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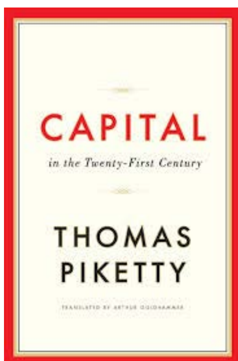
Capital in the Twenty First Century

A Review of Thomas Piketty's Capital in the Twenty First Century

By Kristina Wile



With the 2014 release of his book, *Capital in the 21st Century*, Thomas Piketty created a flurry of media responses and reactions, both negative and positive. Here, we endeavor to focus in on the work itself, while throwing a systems thinker's hat into the ring. Which is to say, we read the book.

Note that his analysis, and thereby this analysis, focus primarily on the thinking part of Systemic Thinking. In this piece, we inspect the historical data and the theory he forwards, while omitting the important social and emotional content as well as the perspectives of other stakeholders in the system. Though other's comments undoubtedly highlight important considerations, we think a systems understanding of Piketty's work alone can provide a foundation for further exploration.

So, to what extent does Piketty advance the understanding of the forces contributing to inequity using the data and articulating hypotheses from a systemic perspective?

Big Picture

Piketty taps into a lot of data sources. He aggregates data at the highest level to show global population, income, and capital dynamics. He considers and aggregates data representing the entire world, but also breaks down the same data to show interesting national dynamics. This allows him to explore interesting similarities in dynamic patterns, although these patterns are sometimes shifted in time.

Piketty alludes to the science of economics as errantly setting itself apart from other social sciences and makes the case that economics is intimately related to these disciplines. Despite this call to the interconnectedness of the disciplines, the data he has gathered is bound by the demographic and economic. This creates a great opportunity for future systemic exploration.

Patterns of Behavior Over Time

Where possible, Piketty takes an admirably long, historical look at the data. In some cases, the data he references spans as far back to what he terms *antiquity* (0 AD), though most of his sources begin

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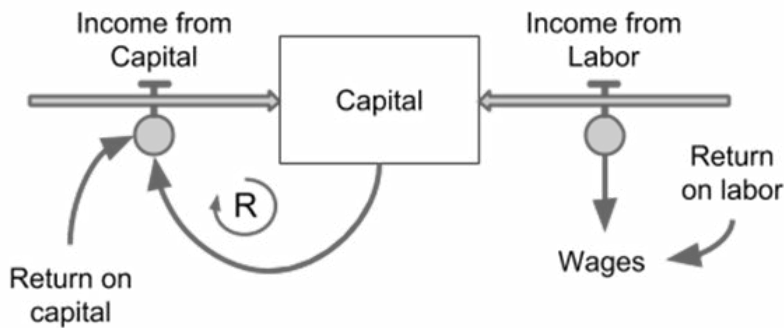

Figure 1: The essential dynamic structure in Piketty's Capital in the 21st Century.

between 1500 and 1700 AD.

Granted, to achieve this long-term perspective, he needs to collect data from many different sources, with varying levels of trustworthiness. As a researcher, he is now being called upon to address issues. And, as is the research tradition, he bemoans unavailability, uncertainty, and likely error even in the modern datasets.

Despite these unavoidable data-collection difficulties, Piketty has gathered an impressive array of historical data. He is attentive to details in the data and to the smaller perturbations that a systems thinker might not focus on. These elements make for interesting reading, but from a systems perspective, the assembled data and their long time horizon are impressive.

The figures in the book, many of them represented in behavior over time charts, tell the majority of the long-term arc of the story—and delightfully, all the behavior over time graphs in the book can be perused here: http://piketty.pse.ens.fr/files/capital21c/en/Piketty2014FiguresTablesLinks.pdf

Structure

Piketty employs some event-level thinking in his explanations of economic shocks of the world wars, as well as the Great Depression. He also takes care to explain the detailed historical events behind fluctuations in event levels in the behavior graphs for each nation. These narratives advance few systemic hypotheses, with the notable exception of the French Revolution. Piketty postulates that the extreme inequality of capital was a primary driver of that war, as it was the highest that has ever been observed worldwide, to date. As he details in both the narrative and data, the French Revolution led to a dramatic correction of that situation—a decimation of the capital of that country.

Key Stock and Flow

Piketty identifies the primary stock of concern as that of capital, at either the national or the global level. He talks, in turn, about several different breakdowns or segments of this stock, such as privately held versus publicly held capital, domestic versus net foreign capital, or specific types of capital like agriculture, land, or housing. Though none of these distinctions are critical to his main conclusions, the comparative graphs over time yield interesting insights.

He also notes that measuring this stock is not straightforward, and has become less straightforward over time, due to globalization. Piketty recommends a worldwide agreement to report all capital, but realizes that several nations have differentiated themselves in the fiscal market as tax havens where the very opaqueness of these records provides strategic advantage for investments.

The related flow is the total national (or worldwide) annual income, which flows into the stock of capital filling it up. The amount of this flow can be split into the income produced from the capital being invested plus the income from labor that is invested (Fig.1). This distinction ends up being central to the book, as the forces driving growth for each are quite different in nature.

Piketty's Main Points

The inflow to the stock (bathtub) of capital comes from two sources: income from capital and income from labor. Each inflow has an associated fractional

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rate of return, identified as capital return and labor return. And, the rate of return on capital is also dependent on the size of the capital stock. Let's take this one step at a time:

The capital to income ratio can vary and is called β. So that is the ratio of the stock divided by the flow. For example, if the stock of capital, or wealth, is 6 times the inflow in a given year, β is equal to 600%. Now, the fraction of the income flow that comes from capital (not income) is α. And the rate of return on capital is r.

From this, we can determine the fraction of this inflow coming from the capital using this equation. So if the capital to income ratio (β) equals 600%, and the rate of return on capital is 5%, then the fraction of income coming from capital (α) will be 30%.

$$\alpha = r * \beta$$

This equation is presented by Piketty as a static economic law, widely accepted and mathematically true at every point in time. Consider for a moment that the implications of the stock of capital begin larger than the income flow (β)—what would happen to the share of income due to capital (α)? It would be large, and conversely, the income due to labor would be small. This is important, because not everyone in a national population has capital.

The second economic law presented by Piketty is focused on capital growth over time. The capital to income ratio is equal to the national average savings rate(s), divided by the growth rate in national income (g).

$$\beta = s / g$$

This means that if a country saves a lot and grows slowly, it will accumulate a large stock of capital. It also means that growth is an important issue. When growth is low, there is a large effect on the capital to income ratio over time.

Most of the population benefits from the return on labor, which is seen as growth in wages. And in a growing economy, defined as an economy where the total national income is growing year over year, everyone benefits. But only a small segment of the population that holds most of the capital benefits from the return on capital. Americans in the 20th century have enjoyed a more stable income to capital ratio due to higher growth demographically, which helps explain their relative affinity for capitalism.

Growth in national income is largely driven by demographics (population growth) and, to a smaller extent, productivity gains. Because future demographics are likely to grow more slowly, we can reasonably expect slower rates of growth in the future (Figure 2).

This population growth slowdown has already happened in the US, Europe, and other wealthy nations and the size of the capital stock is higher than ever before. This means that the return on capital will continue to be higher than that of labor and the inequality with respect to income will continue to increase.
One main point Piketty makes is analogous to the simple growth dynamics of a bank account. Given a fixed rate of return, the amount of capital in the bathtub will increase exponentially (R1) and the data bear this out convincingly, aside from the corrections of the world wars, the Great Depression,

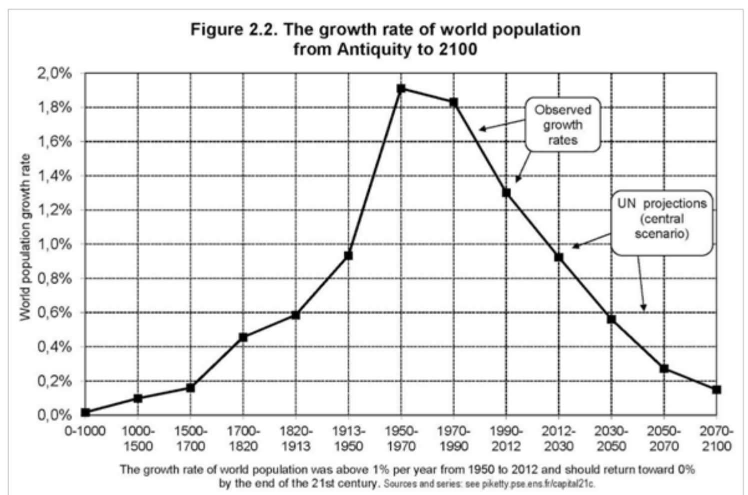

Figure 2: Past and projected future economic growth rate driving wage growth. Source: http://piketty.pse.ens.fr/en/capital21c2

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and the crash of 1990. From this, Piketty concludes that the amount of capital will continue to grow exponentially. For systems thinkers, that appears likely, until the next correction occurs, or a limit is met.

One of the major conclusions of Piketty's work is the idea that most people in history, in any given national population, have owned, and do own, little to no capital stock, and have not benefited from growth dynamics. Their return on labor in the form of wages is not saved for investment, because it is spent on living. This labor income and relatedly, wages, do not rise exponentially, as capital income does. In fact, wages sometimes do not even increase at the rate of inflation, which effectively shrinks the relative value of that income. The lack of ownership of capital is the main cause of increasing inequality, of both income, and capital ownership.

Piketty is careful to note that those in the lower half of the distribution of either capital or income fare reasonably well in economies that are growing. When there is growth in the economy, the rate of return on labor is somewhat closer to the rate for return on capital. But, again, that growth is driven primarily by demographic growth, and to a lesser extent by growth in productivity (notably through technology or education).

Piketty identifies many similarities among nations. These similarities provide a compelling case for underlying structural drivers, although they are sketchily outlined. He identifies the reinforcing forces of economic and capital growth that generally will continue in lieu of various corrections with capital destroying effects, such as the First and Second World Wars. A systems thinker might consider whether the various corrections were internally produced Limits to Growth in one form or another.

We suggest some of these shocks stem from the social context relating to this economic growth. Examples of this are the extreme wealth inequality in the French Revolution, the extreme riskiness in lending in the crash of 1989, or the extreme speculation—then contraction—during the Great Depression. And, we leave it to historical and economic scholars to connect the dots between the capital levels and the development of the world wars. Piketty does note that the destruction in capital in Europe after the world wars was in large part the intentional result of policies designed to reduce the concentration of capital (balancing feedback), and not just due to the physical destruction of capital through combat.

Piketty also identifies an additional reinforcing dynamic (R2) that is well grounded in the data. Higher amounts of capital get higher returns on a fractional basis (Fig. 3). The owners of large capital stocks have less risk aversion and are more willing to invest in the focused and clever financial management services that provide them with better returns. Additionally, he notes that prices of real estate and financial stocks are especially volatile, making them less attractive to investors with smaller capital holdings, such as those saving primarily for retirement savings, or so-called lifecycle investors.[2]

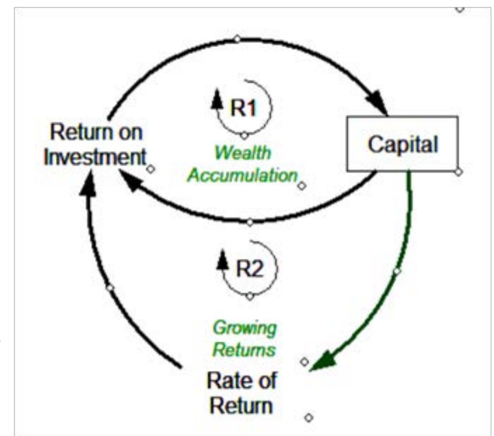

Figure 3: The supercharged reinforcing processes driving capital growth.

Smaller investors are less able to tolerate the large fluctuations in value driven by speculative bubbles. There is even evidence of those with high capital holdings paying for advance notification of market movements before the rest of the investors in the financial systems can see.[3] This, of course, throws more fuel onto an already reinforcing feedback-loop fire.

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Piketty notes a historical shift from rentiers (those who simply live on the the income derived from their capital investments), who were prevalent, especially in European countries, to a somewhat larger fraction of the population in wealthier nations, who make stunningly large incomes. These incomes are difficult to explain aside from these individuals, so-called "super managers," having a strong role in setting their own remuneration.

Piketty notes that the top decile (10%) of incomes (or of capital owners) encompasses two separate worlds, the 1% and the lower 9%, where the income from capital becomes progressively more dominant in the total income (Fig. 4).

Intermediate Conclusion and Potential Leverage Points

Piketty's repeated conclusion that is solidly supported by data is that those in the top 1% (or 0.1%, or 0.01%) of capital owners will continue to build their capital stocks (and income) at an increasing rate. At the same time, the majority of those in the lower 50% (or 80%) of the population who have only labor income will not see their incomes grow. Piketty suggests that there will ultimately be a limit to this growth in inequity. He advocates for interventions to slow increasing inequality that are policy driven, rather than enduring a naturally correcting shock, like revolution.

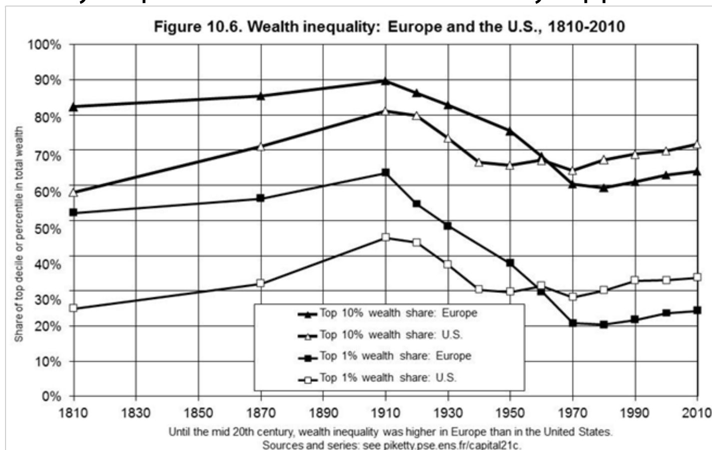

Figure 4: Comparative inequality in capital holdings.
Source: http://piketty.pse.ens.fr/en/capital21c2

Lack of agreement on goals notwithstanding, Piketty puts forth some ideas that are hypothetical. He identifies several possible interventions, including several taxation schemes and articulates many pros and cons for each. Piketty recognizes the systemic nature of the problem and admits that his best guess for the leverage point is at best a stretch politically.

Given the rise in number of super managers, wealth concentration is already less extreme than it was in 18th century Europe. Although meritocracy is an important theme in the capitalistic story in the US, inheritance has, and will, dominate the dynamics at the very top. Piketty notes that influencing the means (e.g., elite educational institutions) by which people gain access to the super manager track could be an intervention.

Piketty's favored intervention is a progressive tax on capital holdings at a very low rate on the top capital holders. Piketty suggests that the few people worldwide with the largest capital stocks should not reap any extra benefit from those stocks. He cites data conveying that the very wealthiest people rarely claim more than $50 million on their tax returns, suggesting that all the rest is simply rolled back into their capital stocks in the form of capital gains. And, at some point it becomes difficult to spend more than $500 million dollars each year.

The effect of such a policy frees up capital that is not being managed well enough to continue to make a return higher than the tax rate. This creates investment opportunities for smaller capital holders, effectively shifting ownership from the top percentiles downward (p. 374). He notes this investment policy works best if all nations implement something similar so that capital mobility is not a factor, while admitting that regardless of these limitations, implementation would be extremely difficult.

Other Noteworthy Observations

Piketty is clear that in the financial crisis of 2008, the national banks had a role, and they performed that

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role exactly as intended. They were the lender of last resort. National banks exist to prevent a free fall such as that experienced in the Great Depression. When looking at the data, it is clear that there was not a rise in the size of the state, as it was perceived. All wealthy nations have tracked similarly, spending anywhere from 30%-55% of their national income on basic services including law, order, education, security, and basic health care (Fig. 5).

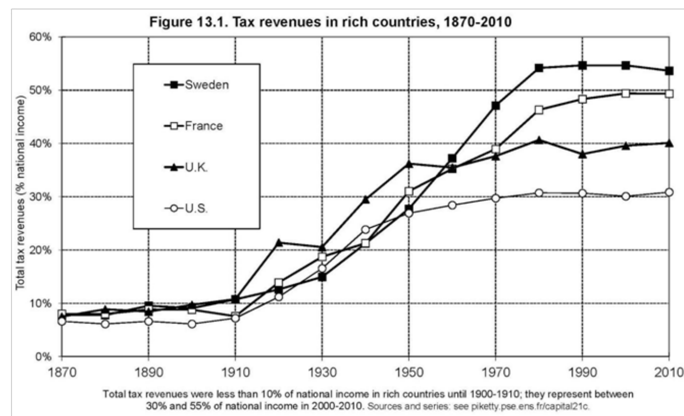

Figure 5: National public expenditures reflecting size of government. Source: http://piketty.pse.ens.fr/en/capital21c2

The fraction of national income spent on governments for all the wealthy nations has settled to be between 30% and 50% in the last several decades. Piketty clearly states that nearing this size, bureaucratic organization becomes problematic, and is in need of reorganization for efficiency. He also notes that there is significant agreement that basic human rights can be provided at this level of investment in government capital. There is no reason to make it larger. One of Piketty's recurring points is that the government that exists could, and should, be made more efficient.

Other interesting effects he covers, but we omit here, include the effects of inflation, slavery, investment in state capital or national debt, foreign-owned state debt, and privatization. His treatment of these is straightforward and data based, and in each case they are not the decisive drivers of long-term behavior.

Final Notes

Piketty admits that with human lifespans, we do not live long enough to benefit from (or suffer through, as the case may be) a particular growth or correction period, so these insights may be small comfort. As Keynes said, "In the long run, we will be dead." For us, however, anchoring ourselves in the data, and thinking about the long-term dynamics helps to keep the shrill arguments in perspective.

In fact, the nations in the world do seem to evolve similarly, in that basic rights of education and basic health care are becoming more widely available. Other data sources (e.g., see gapminder.com) confirm many positive trends for humanity. Infant mortality has decreased, and the average income of people worldwide has tended to improve over time.

Granted, in many ways we are between a rock and a hard place: between the inequality problem Piketty elucidates, and the detrimental environmental effects of an economy that has to grow to be fair. But this long-view data has let us acknowledge that the arc of history has indeed bent toward progress.

Piketty acknowledges the larger system of intertwined factors (social, cultural, political and military) that came into play in the corrections, but his analysis is bounded in classic reductionist style. It is no surprise that there is an opportunity for the systemic thinkers among us to build on this work; simulating the theories, and gathering stakeholders together to discuss goals and options for long term solutions.

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