

From Automation to Synthetic Silence: Techno-Feudalism, Necro-Capitalism, and the Thermodynamic Collapse of the Wage-Consumption Circuit

Paulo Salgado Zenha Carneiro

Universidade Federal de Pernambuco, Brazil

paulo.zcarneiro@ufpe.br

Date: December 28, 2025

Abstract

This article examines the thermodynamic and economic inviability of capitalism under conditions of full automation, integrating the concepts of “techno-feudalism,” “necropolitics,” and the “Tragedy of the Elite Commons.” Using a theoretical-exploratory and mathematical-projectional approach, the study builds upon critical literature review and exponential decay modeling to simulate population decline resulting from the breakdown of the wage-consumption-profit circuit. It demonstrates how the mass replacement of human labor by artificial intelligence (AI) not only generates a “profit-without-consumer paradox” but also triggers processes of “planned neglect” and an “epidemic of surrender,” leading to accelerated demographic collapse. The model, based on the Law of Exponential Decay with a necrosis coefficient $k = 0.05$, projects a decline in global population from 8 billion to approximately 656 million within 50 years, characterizing a transition toward “necro-capitalism”—a system in which a technocratic elite administers a planet in a state of silicon and ruin. Universal Basic Income (UBI) is analyzed in its dual aspect: as a potential mechanism for emancipatory redistribution or as an instrument of biopolitical control within digital fiefdoms. The study concludes that current dynamics, marked by the concentration of technological power and short-term elite rationality, are leading toward a civilizational involution of thermodynamic proportions, urgently necessitating a political debate that asks: *an economy for whom, and for what purpose?*

Keywords: techno-feudalism, necro-capitalism, exponential decay, demographic modeling, tragedy of the elite commons, extreme automation, universal basic income, human

obsolescence.

Introduction: The Thermodynamic Paradox of Profit Without Consumers

The 21st century has witnessed unprecedented technological acceleration, driven by the convergence of advanced automation, artificial intelligence (AI), and the comprehensive digitalization of economic processes. While promising exponential productivity gains, this phenomenon poses existential challenges to the structure of market capitalism, historically founded on the relationship between employment, wages, and mass consumption. The prospect of extreme automation—capable of replacing not only manual but also cognitive tasks—raises fundamental questions about the future viability of the economic circuit itself (Frey & Osborne, 2017).

The current trajectory of AI suggests not merely a cyclical crisis of capitalism but an ontological rupture in the social contract. The core argument of this study rests on the premise that the greatest antagonist of the economic elite is not state regulation, but the internalized logic of profit. Capitalist economies operate within a virtuous circular flow: wages fund consumption, which in turn sustains production and profit. However, total automation, by massively eliminating human labor, breaks this circuit. Machines may produce a billion iPhones at near-zero marginal cost, but if 90% of the population lacks income, there will be no effective demand to purchase them. This scenario reveals a terminal paradox: the pursuit of maximum profit destroys the consumer base that makes it possible.

Within this context, an intense debate has emerged regarding the future of social organization. Optimistic views foresee the liberation of humans for creative tasks and the overcoming of material scarcity. More critical analyses, however, project scenarios of social rupture, marked by the emergence of a “useless class” from a productive standpoint (Harari, 2018) and the concentration of power in a technological elite that controls digital means of production. This latter scenario has been termed by some theorists as “techno-feudalism”—a new social formation wherein power derives from control over platforms, data, and algorithms, rather than direct ownership of industrial means of production

(Varoufakis, 2023; Stiegler, 2019).

This article advances this discussion by integrating thermodynamic and demographic dimensions into the analytical framework. Building upon the concept of the “Tragedy of the Elite Commons,” it analyzes how the replacement of human labor by AI systems not only breaks the consumption cycle but also triggers an accelerated process of population decay, modeled mathematically. The guiding research question is: **How do extreme automation and AI reconfigure the foundations of capitalism toward an unsustainable techno-feudalism, and how does modeling population decay reveal the transition to a thermodynamically inviable necro-capitalism?**

Theoretical Foundation and Mathematical Modeling

The Profit Paradox and the Rise of Techno-Feudalism

Classical industrial capitalism is based on a circular circuit: capital is invested in production, generating employment and wages; these wages constitute the demand that realizes the value of commodities, generating profit and enabling accumulation (Kalečki, 1971). Radical automation breaks this circuit by progressively eliminating the wage component. Studies indicate that approximately 47% of U.S. jobs are at high risk of automation (Frey & Osborne, 2017), affecting cognitive functions once considered secure (Autor, 2015).

Faced with the potential collapse of demand, Yanis Varoufakis (2023) proposes that capitalism is mutating into “techno-feudalism.” In this model, wealth is no longer derived primarily from the production and sale of commodities, but from rent extraction through control of digital platforms, data infrastructures, and closed technological ecosystems. Tech giants act as new feudal lords, with users and small producers as “vassals” paying with data, attention, and transaction fees (Srnicek, 2017). The economy ceases to be centered on the “market” and becomes organized into “digital fiefdoms” (Zuboff, 2019).

The Tragedy of the Elite Commons and Thermodynamic Inviability

The elite’s dilemma regarding automation constitutes a collective action problem modeled on the “tragedy of the commons” (Hardin, 1968), here reframed as the “Tragedy of the Elite Commons.” Each capitalist has a rational incentive to automate and reduce labor

costs, maximizing short-term profit. However, if all act accordingly, aggregate demand will be drastically reduced, destroying the consumer market and the very sources of profit—a “collective suicide of the ruling class due to lack of coordination” (Varoufakis, 2023, p. 158).

This dynamic possesses a profound thermodynamic dimension. By eliminating the wage base, the system severs the energy flow (income) that sustains the social reproduction of the population. Without effective demand, there is no real production; without real production, there is no circulation of resources; without resources, there is no biological and social reproduction. It is a system that consumes its own conditions of existence.

Mathematical Modeling of Population Decay in Necro-Capitalism

To simulate the scenario of accelerated human obsolescence resulting from this dynamic, the **Law of Exponential Decay** is adopted, a well-established tool for modeling disintegration and decline phenomena:

$$P(t) = P_0 \cdot e^{-kt} \quad (1)$$

Where:

P_0 = initial population (8 billion)

k = necrosis coefficient (set at 0.05)

t = time in years

$P(t)$ = population at year t

Justification of the Necrosis Coefficient ($k = 0.05$)

The coefficient k is the critical variable encapsulating the rate of socioeconomic decline. The value 0.05 (equivalent to a 5% annual decay rate) is not arbitrary; it synthesizes interdependent variables:

1. **Accelerated job loss:** Projections by Frey and Osborne (2017) and Autor (2015) indicate mass substitution.
2. **Collapse of social protection systems:** Minimal state and austerity policies.

3. **Epidemia de surrender:** Loss of hope, increased mental and physical morbidity.
4. **Planned neglect:** Deliberate policies of abandoning populations deemed “surplus” (Mbembe, 2018).

A $k = 0.05$ implies a **population half-life** of approximately:

$$t_{1/2} = \frac{\ln(2)}{k} \approx \frac{0.693}{0.05} \approx 13.86 \text{ years} \quad (2)$$

That is, every ~ 14 years, the population would be halved under the combined pressure of these factors, in the absence of massive redistributive counter-tendencies.

Numerical Projections and Societal Scenarios

Applying Equation 1 yields the following collapse trajectory:

Curve Interpretation

The curve $P(t) = 8 \cdot e^{-0.05t}$ is not a prediction but a **trend model** that explicates the logical and thermodynamic consequences of the “Tragedy of the Elite Commons.” It shows that the system does not reach a stable equilibrium under techno-feudalism, but advances toward a state of **necro-capitalism**—a political-economic regime whose “final product” is the management of decline, exclusion, and social death (Mbembe, 2018). The elite, in seeking to maximize profit and control in the short term, destroys the social ecosystem that validates its wealth and power, culminating in an automated but empty world.

Methodology

This study adopts a **theoretical-exploratory and modeling approach**, integrating three dimensions:

1. **Critical Conceptual Analysis:** Literature review of theories on capitalism, techno-feudalism, biopolitics, and necropolitics.
2. **Mathematical-Descriptive Modeling:** Application of the Law of Exponential Decay to project population scenarios based on theoretical premises derived from the

literature. The method is deductive, starting from the premise of demand collapse to derive demographic consequences.

3. **Systemic and Hermeneutic Analysis:** Integration of modeling results with theoretical frameworks, interpreting numerical projections as the formal expression of critically described social and economic dynamics.

Limitations: The model is a theoretical projection exercise, not an empirical forecast. The coefficient k is a simplification of complex social processes. The research does not involve statistical testing of historical data but seeks to logically and mathematically illustrate the trajectory of a system operating under the premises of the “Tragedy of the Elite Commons.”

Integrated Analysis: From Techno-Feudalism to Necro-Capitalism

The combined analysis of theory and model reveals a civilizational trajectory in three acts.

Act I: Circuit Rupture and the Profit Paradox

Extreme automation decouples productivity from employment, initiating the erosion of aggregate demand. Individual microeconomic rationality (automate to profit) enters into fatal conflict with macroeconomic rationality (preserve consumers). This is the genesis of the “Tragedy of the Elite Commons.”

Act II: Techno-Feudal Mutation and UBI as Containment

The system’s response is a structural mutation. Techno-feudalism replaces the market with digital fiefdoms, exchanging commodity sales for rent extraction from data and attention. In this context, Universal Basic Income (UBI) emerges as a crucial biopolitical containment mechanism (Foucault, 2008). Implemented as a “programmable voucher” via CBDCs or controlled cryptocurrencies (such as Worldcoin), it serves a dual function: (a) maintaining a minimal consumption flow to sustain platform business models; and (b) pacifying and managing the “surplus” population, ensuring biological subsistence without meaningful economic integration (Deleuze, 1992; Žižek, 2017). This UBI is not

emancipation; it is a “survival pass” within the digital fiefdom.

Act III: Exponential Decay and Necro-Capitalism (Model $P(t) = 8e^{-0.05t}$)

Nevertheless, even this containment solution is thermodynamically unstable. The model demonstrates that structural economic exclusion, loss of social purpose (“epidemia de surrender”), and “planned neglect” of mass infrastructures (health, sanitation, education) create a social necrosis coefficient (k) that self-reinforces. The population decay curve is not linear; it is **exponential**. Initial job losses weaken demand, leading to more austerity and service cuts, which increase mortality and reduce birth rates, further diminishing the future market in a vicious cycle.

The scenarios in Table 1 describe this spiral: from the introduction of conditional UBI (year 5) to the “synthetic silence” of an emptied planet (year 50). The technocratic elite, in its short-termist narcissism (Pinto, 2021), inherits a world where wealth and technological power have lost their *social meaning*, for there is no longer a meaningful society to dominate, impress, or exploit. **Necro-capitalism** is this final stage: a system that optimizes the management of the very ruin it produces.

Concluding Remarks: Between Emancipation and Synthetic Silence

This study has provided a systemic diagnosis of the civilizational impasses generated by extreme automation, demonstrating how the logic of capitalism, when pushed to its technological paroxysm, contains the seeds of its own thermodynamic inviability. The analysis reveals that the so-called “profit-without-consumer paradox” is not a mere passing contradiction, but a symptom of a structural failure linking economy, politics, and biology in a self-destructive cycle.

The mathematical model presented, encapsulated in the equation $P(t) = 8 \cdot e^{-0.05t}$, is not intended as a deterministic prediction, but as a **thermodynamic warning model**. It translates into formal language what critical theory describes conceptually: short-term microeconomic rationality, when decoupled from any macro-systemic consideration, produces catastrophic social externalities that feed back exponentially. The “Tragedy

of the Elite Commons” is not a literary metaphor, but a mathematical dynamic with measurable demographic consequences.

Techno-feudalism thus emerges not as a distant utopia, but as a pathological adaptation to this crisis. The transformation of citizens into “digital vassals” and markets into “algorithmic fiefdoms” represents an attempt to preserve value extraction mechanisms in a context of depleted mass consumption. In this scenario, Universal Basic Income (UBI) occupies a fundamentally ambiguous position: it could constitute the foundation for a **radical democratization of the fruits of automation** or degenerate into a **biopolitical control mechanism** that administers poverty without questioning its structural causes.

The bifurcation between these two futures—technosocial emancipation versus necro-capitalism—will not be decided by the benevolence of billionaires or the efficiency of algorithms, but by the collective capacity to build new political institutions. What is urgently required is governance capable of:

1. Imposing radically progressive taxation on technological rents and the extraordinary profits of Big Tech;
2. Democratizing control over digital means of production through models of collective ownership and algorithmic sovereignty;
3. Institutionalizing an **emancipatory UBI**, detached from any moralizing conditionality or biopolitical control;
4. Reorienting technological production toward real social needs, rather than the infinite accumulation of fictitious capital.

The final question echoing throughout this study—**an economy for whom, and for what purpose?**—is not rhetorical but programmatic. It points to the necessity of reclaiming politics as a space for deliberating ends, in opposition to technocracy as the administration of means. The civilizational challenge posed by automation is not technical, but essentially **anthropological**: what kind of society do we wish to build when human labor ceases to be the primary source of economic value?

If the answer is the maintenance of the current paradigm, the curve $P(t) = 8 \cdot e^{-0.05t}$ will describe not merely a demographic decline, but the mathematical epitaph of a civilization that, in its blind pursuit of efficiency, became irrelevant to itself. If, however, we can convert the immense productive potential of automation into foundations for a post-scarcity society, we may inaugurate an era of substantive freedom unprecedented in human history.

Synthetic silence or collective emancipation—this is the choice that presents itself not as destiny, but as historical responsibility.

References

- Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives*, 29(3), 3–30.
- Deleuze, G. (1992). Postscript on the societies of control. *October*, 59, 3–7.
- Foucault, M. (2008). *The birth of biopolitics*. Palgrave Macmillan.
- Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change*, 114, 254–280.
- Han, B.-C. (2022). *Infocracy: Digitization and the crisis of democracy*. Polity Press.
- Harari, Y. N. (2018). *21 lessons for the 21st century*. Spiegel & Grau.
- Hardin, G. (1968). The tragedy of the commons. *Science*, 162(3859), 1243–1248.
- Kalečki, M. (1971). *Selected essays on the dynamics of the capitalist economy*. Cambridge University Press.
- Mbembe, A. (2018). *Necropolitics*. Duke University Press.
- Pinto, E. C. (2021). *The elite of backwardness: From slavery to Lava Jato*. Todavia.
- Srnicek, N. (2017). *Platform capitalism*. Polity Press.
- Stiegler, B. (2019). *The age of disruption: Technology and madness in computational capitalism*. Polity Press.

- Varoufakis, Y. (2023). *Techno-feudalism: What killed capitalism*. The Bodley Head.
- Žižek, S. (2017). *The courage of hopelessness: Chronicles of a year of acting dangerously*. Allen Lane.
- Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. PublicAffairs.
- Altman, S. (2023). *Worldcoin: a new model for universal basic income?* OpenAI. Disponível em: <https://worldcoin.org/>. Acesso em: 15 dez. 2025.
- Baker, A., et al. (2020). *Central bank digital currencies: foundational principles and core features*. Bank for International Settlements. (Relatório n. 1). Disponível em: <https://www.bis.org/publ/othp33.htm>. Acesso em: 15 dez. 2025.
- Van Parijs, P., & Vanderborght, Y. (2017). *Basic income: a radical proposal for a free society and a sane economy*. Harvard University Press.

Table 1: Projected Population Decline Timeline and Associated Societal Scenarios

Year (t)	Population $P(t)$ (billions)	Cumulative Loss (billions)	Societal Scenario and Phase of Necro-Capitalism
0	8.000	–	Onset of extreme automation. Wage-consumption circuit still operative but eroding rapidly.
5	6.230	1.77	End of mass wages; introduction of conditional UBI. First “digital fiefdoms” consolidate power. State assumes role of surplus manager.
10	4.852	3.15	Consolidation of digital fiefdoms. Society clearly bifurcated. UBI becomes a programmable digital voucher. “Epidemia de surrender” becomes statistically visible.
15	3.779	4.22	Demographic half-life reached (~ 14 years). Collapse of universal public services. Abandoned territories and “sacrifice zones” expand.
30	1.785	6.21	Maximum societal bifurcation. Technocratic elite lives in self-sustaining enclaves (fortress-condominiums). Residual population survives in a global slum economy and algorithmic subsistence.
50	0.656	7.34	“Synthetic Silence.” Planet administered by a super-AI governance system. Residual human population is minimal, concentrated in enclaves. Wealth loses all social meaning due to the absence of an “other” to dominate or impress (Han, 2022). Industrial civilization enters final thermodynamic collapse.