Inequality, Condensation and Redistributive Taxation

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Social and economic inequality stands as one of the most pressing challenges of the 21st century. Thomas Piketty[1] demonstrates that income inequality, particularly in developed nations, has been steadily increasing since the 1970s. This resurgence of inequality mirrors the conditions of "patrimonial capitalism" from the 19th century, where inherited wealth and capital accumulation were the primary forces driving economic disparities. Such trends as well as data from present wealth distribution in several countries have raised preocupation about a potential return to an era where economic power is concentrated in the hands of a very small elite.

This issue has garnered significant attention from economists, mathematicians, and physicists. Econophysics, for example, uses models from statistical mechanics to explain wealth distribution as a result of exchanges between economic agents. A common analogy compares market exchanges in society to energy transfers between molecules in physical systems. However, while physical systems tend toward energy equipartition, most economic exchange models instead result in what is known as a "condensed" state—where wealth is concentrated in the hands of a few, while the majority hold very little.

Extreme inequality poses risks beyond moral concerns. When a significant portion of the population is deprived of adequate resources, it hampers their ability to participate in the economy. This exclusion leads to diminished consumption, reduced demand, and stagnation in economic activity. In this scenario, some economists warn of the "thermal death" of markets, where economic dynamism falters due to insufficient resource circulation[2].

In this context, we explore how even a fair system of exchanges still leads to wealth "condensation" — a scenario where wealth becomes concentrated in a few hands. Furthermore, we examine the potential of various taxation policies to address this imbalance[3]. Redistributive taxes, whether applied broadly across society or targeted specifically at the most vulnerable, not only reduce inequality but also stimulate broader economic participation and growth. By reallocating wealth more evenly, these policies can reinvigorate market activity and mitigate the risks associated with extreme inequality.

References

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