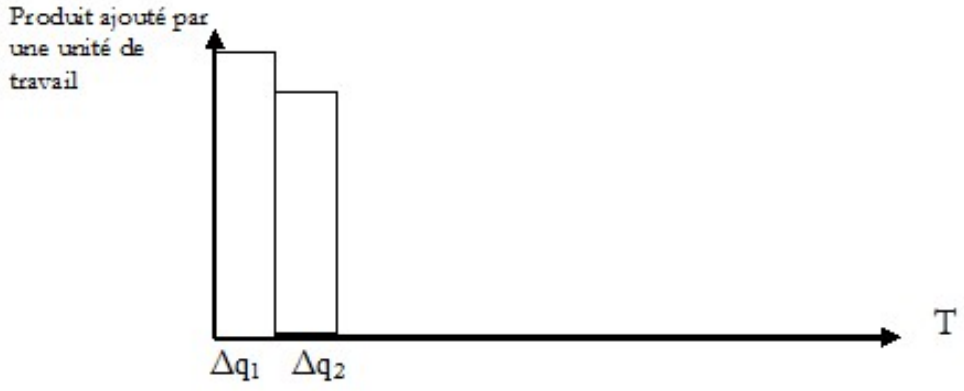
  - Taken together, **they obviously produce more wealth** than the first unit of labour did in the first stage.

  - **But** they do not produce twice as much. **They produce less than twice as much**.

Clark’s demonstration: an "imaginary experiment"

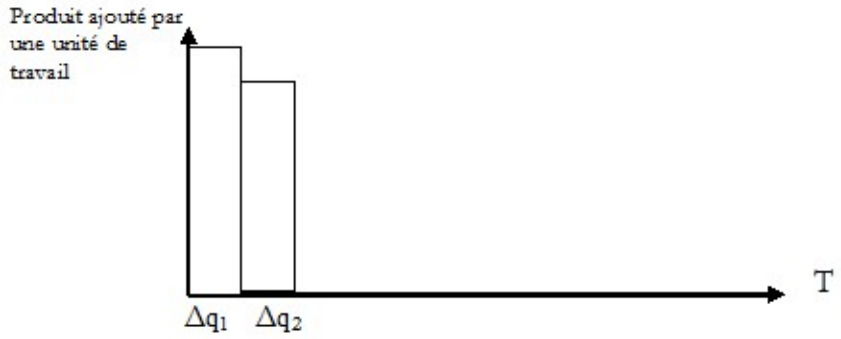
- Indeed, when a single unit of labour (T_1) is employed (together with the entire stock of capital), the product (Δq_1) produced by this unit of labour is very large.

- When an additional unit of labour (T_2) is added, the increase in product (Δq_2) generated by this additional unit is smaller than the product produced by the previous unit.



Clark's demonstration: an "imaginary experiment"

- "We shall find that each unit as it begins to work adds less to the previous product than did the unit which preceded it, and that the tenth unit adds the least of all."



- What is added to total product by the last unit of labour employed is the **marginal product of labour** (the marginal productivity of labour in value terms). According to J. B. Clark, **the marginal productivity of labour is diminishing**. This is the fundamental assumption of his reasoning.

Clark’s demonstration: an "imaginary experiment"

- But does saying that the marginal productivity of labour is diminishing mean that the second unit of labour produces less than the first?

  NO.

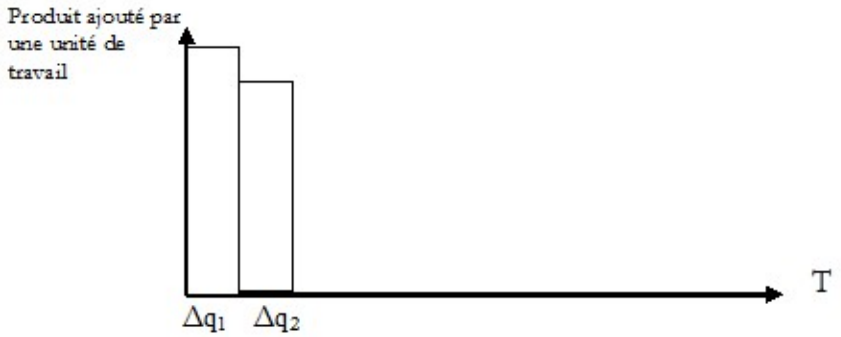
  $\Rightarrow$ Since the **units of labour are homogeneous**, **each unit produces the same amount**.

  The proof is that if one of the two units is withdrawn — whichever one — we return to the situation of the first stage.

Clark's demonstration: an "imaginary experiment"

- **What, then, is the share of the product that should be granted to labour?**
  "Care must be taken not to confound the addition that is made to the product in consequence of the additional working force with the amount which, after the enlargement of the force, is **created by the last unit of labor and its pro rata share of the capital**."

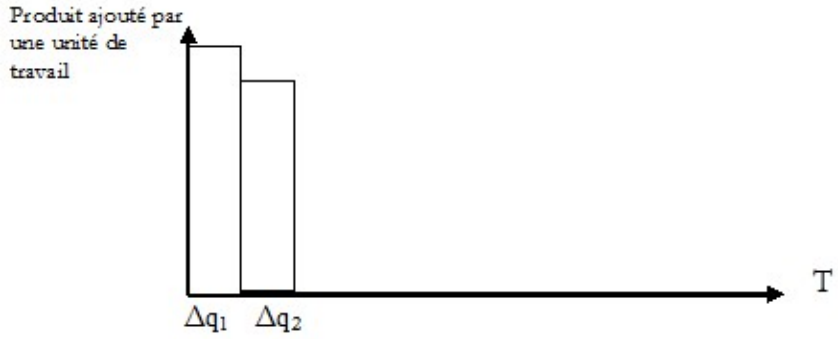
- Indeed, at this **second stage**, the quantity produced by **each unit of labour together with its proportional share of capital** is equal to **one half of total product**, that is $(\Delta q_1 + \Delta q_2) / 2$.
  By contrast, **what the additional unit adds to total product** is **smaller**, namely Δq_2.



Clark's demonstration: an "imaginary experiment"

- According to J. B. Clark, it is what the last unit adds to total product (Δq_2) that should be identified as the "bare product of a unit of labour", and should therefore determine its remuneration.

"... that which we call the product of a unit of labor is what that unit, coming into the field without any capital, can add to the product of the labor and capital that were there before."

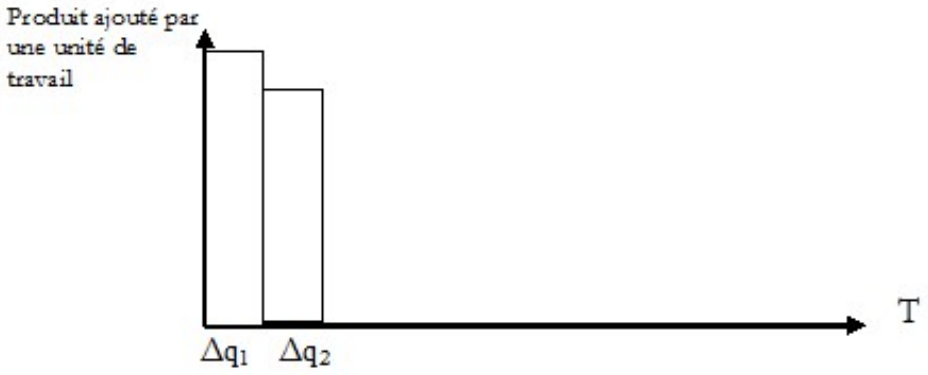


Clark's demonstration: an "imaginary experiment"

- Where, then, does the difference in output between the two stages ($\Delta q_1 - \Delta q_2$) come from, and to whom or to what should it be attributed?

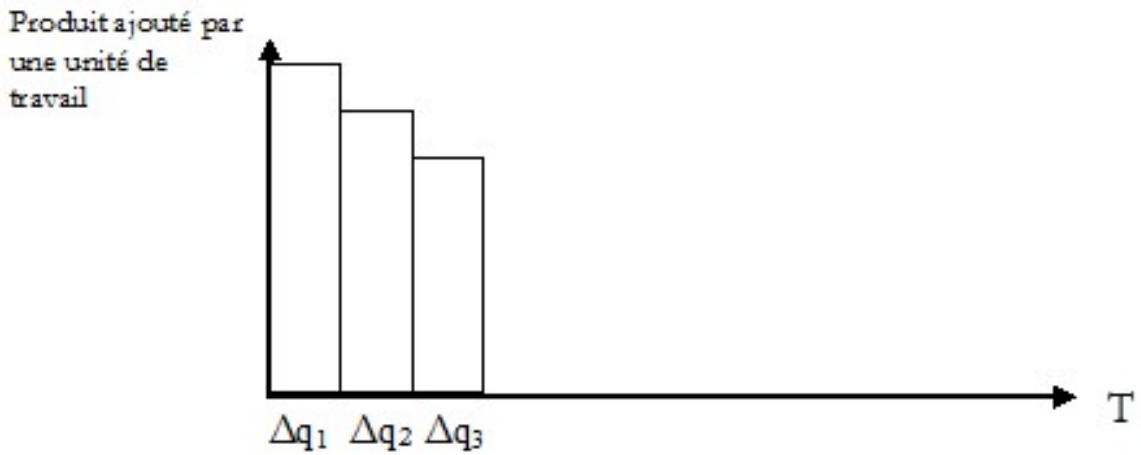
  ⇒ **Since this difference does not come from labour, it must come from capital**.

  - The *specific product* of **each unit of labour is Δq_2**.
  - The *specific product* of the two units of labour taken together is therefore $2\Delta q_2$.
  - The *specific product* of the **total capital**, at this stage, is $\boldsymbol{\Delta q_1 - \Delta q_2}$.



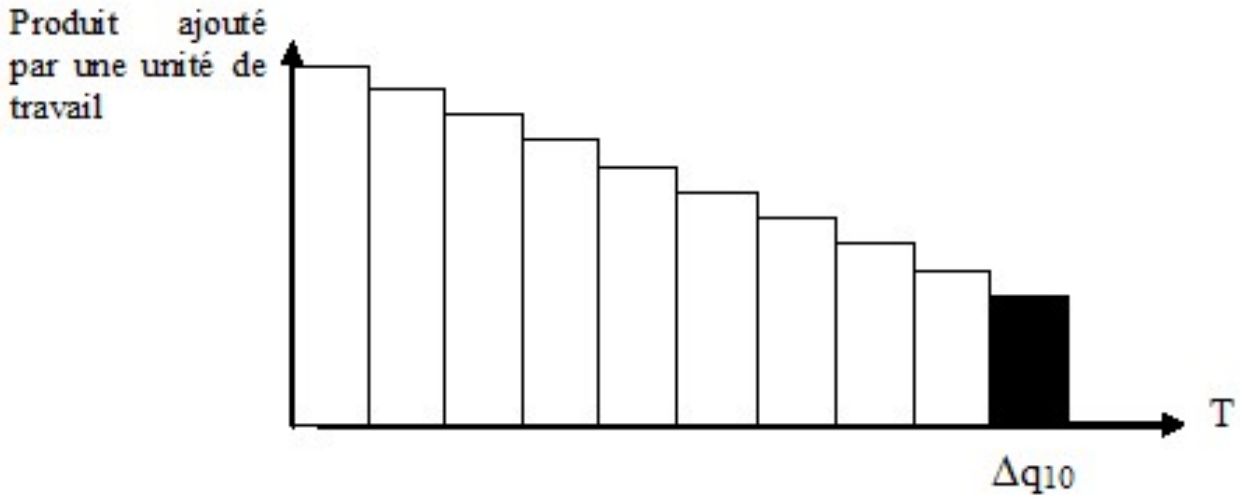
Clark's demonstration: an "imaginary experiment"

- *3rd stage of the experiment:*
- A **third unit of labour** is added, which therefore uses, together with the first two units, **the whole amount of capital**.
- The three units obviously produce more output than the first two units did at the second stage of the experiment.
- But once again, the **additional quantity of product (Δq_3) is smaller than Δq_2.**



Clark's demonstration: an "imaginary experiment"

- And so on, up to the tenth unit of labour.

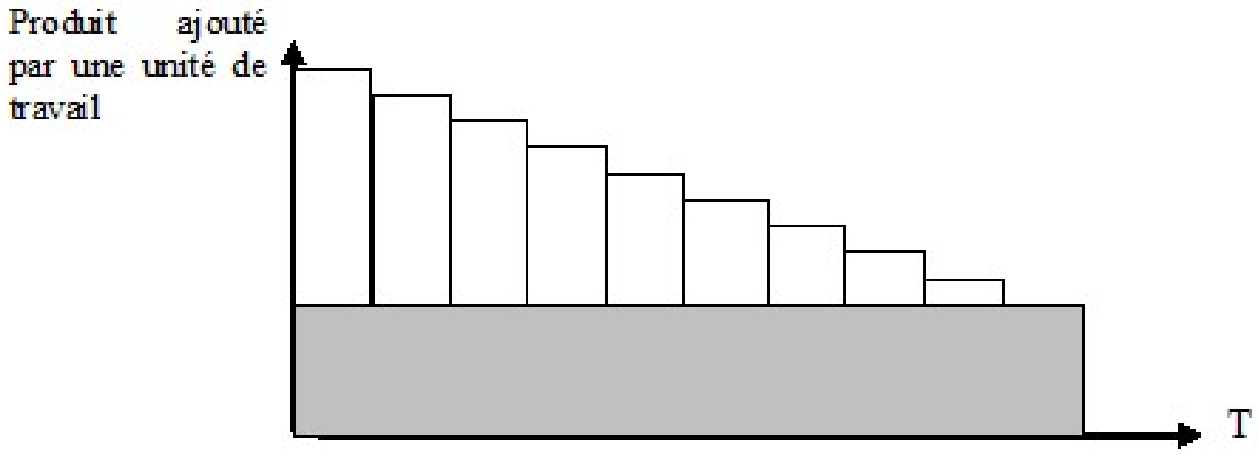


- When the **tenth unit of labour** is employed, it adds Δq_{10} to the product (with $\Delta q_{10} < \Delta q_9 < \Delta q_8 < \ldots < \Delta q_2 < \Delta q_1$).

- The **total product** is then $\Delta q_{10} + \Delta q_9 + \Delta q_8 + \ldots + \Delta q_2 + \Delta q_1$.

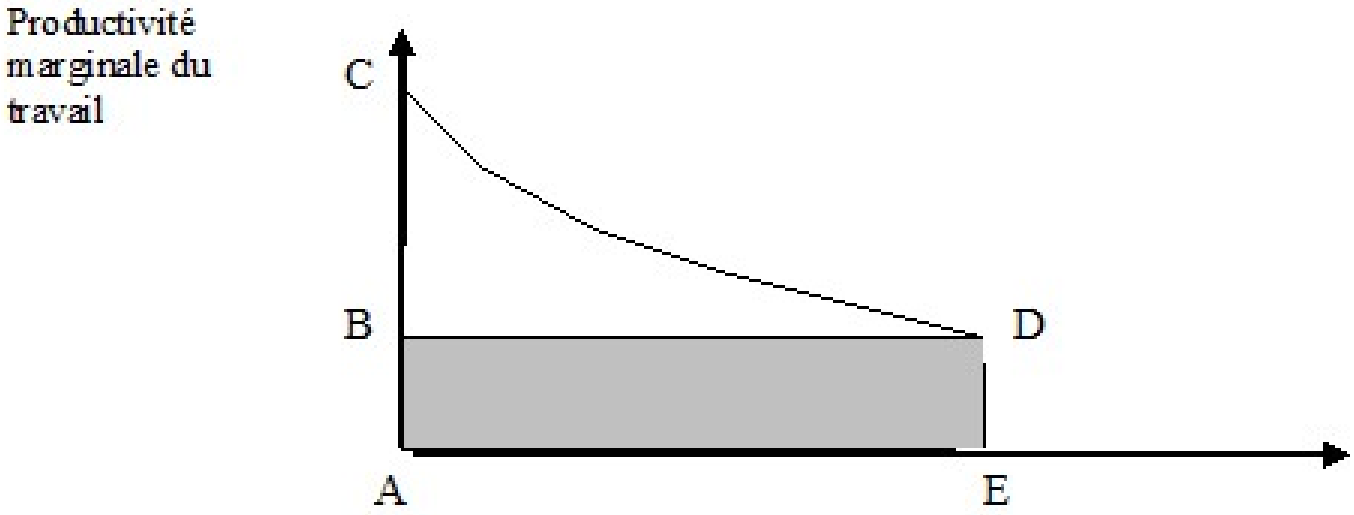
Clark's demonstration: an "imaginary experiment"

- The last unit of labour adds Δq_{10} to the product. This is what JBC calls the **final productivity of labour**, which determines both **labour's contribution to production and its remuneration**.
- Since ten units of labour are now employed, the share of the product accruing to labour is therefore equal to $\boldsymbol{10 \cdot \Delta q_{10}}$.
- The **remainder of the product**
  ($\Delta q_{10} + \Delta q_9 + \Delta q_8 + \ldots + \Delta q_2 + \Delta q_1 - 10 \cdot \Delta q_{10}$)
  must be attributed to **capital**.



Clark’s demonstration: an "imaginary experiment"

- Passing to the limit, we recover Clark’s scheme:

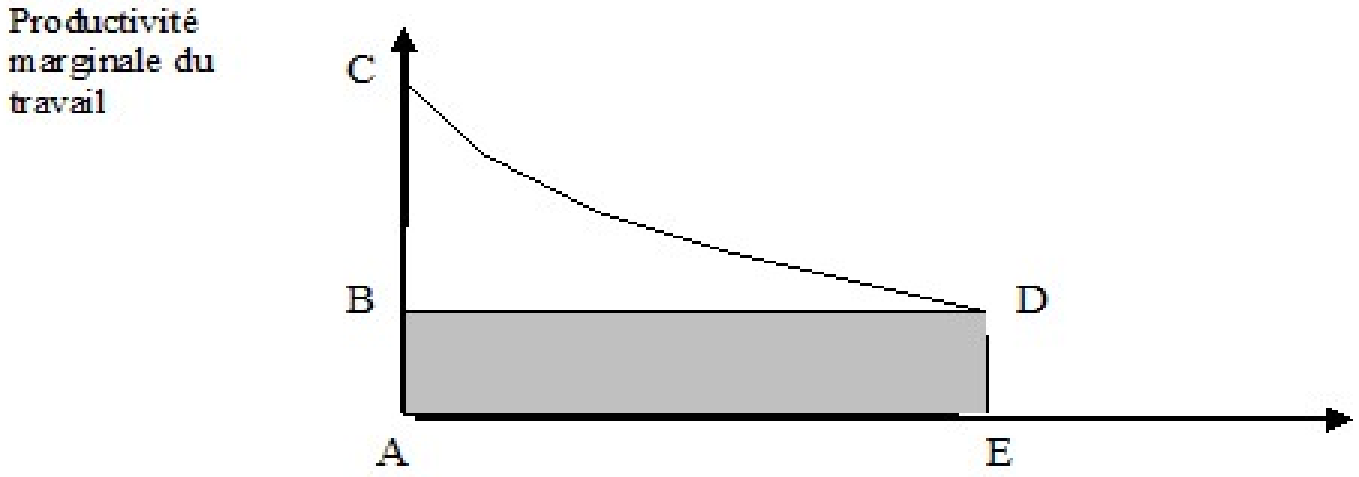


- The total product is equal to the total area ACDE.
- The share of the product going to **labour** is equal to the area **ABDE**.
- The share of the product going to **capital** is equal to the area **BCD**.

Clark’s demonstration: an "imaginary experiment"

- At the end of this first “imaginary experiment,” **interest appears as a residual**, since it is represented by the area BCD, obtained by subtracting from the total area (ACDE) the area corresponding to wages, or to the quantity of product attributed to labor (ABDE).

- BCD (interest on capital) = ACDE (total product) – ABDE (wages of labor)



Clark’s demonstration: an "imaginary experiment"

- But there exists another explanation of interest. This one is strictly symmetrical to that of wages.

- In order to determine interest (the income of capital), we now carry out a second “imaginary experiment,” symmetrical to the previous one.

- Let us therefore assume, with J. B. Clark, that:

  – the **total amount of labour in society is a fixed quantity**;

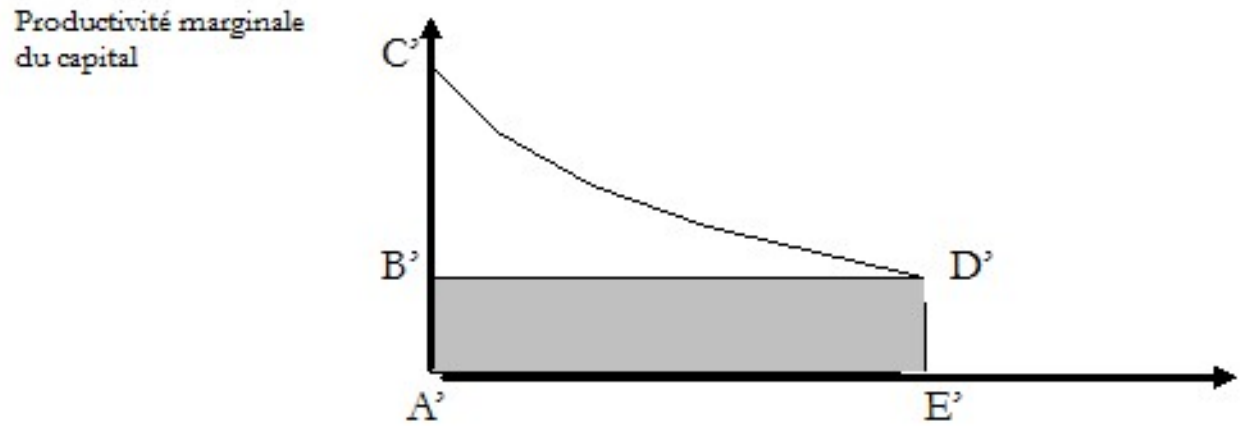
  – the **total capital of society is divided into ten homogeneous units**, or “units of capital”;

  – these units of capital are **employed one after another with the total labour of society**.

Clark’s demonstration: an "imaginary experiment"

- At the end of this second experiment (assuming diminishing marginal productivity of capital), we obviously obtain **a scheme similar to the previous one**, with:

  B’C’D’ (wages of labour) = A’C’D’E’ (total product) − A’B’D’E’ (interest of capital).



Clark’s demonstration: an "imaginary experiment"

- **Why is this important for Clark?**
  ⇒ To challenge the classical economists and Marx.

- We have seen **that Ricardo and Marx rely on different explanations** for the income of workers, on the one hand, and that of capital, on the other.

- **Wages** were determined according to a **subsistence level**, allowing for the reproduction of the working class.

- **Capital income** was determined **residually**, both in Ricardo and in Marx (for whom the surplus labour corresponding to surplus value also appeared as a residual—total labour minus necessary labour).

Clark's demonstration: an "imaginary experiment"

- **According to J. B. Clark, by contrast, the same explanation applies to the determination of wages and to the determination of interest on capital,** which tends to place the two forms of income on an equal footing**.**

- This notion of equality in the determination of incomes is crucial, since Clark's objective is to demonstrate that capitalist **remunerations are just**.

  ⇒ **Commutative justice**: everyone stands on an equal footing with respect to competition and the "natural laws" of the market.

- Competition therefore satisfies **both** the criteria of **distributive justice** ("to each according to his contribution") and **commutative justice** (workers and capitalists placed on an equal footing).

Weaknesses of Clark's analysis

- **Clark's analysis exhibits several weaknesses:**

  - the status of the entrepreneur

  - the assumption of diminishing marginal productivity and constant returns

  - the power relationship between workers and employers (entrepreneurs)

Weaknesses of Clark's analysis

- **The status of the entrepreneur in Clark's (and Walras's) framework raises a problem.**

- The remunerations ensured by competition are "just" in the sense that they return to capital the share of wealth produced by capital, and to labour the share produced by labour.

- But if this is so, **what share of the product remains for the entrepreneur**, who, according to Clark, does not produce wealth but performs a function of mere coordination, of bringing the factors together?

  ⇒ **NONE.** This share is, **logically, zero**.

Weaknesses of Clark's analysis

- **What share of the product remains for the entrepreneur?**
  ⇒ **NONE.** This share is, **logically, zero**.

- The entrepreneur's income—profit—thus **truly appears as a residual**, in contrast to wages and interest.

- Yet **at equilibrium, this residual must necessarily be zero**, since the shares attributed to labour and capital exhaust the entire product.

  ⇒ The **"product exhaustion theorem"** therefore implies the **nullity of profits**.

Weaknesses of Clark's analysis

- **The "product exhaustion theorem" implies the nullity of profits**.

  "Entrepreneur's profits, when they exist, mean that this equilibrium is disturbed." (Clark 1907, chap. 8)

- Léon Walras reaches the same conclusion:

  "The state of equilibrium of production, which implicitly includes the state of equilibrium of exchange, is the state in **which the selling price of each product is equal to its cost of production in productive services** (...) in the state of equilibrium of production, **entrepreneurs make neither profit nor loss**.**"**
  (*Elements of Pure Economics*, Lesson 18, 1874)

Weaknesses of Clark's analysis

- **Problem: the status of the entrepreneur is paradoxical.**

- **The entrepreneur is necessary to the analysis**, since it is he who achieves the criterion of distributive justice, by remunerating each factor ("productive services" in Walras's terminology) according to its "real" contribution to production—that is, its marginal productivity.

- Yet he pursues an objective that he never attains: **at equilibrium, profit is nothing but a residual and purely notional category**.

- Once equilibrium is reached, the entrepreneur can in fact be dispensed with altogether:

  "We may even, in this state, abstract from the intervention of entrepreneurs, and consider not only productive services as exchanged for products and products as exchanged for productive services, but even productive services as exchanged ultimately against one another."
  (Walras, *Elements of Pure Economics*, Lesson 18, trans. William Jaffé)

Weaknesses of Clark's analysis

- JBC does not explain why the entrepreneur would agree to give up the entire product to capitalists and workers and coordinate production "benevolently".
  → His reasoning is **atemporal**. If, by contrast, one reasons dynamically, the absence of profit today is a bad incentive for entrepreneurs to initiate production in the future.

- Walras attempts to address this difficulty by assuming that **entrepreneurs are workers or capitalists in their own firms, paying themselves wages or interest** at the rates determined by competition.

- Yet one fails to see why such agents would be willing to exert the additional effort required to coordinate production, since **their income would be strictly identical if they merely participated in markets as simple suppliers of labour or capital**.

Weaknesses of Clark's analysis

- **The hypothesis of diminishing marginal productivity of factors**

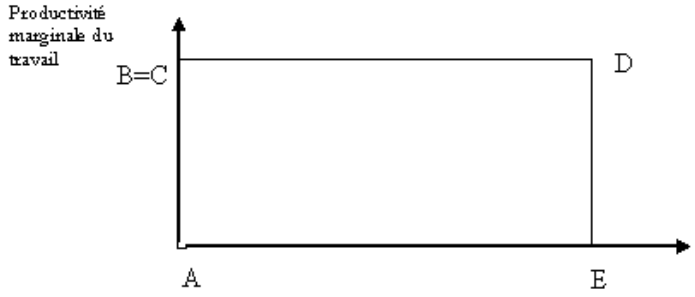
- This hypothesis - which he presents as a "universal principle" is also necessary for JBC's argument:

  "This principle is the law of final productivity, **one of those universal principles which govern economic life** in all its stages of evolution. Either one of the two agents of industry, used in increasing quantities in connection with a fixed amount of the other agent, is subject to **a law of diminishing returns**. The final unit of the increasing agent produces less than did the earlier units in the series." (Clark 1907, chap. 9)

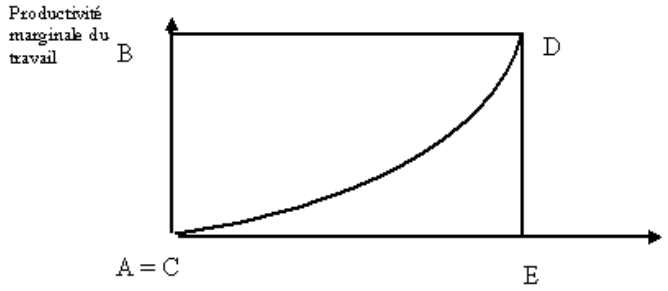
Weaknesses of Clark's analysis

- With constant or increasing marginal productivities, Clark's schemes would be very different... and his demonstration would fall apart.

constant productivity :
no share left for
the other factor



increasing productivity :
the income of a single factor
exceeds the total product



- The areas (ACDE, ABDE, BCD) only have a "distributive meaning" if the marginal productivity curve is strictly decreasing.

Weaknesses of Clark's analysis

- **Then, the very notion of the "marginal productivity" of a factor is far from self-evident.**

  - First, **it is problematic for identifying the contribution of an individual agent** whenever production is based on **cooperation**.
  The many goals scored by Mbappé may seem to justify his salary; yet without his teammates, Mbappé would score no goals at all, and his "marginal productivity" would be zero.
  What is produced is irreducibly **collective**, and the attribution of a marginal product to an individual agent is conceptually fragile.

  - Second, it is also problematic when it comes to **distinguishing what is produced respectively by labour and capital**.
  When Clark writes that "the total capital" is used by one unit of labour, then by two, then by three, and eventually by ten units of labour, what exactly is he referring to?

Weaknesses of Clark's analysis

- When Clark writes that "the total capital" is used by one unit of labour, then by two, then by three, and eventually by ten units of labour, **what exactly is he referring to**?

- Consider a cleaning firm whose capital consists of a single vacuum cleaner and ten workers.

  - The first worker (one "unit of labour") cleans a surface X using the vacuum cleaner (the "total capital") during a given period t.

  - However, adding additional units of labour does not increase output: with ten workers and one vacuum cleaner, one worker operates the vacuum cleaner while the nine others merely watch.
  The surface cleaned during period t remains equal to X.

Weaknesses of Clark's analysis

- Unless one assumes the following:

  - at stage 1, *total capital* consists of one electric vacuum cleaner;

  - at stage 10, *total capital* consists of ten wooden brooms*;

  (**it cannot consist of ten vacuum cleaners, since the total amount of capital is assumed to be the same in value*)

- It follows that it is necessarily not the same "total capital" — or at least **not capital of the same physical form** — even if its value is assumed to be constant.

Weaknesses of Clark's analysis

- JBC concedes:

"We will set at work one section which we have called one unit of labor and will put into the hands of its members the whole capital which is designed ultimately to equip the ten sections**. It is very clear that the forms that this capital will take cannot be the same** that it will have to take when the entire working force is using it. Indeed, **we shall have to tax our ingenuity to devise ways in which one unit of labor can utilize the capital that will ultimately be used by ten**. The tools and machines will have to be few in number but very costly and perfect. We shall have to resort to every device that will make a machine nearly automatic and cause it to exact very little attention from the person who tends it. The buildings will have to be of the most substantial and durable kind. We shall have to spend money without stint wherever the spending of it will make labor more productive than it would otherwise be." (Clark 1907, chap. 8)

Weaknesses of Clark's analysis

- **Product exhaustion and constant returns to scale**
  The zero-profit result finally implies an assumption that is **not made explicit by Clark**.

- Consider a standard production function $f(K,L)$

  (where K denotes the quantity of capital and LLL the quantity of labour)

  exhaustion of the product translates formally as:

$$Lf'_L(K,L) + Kf'_K(K,L) = f(K,L)$$

  where $f(K,L)$ is total output, $Lf'_L(K,L)$, the share of output created by labor, and $Kf'_K(K,L)$, that created by capital

- According to **Euler's theorem**, this equality implies that $f(\cdot)$ is homogeneous of degree one. It follows that the exhaustion of the product requires the assumption of **constant returns to scale**.

Weaknesses of Clark's analysis

- For the zero-profit assumption to hold, **returns to scale must be constant**.

- However, **constant returns to scale create a problem under perfect competition**.

- When returns to scale are constant, the producer's demand for inputs and supply of output are **zero, infinite, or indeterminate**, depending on whether the output price is respectively **below, above, or equal to unit cost**.

- This leaves only an **indeterminate equilibrium solution**:
  even if the firm is willing to produce — at zero profit — in order to satisfy demand, **price information alone does not allow it to determine at which level.**

Weaknesses of Clark's analysis

- This is why the Arrow–Debreu (1954) model of perfect competition **privileges the assumption of decreasing returns to scale**.

- To sum up, **Clark's "demonstration" is not compatible with the model of perfect competition**, despite what some textbooks may claim.

Weaknesses of Clark's analysis

- **The balance of power between workers and employers**

- Clark's analysis assumes a **perfectly balanced power relationship between workers and employers** (that is, between workers and "entrepreneurs").

- Otherwise, nothing would compel the entrepreneur to remunerate labour at its marginal productivity and to relinquish the entirety of profit.

- The real-world entrepreneur seeks profit; he is not a volunteer. He may therefore have an incentive to "exploit" labour.

Weaknesses of Clark's analysis

- Clark admits: :

  "This would require **that a workman should be able to set employers bidding against each other for his services just as actively as an employer can make laborers bid against each other in selling their services**. If this were the case, every unit of labor could get what it produces, no more and no less."
  (Clark 1907, chap. 9)

Weaknesses of Clark's analysis

- By Clark's own admission, his analysis would only be valid if there were perfect equality between workers and employers.

- It must be acknowledged that **this was far from being the case** at the time when he was writing (see **introduction**).

- The historical context and the condition of the working class at the end of the nineteenth century in the United States (as well as in Europe) do not allow one to claim that actual situations and remunerations tended toward the ideal described by Clark, despite his assertions.

- This stands in contrast with the more realistic way in which Smith and Marx describe power relations between capitalist employers and workers.