

■ Research

As a researcher in political economy, my work is characterized by a strong focus on probabilistic thinking and mathematical methods applied to economic ideas. What drives me as a researcher is to uncover the inner workings of capitalism and reveal the underlying dynamics governing economic variables. My research interests are in the intersection of political economy, heterodox macroeconomics, history of economic thought and quantitative empirical methods.

In the field of social sciences, we aim to understand systems characterized by complex, non-additive interactions among individuals. These interactions are shaped by various institutions which influence, organize and regulate the resulting social outcomes. These systems often produce recurring patterns that manifest as statistical emergent effects in the macroeconomy. My research is focused on unfolding the mechanisms that generate these aggregate social outcomes and exploring the connection between individual actions and social outcomes. The objective of my research is to study how social and economic institutions engender distributional outcomes of variables such as wealth, income, profits, wages, output, and formulating a statistically grounded theory that elucidates the institutional and structural components of economic systems to enhance our comprehension of observed macroeconomic phenomena and regularities.

Orthodox definition of equilibrium is inadequate to characterize complex evolutionary systems such as capitalism. The unique and stable equilibrium found in standard Neoclassical theory is a degenerate equilibrium, explained by deterministic structures such as the 'fixed point' equilibrium representation. These models often lead to unfulfilled predictions that don't align with reality, proving inadequate for characterizing complex social systems. Contrary to this reductionist approach, my work utilizes methods and models informed by statistical physics and information theory. This approach treats economic variables as random variables, providing non-deterministic equilibrium predictions. The methodology derives equilibrium in a statistical sense, such as stationary probability distributions that are both theoretically sound and empirically verifiable. This approach offers a parsimonious and elegant way to model social interactions and phenomena that conventional methods fail to capture.

The statistical equilibrium approach has one great strength which is the incorporation of theoretically grounded priors as constraints, modifying the resulting state variable distribution. The nature of those constraints is varied such as environmental conditions, behavioral tendencies, and institutional structures. The power of statistical equilibrium is that no unwarranted mathematical assumptions are necessary to generate distributions not supported by empirical evidence. Besides the aggregate macroeconomic description of the system, an important aspect of this framework is that endogenous fluctuations arise from randomness of agents actions. I work with cutting-edge approaches enabling me to bring a fresh and exciting perspective to classical political economy themes.

My current PhD research can be divided between theoretical and empirical investigations using statistical equilibrium approaches. My job market paper, "*A Statistical Equilibrium Approach to*

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Adam Smith's Labor Theory of Value”, coauthored with Dr. Ellis Scharfenaker and Dr. Duncan Foley, is a theoretical investigation that provides a detailed exploration of Adam Smith's labor theory of value and price using statistical equilibrium methods applied to the stability and self-organization of the social division of labor. This paper answers the question about how a social division of labor occurs in a decentralized economy comprised of independent producers choosing what to produce considering only their expected payoffs. Achieving the social division of labor and social reproduction is an inherently statistical problem and concerns the distribution of individual producers across all lines of production through time. The objective of the model is to predict both the center of gravity of producers across lines of production as well as the endogenous fluctuations between lines of production. The model shows that even in absence of accumulation, market exchange dynamics endogenously generates inequality in the form of an exponential distribution of wealth.

Within my PhD thesis, an empirical analysis examines the equalization of profit rates in the US economy since the 1960s. On “Capitalist Competition and Profit Rates: A New Perspective on the Distribution of Profit Rates” I discuss how the asymmetries observed since the 1980s in the distribution of US profit rates, caused by firms surviving with negative profits and highly profitable “superstar” firms impact on the overall profit rates equalization. Market monopoly power and market concentration affected competition dynamics since the 1980s, but delving into real competition and Marxian thinking I show how the emergence of monopolies is a logical consequence in capitalism, and not an excrescence or a change in capitalistic foundations. For that, I consider real competition as the central regulating mechanism of capitalism and a turbulent and antagonistic description of an economy led by the profit motive. This paper contributes with understanding the asymmetries in equalization of profit rates as a natural consequence of capitalism competition instead of a changes on its institutions.

A third paper on my thesis explores the concept of equilibrium in economic theory. It is circulating as a working-paper hosted in the University of Duisburg-Essen's website, and it is co-authored with Dr. Jan Weber (University of Duisburg-Essen). “*Back to the Classics: R-Evolution Towards Statistical Equilibria*” suggests the use of statistical equilibrium methods to characterize the equilibrium notion in economics. This paper had an extended abstract accepted to be published in the *Review of Evolutionary Political Economy* and is currently under review for a special issue in late Fall 2023. I critique the lack of realism in contemporary economic modeling and propose a return to the probabilistic approach found in classical political economy literature. My central concern is the prevailing fixed-point equilibrium notion in mainstream economics, which hinders an accurate representation of the economy as a complex system marked by feedback mechanisms, evolution, and emergence. In contrast to mainstream methods that use external shocks to introduce stochasticity, I advocate a return to classical political economy's inherently statistical treatment of economic variables as random variables. I demonstrate that the statistical equilibrium approach offers a nuanced understanding of economic systems, emphasizing its capacity to enhance realism in economic models without unwarranted assumptions.

I am author of two papers published in peer-reviewed journals. In “*Accumulation, Profit Rate, and Financialization in Brazil, 2000-2016*,” I investigates the dynamics of the Brazilian economy, using Weiskopf's profit rate decomposition and its connection with financialization. The paper reveals cooperation between capitalists and workers during Lula's government and competition during Dilma's years. The second, “*Trabalho e Dinheiro: A Teoria Monetária Marxista e o Dinheiro de Crédito*” (Labor and Money: Marxist Monetary Theory and Credit Money), delves into credit money as the general equivalent, tied to the liabilities of the Central Bank and maintaining a connection with social labor. It illustrates this relationship through the formalization of the monetary expression

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of labor time (MELT) in a credit money economy and concludes by discussing inflation theories rooted in Marx's monetary theory.

My future research agenda includes both theoretical and empirical efforts to understand capitalist dynamics even further. On the theoretical front, I aim to extend the existing model of division of labor to consider accumulation. This extension will incorporate the impact of durable goods on the model. Specifically, I aim to explore how the presence of a durable good, such as an initial stock of steel, influences consumption patterns in markets that do not clear. Furthermore, I anticipate that the introduction of a durable good will intensify the endogenous inequality emerging from market dynamics. This effect is expected to occur even in the absence of class division. Through this research, I hope to shed light on the benefits of this exciting methodology to unfold the dynamics of capitalist economies. In a new paper I plan to consider not only independent producers (commodity law of exchange) as in Smith, but class structure from a Marxian standpoint (capitalist law of exchange), expanding the model to incorporate the Marxian features to division of labor. I am already thinking about another model dealing with the equalization of the rate of exploitation and the rate of surplus value, in order to discuss how exploitation is a structural aspect of capitalism. There is an ongoing debate about the aspects of a polycrisis impacting the environment, migration, inequality, gender disparities, racial discrimination, food insecurity, etc. that would benefit to be explored within my methodology. On the empirical side, I plan to work with quantal response statistical equilibrium models (QRSE) to incorporate the entry and exit dynamics in the estimate of the distribution of profit rates, exploring more aspects of "zombie firms" and "superstar firms" affecting each tail of the distribution. I have a draft paper that applies Shaikh's method to estimate the rate of surplus value in the manufacturing sector in Brazil, which I plan to return to it the near future.

Finally, I understand that in academic research two aspects are crucial: the impact of the research, measured by impact factor and its relevance to the scientific community, assessed via funding and research grants. All my research efforts are tailored to meet these two expectations. While my research agenda is supported by the state-of-the-art methods, it puts me in a good position to pursue impactful publications and to affect our scientific community. I envision that by staying in constant exchange with other researchers in the frontiers of science and knowledge. At the end of the day, science is a collective effort to make a better future possible.

Research

Journal Articles

- 2023 **Theodosio, Bruno; Weber, Jan**, "*Back to the Classics: R-Evolution Towards Statistical Equilibria*", *Review of Evolutionary Political Economy*, Special Issue: "Pluralist Economics in an Era of Polycrisis: Young Scholars' Voices".
Abstract accepted. Full paper under review
- 2023 **Theodosio, Bruno**, "*Accumulation, profit rate, and financialization in Brazil, 2000-2016*", *In Revista de Economia*, Vol. 44, Issue esp., p. 463. Universidade Federal do Paraná.
Link
- 2019 **Theodosio, Bruno**, "*Trabalho e dinheiro: a teoria monetária marxista e o dinheiro de crédito*", *In Revista da Sociedade Brasileira de Economia Política*, Vol. 51
Link

Working Papers

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- **Theodosio, Bruno; Weber, Jan**, “*Back to the Classics: R-Evolution Towards Statistical Equilibria*”, *ifso working paper series 28*, University of Duisburg-Essen, Institute for Socioeconomics (ifso).Link

In Progress

- **Capitalist Competition and Profit Rates: A New Perspective on the Distribution of Profit Rates**
- **The Brazilian manufacturing rate of surplus value between 2000 and 2017**, with *Antônio Albano de Freitas*

Seminars and Presentations

- 2024 **URPE@ASSE**, *San Antonio, USA*, *Zombie Firms and Capitalist Competition: A New Perspective on the Distribution of Profit Rates*, planned
- 2023 **Western States Graduate Workshop**, *Salt Lake City, USA*, *A Statistical View of the Labor Theory of Value*
- 2023 **World Social Science Association**, *Tempe, USA*, *A R-Evolution of Equilibria*
- 2022 **Western States Graduate Workshop**, *Salt Lake City, USA*, *Profit rate and accumulation in Brazil 2000 2017*
- 2021 49th **ENCONTRO NACIONAL DE ECONOMIA**, *online, Brazil*, *The Brazilian Manufacturing Rate of Surplus Value Between 2000 And 2017*, with Antonio A. de Freitas
- 2018 **IX Colóquio Internacional Marx Engels – IFCH/Unicamp**, *Campinas, Brazil*, *Teoria e empiria da lucratividade em Marx: em busca das mediações*
- 2017 **Colóquio Internacional Marx e o Marxismo**, *Roundtable: Sobre os percursos da crítica da economia política. Essência e aparência da crise em Marx - lei da queda tendencial da taxa de lucro e desmedida*
- 2017 **XXII Encontro Nacional de Economia Política**, *Essência e aparência da crise em Marx: lei da queda tendencial da taxa de lucro e desmedida*
- 2015 **23º SIICUSP – Simpósio Internacional de Iniciação Científica da Universidade de São Paulo**, *São Paulo, Brazil*, *As formas aparentes das crises em Marx*

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