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Piketty's Capital in the 21 st Century and modern finance: The other [r – g] relationship

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ABSTRACT

In this study we look at one wheel in the machinery of modern finance that may help evaluate Piketty's contributions in his best-seller Capital in the 21st Century (C21C): the constant-growth equity model, also known as Gordon's model. We first briefly review Piketty's text, and highlight two theories advanced by Piketty: one about the relationship between return on capital and economic growth (r – g) associated with the ratio between two variables (k/y), and another theory in which the same (k/y) relationship is associated with a ratio between the growth rate of savings-to-economic growth (i.e., k/y = s/g). Piketty uses these two devices, s/g and r > g to warn readers about a possible future of secular stagnation (a continued age of very low or even negative g's), in which the inequality r > g may create inequality levels not seen since the XIX century, or worse. The constant growth model, however, provides what Piketty's analysis does not include: transitional dynamics, the adjustments agents would make in such dire low growth scenario and system responses. Furthermore, the constant growth model shows why r > g, r – g > 0 is both a logical and a computational condition valid for all times. In sum, we show that Piketty's theoretical devices cannot support his contentions.

1. Introduction

Thomas Piketty's book Capital in the 21 st Century (C21C), published in 2014, caused plenty of immediate reactions. The title, methodology, and narrative strategies employed by Piketty can be regarded as a tribute to Karl Marx, who published a massive volume entitled "Capital: A Critique of Political Economy" in the nineteen century. Piketty's C21C effort focuses on documenting, analyzing and addressing the issue of inequality of income and wealth.

Economics in the nineteenth century was an interdisciplinary endeavor, combining economic elements (prices, quantities, trade, currency, interest rates, and so on) with political decisions and social movements. John Stuart Mill's Principles of Political Economy (1994, originally published in 1848) set very high interdisciplinary standards. Marx further widened the scope of economic and political analysis to include philosophical (materialism, Hegel's dialectic method), historical, and sociological elements, which he applied to the first stage of the industrial revolution. One of Piketty's contributions is to reinstate the political component of economic research and its interdisciplinary nature. As an historian, he has collected and curated data series for reliability, going as far back in time as possible. As an economist, he has made contributions to modern growth theory and to the analysis of income and wealth, both domestically and internationally. As a social scientist, he has motivated and contributed to discussions of distribution policies.

Responses to C21C have taken many forms: commentaries ranging from a few paragraphs to several pages in newspapers, magazines, blogs, academic studies, and books. In addition to offering a difficult critical reading, C21C is eminently interdisciplinary and includes a substantial cultural component (French history, economics and politics), which may discourage some readers, especially specialized professionals from approaching Piketty's work critically.

In C21C, Piketty states that inequality in income and wealth may reach during this century proportions only seen during the nineteenth century, or worse. In addition to evaluating data series, he uses two devices to make his point. One is the ratio "s/g" (s, savings; g, growth rate of the economy), and the inequality "r > g" (r is the rate of return on capital, which he uses interchangeably as wealth as well). He first establishes his theoretical foundations, then visualizes a possible future, and finally makes some proposals (an 80% top bracket tax, and an international tax on capital-wealth). More generally, Piketty's approach includes four elements: a) data series, originated from national income product accounts, and tax records among other sources, from which

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several regularities may be observed; b) formulations from a few theoretical growth models; c) an expository strategy characterized by a certain methodological pattern and stylistic choices; and d) generous amounts of supplementary information.

According to our analysis, Piketty's reasoning does not have realistic financial management support, neither for firms nor for households. Therefore, he is building upon a compromised foundation to visualize his very specific terminal states. Some of the tools he employs in C21C are suited to envision a certain state of affairs at point B in the future, given certain numbers in the present, point A. But the key is in the transition; in the individual and system responses, and in the adjustment process to Piketty's prolonged period without economic growth (g). In order to make our point, we employ very straightforward arguments from investing and financial management, most of them implicit in a fundamental model in finance often referred to as "the constant growth model."

Although we have gathered and consulted many references to Piketty and other works by him, we will try to center our study on C21C and focus on the theoretical support for Piketty's main thesis: a future of secular stagnation with extreme inequality brought about by an increase in the capital/income ratio and a very large increase in the spread between the return on capital and economic growth.

We first briefly review Piketty's text to single out the foundations of his reasoning and, in particular, of the items beta = r × capital/income, and alpha = s/g as described in C21C. Afterwards, we introduce the constant growth model. We complement this second section by briefly listing academic analysis of C21C's r > g and s/g modeling, including some post-publication attempts by Piketty to distance himself from his own claims. Concluding comments and the customary references close the study.

2. Piketty's C21C thesis and formulae, r – g and s/g

The American edition of C21C by Belknap Press, and imprint of Harvard University Press, contain 685 numbered pages, with 577 of text and 74 pages of "notes" in the back matter. There are sixteen chapters organized into four parts, which are dedicated to 1) income and capital, 2) the dynamics of the income/capital ratio, 3) the structure of inequality, and 4) regulating capital in the 21st century, respectively. References are to Piketty (2014a) unless indicated otherwise.

The introduction is written to serve as a summary of the work. First, it initiates the major themes of the book: Piketty's thoughts on the long-term evolution of wealth, what it supposedly conveys about the system that produces it, and whether democracy can prevail in a system where private interest reigns supreme. Piketty next argues that debates about equality/inequality and their effects have not been sufficiently based on facts because the necessary data has become available only recently. A brief review of some of the views of a few economists (Malthus, Ricardo, Marx, and Kuznets) about the system follows. Each of these authors touched upon something of interest (population, scarcity, tendency of capitalism to concentrate wealth into fewer and fewer hands, positive effects of growth), but it is the question of distribution (of income and wealth) that needs to be placed "at the heart of economic analysis," according to the author. Part of Piketty's past research involves building data on income and wealth (time series and international data, cross sectioned), data for which he laboriously integrated national income product accounts (NIPA) with detailed tax and property records. And he announces the major conclusions of C21C:

> "The first is that one should be wary of any economic determinism in regard to inequalities of wealth and income. The history of the distribution of wealth has been always political, and it cannot be reduced to purely economic work... The second conclusion ... is that the dynamics of wealth distribution reveal powerful mechanisms pushing alternatively towards convergence and divergence... Over a long period of time, the main force in favor of greater equality has been the diffusion of knowledge and skills" (2014, 20–23).

These conclusions have not caused the uproar that both the book and author have been associated with since its publication. The truly contentious conclusions start one page later, when Piketty introduces his first figure of the book depicting the share of the upper decile of the income distribution in the US from 1910 to 2010. Note to the reader, this figure depicts revenues before taxes, and also excludes government transfers. This chart has become emblematic of Piketty's message concerning increasing inequality and has been reproduced without further examination. The reader should note first that the customary empty space above the maximum numbers at the top of the chart is missing. Second, the data is presented using 5-year periods instead of 1-year in the x-axes intervals. Exhibit 1 shows Piketty's data is very sensitive to such decisions, which compress and magnify the differences in numbers, as observed visually. Furthermore, both chart versions of the same data emphasize the weight of the stock market in wealth dynamics of the top deciles. Specifically, each stock market decreases the wealth share of the top decile by about 3.5% (in the aftermath of the tech-bubble, 2000–2002, it went from 47.6% to 43.8%, a 3.8% drop, in the 2008 crash, 2007–2009, from 49.7% to 46.5%, a 3.2% drop). One may argue that without the last two bull markets (one may add housing as well), the share of the top 10% decile might have remained rather close to the 1945–1990 range, 35–40%.

Immediately afterwards, Piketty indicates that the fundamental force of the divergence in incomes is the inequality r > g (">" is the mathematical symbol for "larger than"):

> "This fundamental inequality, which I will write as r > g (where r stands for the average annual rate of return on capital, including profits, dividends, interest, rents, and other income from capital, expressed as a percentage of its total value, and g stands for the rate of growth of the economy, that is, the annual increase in income or output), will play a crucial role in this book. In a sense, it sums up the overall logic of my conclusions... When the rate of return on capital significantly exceeds the growth rate of the economy (as it did through much of history until the nineteenth century and as is likely to be the case again in the twenty-first century), then it logically follows that inherited wealth grows faster than output and income... The likely decrease in the rate of growth of both the population and the economy in coming decades make this trend all the more worrisome. My conclusions are less apocalyptic than those implied by Marx ... In the model I propose, divergence is not perpetual and is only one of several possible future directions for the distribution of wealth. But the possibilities are not heartening. ... It is important to note that the fundamental r > g inequality ... has nothing to do with market imperfection. The more perfect the capital market (in the economist's sense), the more likely r is going to be greater than g. It is possible to imagine public institutions and policies that would counter the effects of this implacable logic: for instance a progressive global tax on capital, ... actual responses to the problem – including various nationalist responses—will in practice be far more modest and less effective, " ibid. (from pp. 25–27).

The rest of the introduction provides some clarifications about the geographical and historical boundaries of his study and previews the theoretical and conceptual framework. At this point Piketty notes that he will use a few equations, notably $\alpha = r \times \beta$, and $\beta = s/g$. They mean that the share of capital in national income (α) equals the rate of return on capital (r) times the capital/income