



The Commodification of Knowledge and Information

Tomás Rotta

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Twitter: @gperc_uog

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Tomás Rotta

University of Greenwich, London

Greenwich Political Economy Centre (GPERC)

marx21.com/contact/

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Objective

Broad Question

What are the consequences of turning knowledge and information into commodities?

Entry Point

The production, appropriation, and distribution of value

Specific Question

What are the implications of the commodification of knowledge and information for the Marxist theory of value and class?

Methods

Theoretical

Political Economy

Marxist Theory

Empirical

Descriptive analysis

Input-Output matrices and NIPA

New methodology to transform official accounts into PE concepts

Lecture Plan

Lecture Plan

Analysis of the **commodification of knowledge and information** in contemporary capitalism

Consistent account of how information as a commodity effects the workings of both **capitalism** and of **Marxist theory**

Lecture Plan

Analysis in 6 steps:

1. Marx's own writings on cognitive capitalism
2. Immaterial labor hypothesis
3. Knowledge-commodities and knowledge-rents
4. Current debates within the Marxist literature
 - Reproduction cost approach
 - Average cost approach
5. Empirical estimates
6. Final Remarks

Introduction

Introduction

Facts:

Commodified knowledge and information are everywhere

And are spreading very fast

Proliferation of intellectual property rights, patents, and copyrights

At both national and transnational levels

Introduction

In the history of capitalism...

When the **commodity form** took hold of a new economic object, a profound transformation would ensue:

Commodity form took hold of **land** → capitalist **land-rents** emerged

Commodity form took hold of **labor power** → **wage labor** and **wages** emerged

Commodity form took hold of **capital** → **interest-bearing capital** emerged

Commodity form took hold of **knowledge** → **knowledge-rents** emerged

Marx on Cognitive Capitalism

Marx on Cognitive Capitalism

Marx developed some insights on the future of science and information as productive forces within capitalism

Marx, however, had not yet experienced the vast and profound **commodification of knowledge** as we do nowadays

This fact bears consequences for Marxist theory

Our current task:

Consistent account of how **information as a commodity** effects the workings of both **capitalism** and of **Marxist theory**

Marx on Cognitive Capitalism

In the *Grundrisse* of 1858 ...

Marx drafted how he foresaw the **production and distribution of wealth** in a future stage of capitalism

This is known as the passage on the “general intellect” or also the “fragment on machines”

These insights did not reappear in his later writings

Marx speculated on the impact of **technology** and **labor-saving innovations** on **value** as the social form of wealth in capitalism

Marx on Cognitive Capitalism

In capitalism...

Labor time is the measure of **value**

Labor time regulates production and exchange

But technology and science applied to production progressively render **labor time** a miserable measure of **value**

Because of technology, the creation of **value** comes to depend less on the direct **labor time** employed in production

Labor time ceases to be the measure of **value**

Value ceases to be the measure of **use-value**

Marx on Cognitive Capitalism

Capital reduces **labor time** to a minimum, while it posits **labor time** as the sole measure and source of wealth

Capital makes the creation of wealth independent (relatively) of the **labor time** employed on it

But capital still wants to use **labor time** as the measuring rod of all wealth created

This contradiction would undermine the foundations of **value** as the **social form of wealth**

And would create the foundation for a new economy not subject to the **valorization of value**

Immaterial Labor Hypothesis

Immaterial Labor Hypothesis

The **immaterial labor hypothesis**:

Capitalism has been going through a structural shift...

by relying ever more on **immaterial commodities** produced during **non-labor time**

Change in the nature of both labor and commodities

Abstract labor is no longer the **substance of value**

Marx's value theory is **no** longer valid

Immaterial Labor Hypothesis

The **immaterial labor hypothesis**:

Appeared in the 1990s

Main authors:

André Gorz, Toni Negri, Michael Hardt, and Maurizio Lazzarato

Technological progress makes **labor time** an inadequate measure of value

Wealth depends ever more on what is produced during **non-labor time**

Immaterial Labor Hypothesis

The “transformation” that Marx alludes to is the transition from an industry-based to a **service**-based economy

This transition from industry to **services** is the limit to **value theory** grounded on **labor time**

Immaterial labor produces **immaterial products** such as knowledge, information, ideas, images, affection etc.

The qualities and specific characteristics of **immaterial production** tend to transform the labor process and even society itself as a whole

Immaterial labor emerges in the **service** sector and produces **intangible goods**

Immaterial Labor Hypothesis

Immaterial labor blurs the distinction between **work** and **non-work time**

And changes the nature of labor time from **quantitative** to **qualitative**

Current production relations are more tied to the complex and unmeasurable dimensions of **human capital** than to the former tangible forms of **fixed capital**

All the skills and information developed during **non-work time** become subject to the **profit motive**

Immaterial Labor Hypothesis

Fordist worker

Appendix to material production

Work time is measured in hours of repetitive physical effort

Post-Fordist worker

Qualitative aspects of its labor are crucial

Knowledge, skills, behavior, improvisation, imaginative and cooperative capabilities

Skills mostly nurtured outside of the workplace

Immaterial Labor Hypothesis

Abstract labor is no longer the **substance of value**

Immaterial labor has displaced **labor time** as the internal regulating mechanism of capitalism

Immaterial labor creates immaterial commodities whose values **cannot be measured** by the **labor time** required for their production

Valorization of value now depends less on unpaid labor time and hence more on the scientific knowledge and skills developed during **non-labor time**

Immaterial Labor Hypothesis

Fausto, Prado, Virno, and Vecellone:

Criticize the immaterial labor hypothesis and the value theory behind it

But they offer some insights based on Marx's Grundrisse

As capital makes **labor time** an increasingly poor measure of wealth, it modifies the way in which **capital subjugates labor** within and outside the production process

If previous forms of capitalism led to the **formal and real subordination** of labor to capital, capitalism now achieves a higher stage with the **intellectual subordination of labor to capital**

Immaterial Labor Hypothesis

Implications:

The concept of **immaterial labor** poses a theoretical challenge to Marxist theory

If abstract labor is no longer the substance of value then value has lost both its internal measure in labor time and its role in **regulating production and exchange**

Price system becomes **more arbitrary** and dependent on non-economic factors such as **monopoly rights**

Knowledge-Commodities
and
Knowledge-Rents

Knowledge-Commodities and Knowledge-Rents

The immaterial labor hypothesis posed serious challenges to the Marxist theory of value

It is possible, and logically consistent, to **remain within the Marxist theory of value** while concomitantly acknowledging the recent transformations in capitalism

Not necessary to reject abstract labor as the substance of value

Knowledge-Commodities and Knowledge-Rents

In response to this challenge, we introduce **3 new categories** to theorize the **emergence of commodified information**:

1. Knowledge-commodities with zero value
2. Knowledge-rents
3. Knowledge-lords

3 crucial distinctions:

1. Production vs. Reproduction
2. Productive vs. Unproductive activities
3. Moral depreciation vs. Use-value depreciation

Terminology

Notes on the terminology:

More accurate to speak of **activities** rather than sectors

Because sectors and companies comprise a mix of productive and unproductive activities

Productive activity (PA) = economic activity that produces **value**

Unproductive activity (UA) = economic activity that does **not** produce value

Accumulation = increase in the **flow of income** or in the **stock of assets**

Productive accumulation = increase in the flow of income or in the stock of assets in PA

Unproductive accumulation = increase in the flow of income or in the stock of assets in UA

Terminology

Productive activities (PA)

Produce new commodities with value

Produce new value, and hopefully new surplus value

Total Value of PA = Constant Capital in PA + **Marxist VA**
= Constant Capital in PA + Value of LP + Surplus Value

Unproductive activities (UA)

Do not produce new commodities with value

Claim a share on the values produced by PA

Gross Income of UA = Constant Capital in UA + **Net Income of UA**

Knowledge-Commodities and Knowledge-Rents

Production vs. Reproduction:

Crucial to distinguish between **production** and **reproduction** in the determination of **value** and socially necessary labor time

Marx begins *Capital* at a very high level of abstraction, a stage in his theoretical exposition at which we only find the **production** of commodities

Growth, reproduction, and inter-capitalist competition are not yet explicitly (even though they are implicitly) included in the analysis

But as soon as Marx approaches a more concrete level of analysis he progressively introduces the conditions of capital **reproduction**

Knowledge-Commodities and Knowledge-Rents

Production vs. Reproduction:

Once **reproduction** comes to the forefront of the theoretical exposition, there begins an important shift within Marx's value theory

At the initial higher level of abstraction, in which only production is featured, commodity **production** determines the magnitude of values

But once reproduction is explicitly brought into the picture at a more concrete level of analysis, value is then determined by the conditions of commodity **reproduction**

Because of its undue focus on the very first chapters of *Capital*, the Marxist tradition has misunderstood how **reproduction** (not production) determines **value** and **socially necessary labor time**

Knowledge-Commodities and Knowledge-Rents

Production vs. Reproduction:

Capital I:

But in addition to the material wear and tear, a machine also undergoes what we might call a **moral depreciation**. It loses exchange-value, either because machines of the same sort are being produced more cheaply than it was, or because better machines are entering into competition with it. In both cases, however young and full of life the machine may be, **its value is no longer determined by the necessary labour-time actually objectified in it, but by the labour-time necessary to reproduce either it or the better machine**. It has therefore been devalued to a greater or lesser extent.

(Marx [1887]1990:528 – emphasis added)

Knowledge-Commodities and Knowledge-Rents

Production vs. Reproduction:

Capital II:

Just as with any other commodity, so in the case of labour-power, too, its value is determined by the amount of labour needed to **reproduce** it. [...] wages are the value of the commodity labour-power, and the latter can be determined (like the value of any other commodity) by the labour needed for its **reproduction**.

(Marx [1893]1992, p.458-459 – emphasis added)

Knowledge-Commodities and Knowledge-Rents

Production vs. Reproduction:

Capital III:

Marx pointed to

"the great difference in costs between the first construction of a new machine and its reproduction" ([1894]1994:199)

Knowledge-Commodities and Knowledge-Rents

Production vs. Reproduction:

Capital III:

Once machines, factory buildings or any other kind of fixed capital have reached a certain degree of maturity, so that they remain unchanged for a long while at least in their basic construction, a further **devaluation** takes place as a result of improvements in the **methods of reproduction** of this fixed capital. The value of machines, etc. now falls not because they are quickly supplanted or partially devalued by newer, more productive machines, etc., but because they can now be **reproduced more cheaply**.

(Marx [1894]1994:209 – emphasis added)

Knowledge-Commodities and Knowledge-Rents

Production vs. Reproduction:

Capital III:

Fluctuations in the rate of profit that are independent of changes in either the capital's organic components or its absolute magnitude are possible only if the value of the capital advanced, whatever might be the form - fixed or circulating - in which it exists, rises or falls as a result of an increase or decrease in the **labour-time necessary for its reproduction**, an increase or decrease that is independent of the capital already in existence. The **value of any commodity** - and thus also of the commodities which capital consists of - is determined *not* by the necessary labour-time that it itself contains, but by the **socially necessary labour-time required for its reproduction**. This **reproduction may differ from the conditions of its original production** by taking place under easier or more difficult circumstances.

(Marx [1894]1994:237-238 – emphasis added)

Knowledge-Commodities and Knowledge-Rents

Production vs. Reproduction:

Capital III:

Apart from all the accidental circumstances, a large part of the existing capital is always being more or less **devalued** in the course of the reproduction process, since **the value of commodities is determined not by the labor-time originally taken by their production, but rather by the labor-time that their reproduction takes**, and this steadily decreases as the social productivity of labor develops. At a higher level of development of social productivity, therefore, all existing capital, instead of appearing as the result of a long process of capital accumulation, appears as the result of a relatively short **reproduction period**.

(Marx [1894]1994:522 – emphasis added)

Knowledge-Commodities and Knowledge-Rents

In the case of **commodified knowledge**, Marx's reasoning is pushed to its limit

Once initially produced as commodities, knowledge and information tend to require **no labor time to be further reproduced**

They become **knowledge-commodities with zero value**

Monopoly over their ownership gives rise to **knowledge-rents**

Knowledge-lords:

- primary appropriators of knowledge-rents
- owners of commodified knowledge
- mostly private companies

“New enclosures” ensure the existence and flow of knowledge-rents

Knowledge-Commodities and Knowledge-Rents

Examples of knowledge-commodities:

all sorts of commodified data

the useful knowledge of information, techniques, and instructions stored in technical artifacts

computer software

chemical formulas

patented information

recorded music

copyrighted compositions

copyrighted movies

monopolized scientific knowledge

Note:

The **technical artifact** in which the information is stored is **not** a knowledge-commodity

Knowledge-Commodities and Knowledge-Rents

Productive vs. Unproductive activity:

Because knowledge and information can be **reproduced without labor**, its production generates **no value** and hence **no surplus value**

And must be classified as **unproductive activity**

Creation and ownership of commodified knowledge is actually an **unproductive** form of capital accumulation

The profits that accrue to knowledge owners are knowledge-rents that represent **value drawn from other value-producing activities in the economy**

Knowledge-Commodities and Knowledge-Rents

Productive vs. Unproductive activity:

Even though the language is not completely clear, Marx gave us a hint of this reasoning:

[The] product of mental labor – science – always stands far below its value, because the labor-time needed to reproduce it has no relation at all to the labor-time required for its original production

(Marx [1863]1988:Addenda to Vol. 1)

Knowledge-Commodities and Knowledge-Rents

Productive vs. Unproductive activity:

Once discovered, the law of the deflection of a magnetic needle in the field of an electric current, or the law of the magnetization of iron by electricity, cost absolutely nothing. [...] Science, generally speaking, costs the capitalist nothing, a fact that by no means prevents him from exploiting it

(Marx [1887]1990:508)

Knowledge-Commodities and Knowledge-Rents

Productive vs. Unproductive activity:

In *Capital III* Marx then considers the existence of use-values that require no labor to be reproduced:

[The] use-value is the general bearer of the exchange-value, but not its cause. If the same use-value could be created without labor, it would have no exchange-value, yet it would have the same useful effect as ever

(Marx [1894]1994:786)

Knowledge-Commodities and Knowledge-Rents

Four categories of **knowledge-rents**

Monopoly Rent:

Because of intellectual property rights the owner of information is able to price (the use of) its knowledge-commodities above their zero value, hence extracting a **monopoly rent** from its users

The intellectual property rights transform a non-scarce commodity into one that is **artificially scarce**

The monopoly rent exists regardless if the user of the knowledge-commodity is a final consumer or a company using it as an input

If the owner of the knowledge-commodity sells not its use rights but the actual ownership, then the price of the knowledge-commodity is the discounted expected stream of future knowledge-rents

Knowledge-Commodities and Knowledge-Rents

Four categories of **knowledge-rents**

Differential Rent type I (DR-1):

Each knowledge-commodity gives rise to **different levels of productivity** for the companies using them as inputs

If certain companies use a particular software to enhance their productivity, these privileged companies will obtain **DR-1**

The software gives them a concrete productive differential

This is analogous to **lands with different levels of fertility**

But if all companies use the same software, the productive differential is eroded and DR-1 ceases to exist

Knowledge-Commodities and Knowledge-Rents

Four categories of **knowledge-rents**

Differential Rent type II (DR-2):

Companies using knowledge-commodities as inputs do so but with **different amounts of capital intensity**

If the organic composition of capital across companies that use the software are not the same, even if all of them use the same software, **DR-2** will emerge

Knowledge-Commodities and Knowledge-Rents

Four categories of **knowledge-rents**

Absolute Rent:

Absolute rent would exist only if knowledge-commodities **had value** and were produced within a **specific sector** protected by intellectual property rights and with a **lower organic composition** of capital than the rest of the economy

Unlike monopoly rent, which draws from the global pool of surplus value, **absolute rent draws from the surplus value in a particular sector of production**, like land rents in the agricultural sector

Because these conditions are not satisfied in the case of knowledge-commodities, **absolute knowledge-rents are implausible**

Recent Debate within the Marxist Literature

Recent Debate

Recent contributions on the commodification of knowledge within the Marxist literature

Current debate on the **value of knowledge**

Two camps:

- 1. Reproduction cost approach**
- 2. Average cost approach**

Recent Debate

Reproduction cost approach is theoretically superior to the average cost approach

Reproduction cost approach is much closer to Marx's own insights on value theory

Only the **reproduction cost approach** is consistent with the notion of **moral (value) depreciation**

Average cost of production interpretation is **not** consistent with the notion of **moral depreciation**

Recent Debate

Reproduction cost approach:

Teixeira and Rotta, Foley, Rigi

Commodified knowledge tends to have **zero value** because of its costless reproduction

Knowledge-rents are appropriations of the **global pool of value** in the economy

Knowledge-lords can **extract rents multiple times over** from costless copies of the same commodity

Recent Debate

Reproduction cost approach:

By exploiting unproductive workers the **unproductive capitalist** grabs a share of the global pool of surplus value

Knowledge-lords grab a share of the global pool of surplus value without directly contributing to it (even though indirectly they can)

Knowledge-rents cannot be conceptualized solely within national borders, for the core countries are able to extract **rents** from the value produced in **peripheral regions** of the globe

Recent Debate

Average cost approach:

Starosta, Fuchs, and Zeller

Commodified knowledge **has value**

Value of commodified knowledge is given by the initial expenditures necessary to **produce** it

Initial investment necessary to create commodified knowledge (the **research and development costs to produce the “mold”**) determines the **value to be realized** once the knowledge-commodity is sold or licensed

Recent Debate

Average cost approach:

Value of each unit sold is the average cost of production, inclusive of fixed costs and sunk costs to create the very first unit, the “mold”

Value of each unit = total cost to create the mold / number of replicas

Intellectual property rights ensure the **realization of the value** of knowledge-commodities

Recent Debate

Moral (value) depreciation:

- Is the loss of value that, abstracting from the physical wear and tear (the **use-value depreciation**), impacts the stock of all commodities, including those that have already been produced in the past
- Can occur because of the existing reproduction methods on the supply side, and also because of changes on the demand side
- Can occur because reproduction time takes into account the immediate effects of *new technologies* on the obsolescence of already existing technologies
- Can occur because of economies of scale that reduce reproduction costs as more output is produced, for a *given technology*

Recent Debate

Moral (value) depreciation:

Contrary to average costs, reproduction time does not rely on the sunk and fixed costs originally employed in the production of the mold:

“the value of the capital advanced ... rises or falls as a result of an increase or decrease in the labour-time necessary for its **reproduction**, an increase or decrease that is **independent of the capital already in existence**”

(Marx [1894]1994:237-238)

Recent Debate

Moral (value) depreciation:

The immediate drop in the reproduction time of knowledge-commodities after the mold is created does **not** derive from a sudden fall in the average cost due to **economies of scale** and neither from a **change in technology**

The extreme case of moral depreciation that characterizes knowledge-commodities derives from the **structure of the existing methods of reproduction** of commodified knowledge and information

For this reason, **moral depreciation** is logically consistent only with a theory of value based not on average costs but on reproduction time

Recent Debate

Rents vs. Interest

Interest:

- Form of revenue associated with loaned money or with licensed commodities that **have value**
- Borrowed money is an amount of **value** and hence is paid back with **interest**
- Borrowed (i.e. leased) machines and equipment have **value** and hence the lease payments are **interest** payments

Rent:

- Form of revenue associated with commodities that **do not have value**
- In the case of licensed knowledge there is **no value** being borrowed, and hence the payments associated with it are not interest but **rents** instead
- Unworked land yields **rents** to its owner because unworked land requires no labor to be produced (as it is a free gift from nature) and thus contains **no value**

Empirical Estimates (USA economy)

Empirical Estimates

Present-day capitalism is becoming more dependent on the existence of **rents**

Such as land-rents and knowledge-rents

The **expansion of unproductive activities** and of **rentier forms of capital** is exactly what Marx had theorized and foreseen in the development of capitalism

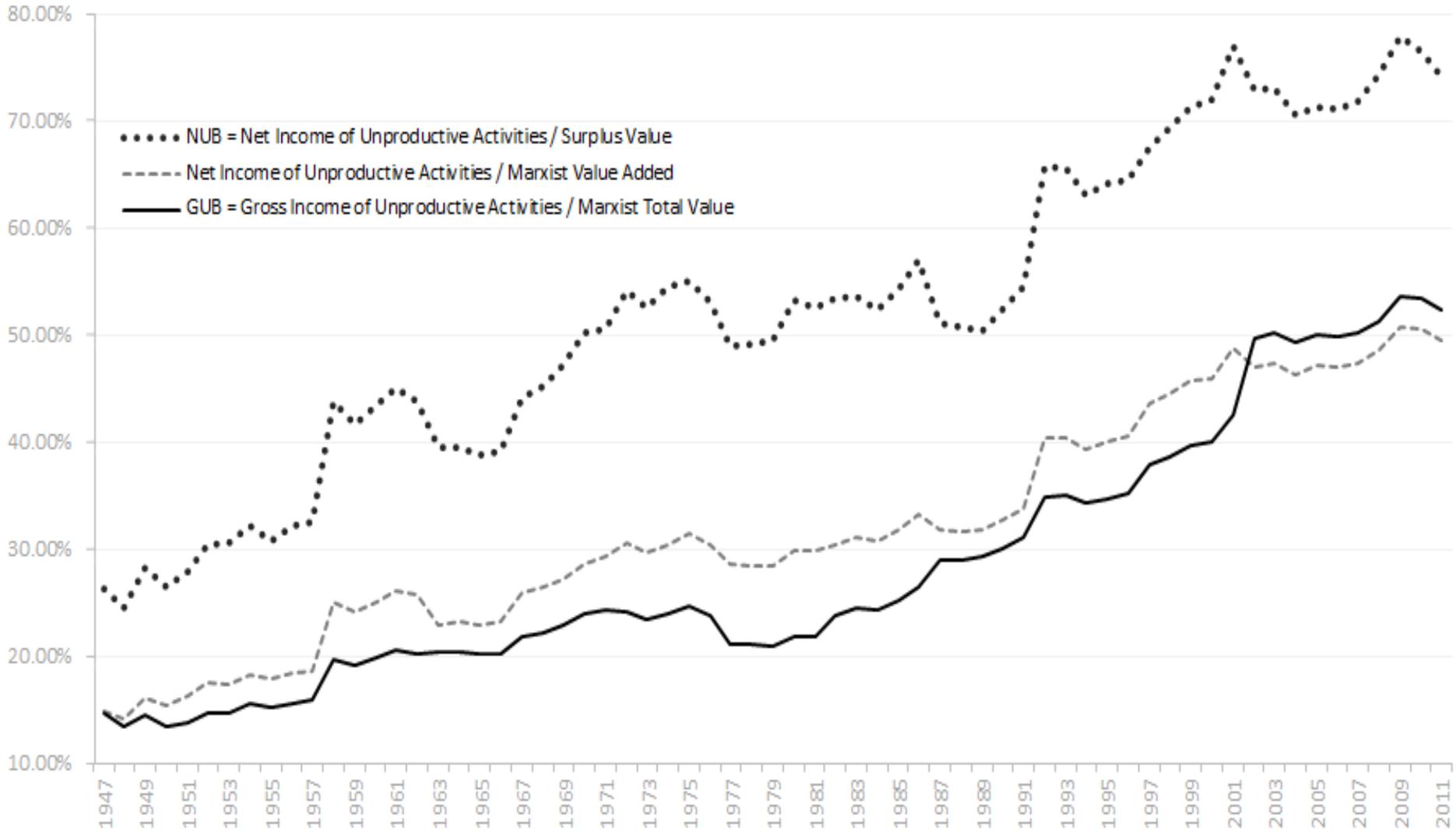
The rise of rentier activities and of other types of unproductive activity is exactly what Marx had conceptualized through his notion of **value autonomization**

Empirical Estimates

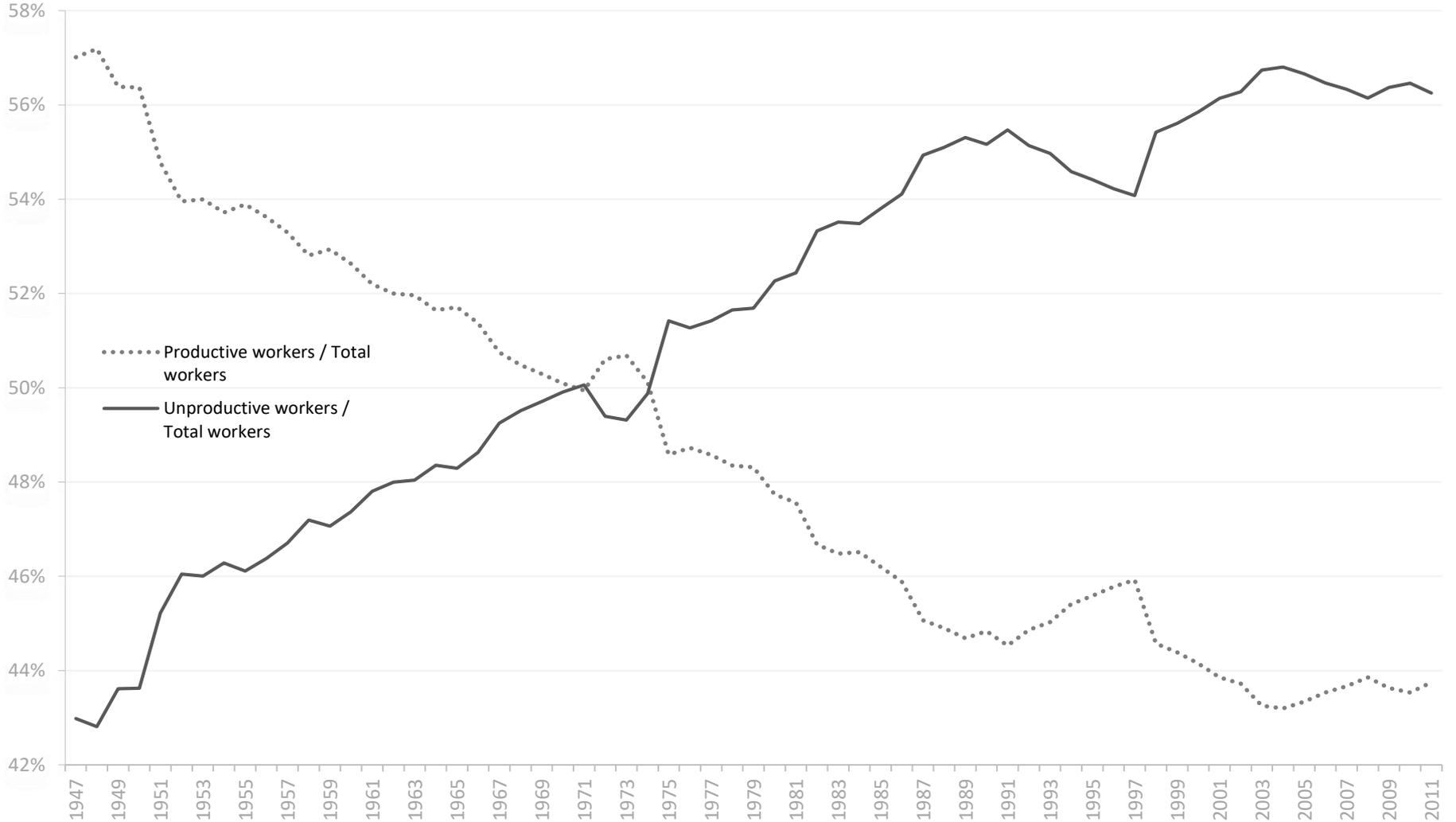
Unproductive Activities:

1. Trade = wholesale + retail
2. Finance + Insurance
3. Real estate brokerage + Land rents
4. Some Government activities
National defense + police
Federal, state, and local administration
5. Advertising; law firms; security firms
6. **Knowledge and Information**
Software
Recorded music + Movies
Scientific knowledge (journals, books etc.)
Pharmaceuticals
Commodified data and information

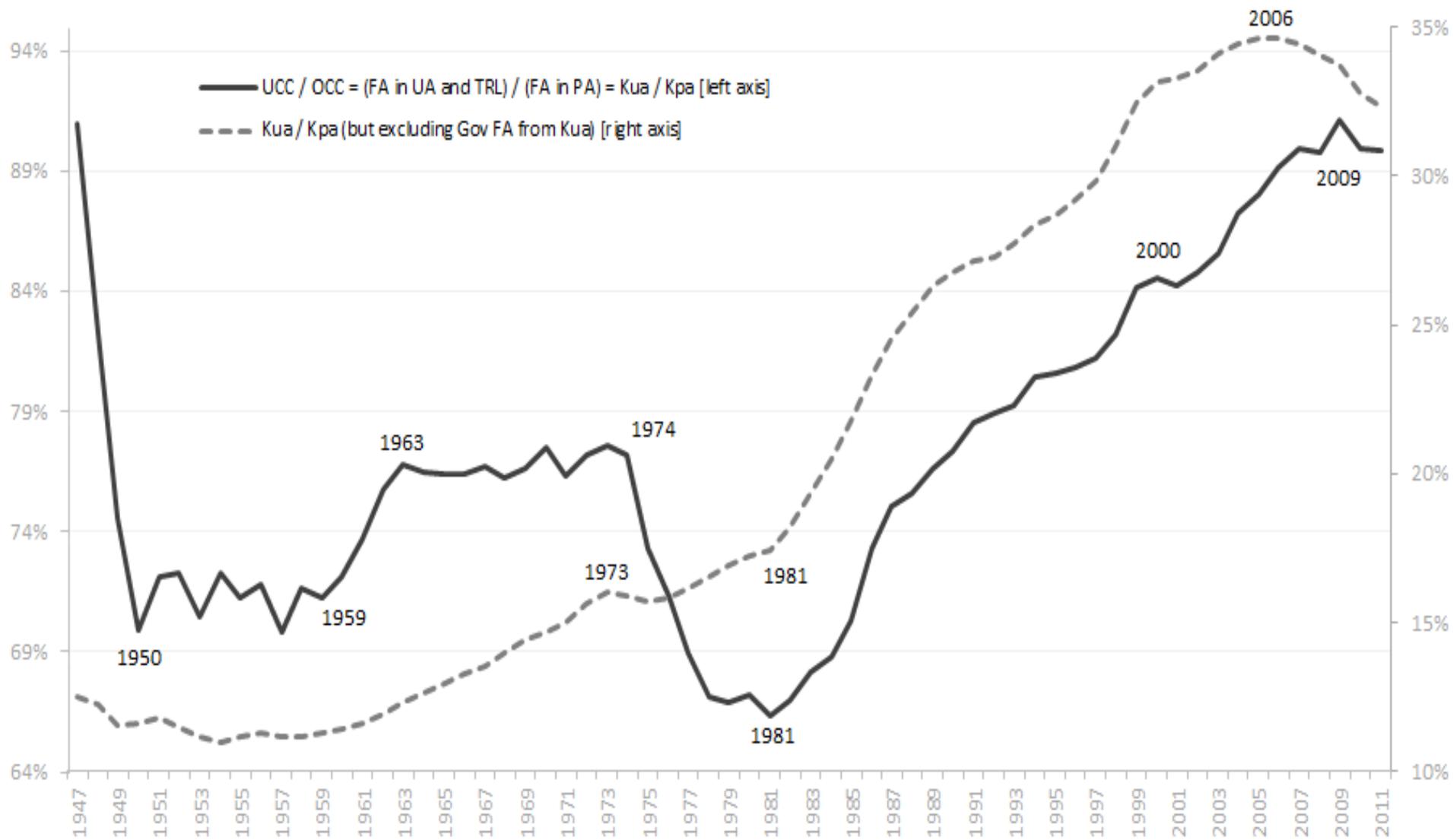
Measures of Unproductive Accumulation (relative flows of income)



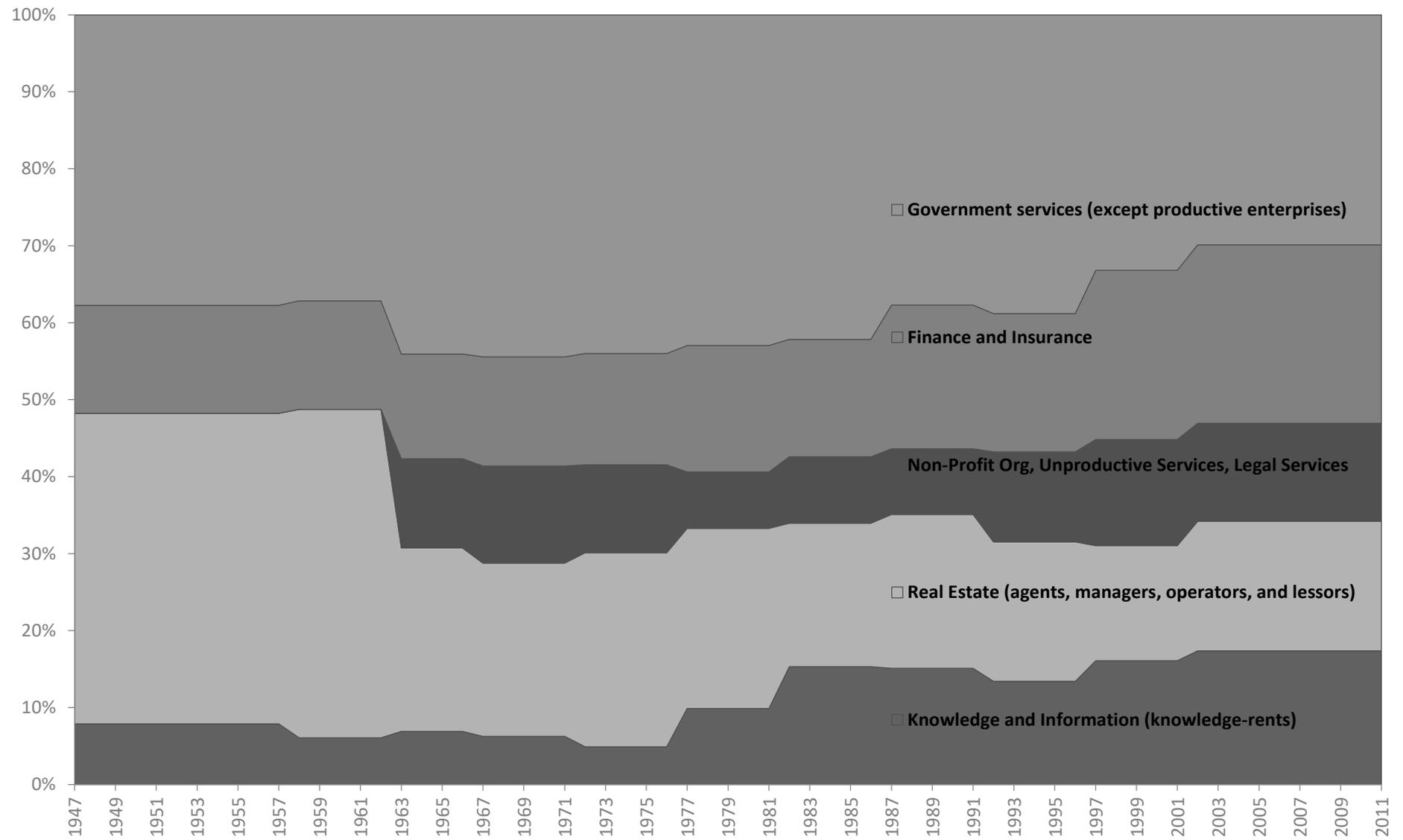
Productive and Unproductive Workers (shares of total employment)



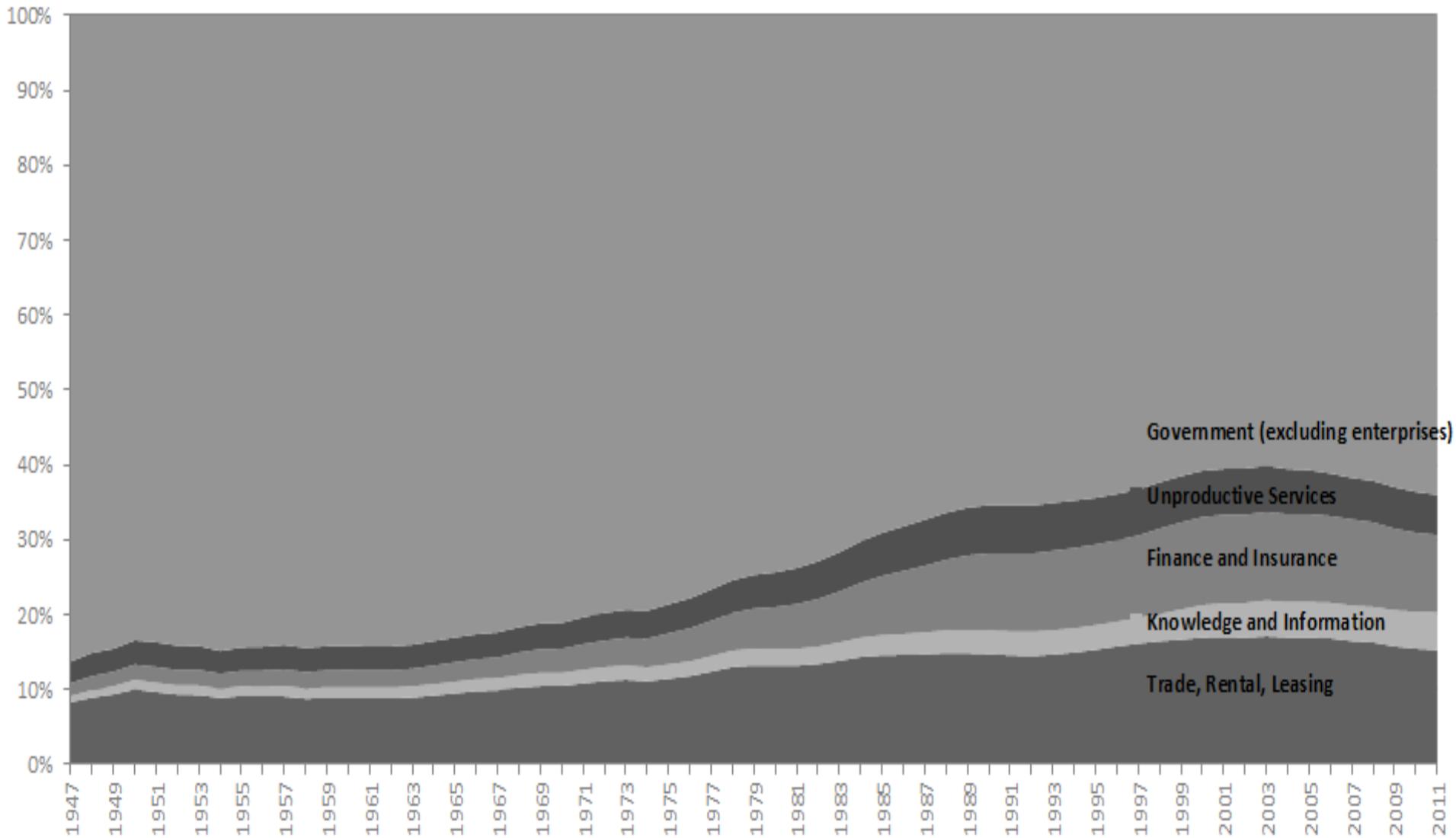
$$\frac{UCC}{OCC} = \frac{K_{UA}}{K_{PA}}$$



Decomposition of the Net Income of UA



Decomposition of the Capital Stock of UA



Empirical Estimates

Total **income** of unproductive activities quadrupled relative to the total value generated in productive activities during the 1947-2011 period

Knowledge creation and finance have been the fastest growing unproductive activities both in terms of **net income** and **capital stock**

Finance and knowledge-rents combined have risen from 21.9% to 40.5% of the net **income** of all unproductive activity, hence nearly doubling in the postwar period

Finance- and knowledge-related activities have grown their combined capital stocks six fold (or 502%) from 1947 to 2011 as a share of the total unproductive **capital stock**

Final Remarks

Final Remarks

Contrary to the immaterial labor hypothesis, there is still **no need to reject the Marxist value theory**

The commodification of knowledge and information can be explained in a consistent way **within Marxist theory of value**

This does not mean that the Marxist theory of value faces no limits

As a theory that is contingent on a specific mode of production and on a specific historical moment, it will make evident its own constraints

Final Remarks

One possible case, even still within the capitalist mode of production, is that of **artificial intelligence (AI)**

In Marxist theory, only **direct human labor** creates new value

Machines and equipment transfer their values to the output but do not add any new value to it

AI could challenge this idea, for it is a **non-labor input that does create a new output not previously conceived, foreseen, or planned by human labor**

AI implies that **fixed capital itself has productive and creative powers**, independent of the human labor originally used to program it in the first place

THANK YOU

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Slides available at: marx21.com/slides/