Review and Critique of Piketty's *Capital in the Twenty-First Century*

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ABSTRACT

This essay is a comprehensive and critical review of Thomas Piketty's *Capital in the Twenty-First Century*. It follows the flow of Piketty's argument carefully and literally and notes his many assertions that are unsupported or contradicted by economic logic and empirical evidence, particularly in the United States. The essay particularly questions the high real interest rate needed to support Piketty's model of growth and distribution, in stark contrast with the low and even negative real interest rates the United States has been experiencing for several years. The essay also summarizes the recent critiques of Piketty's arguments by other leading economists.

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This paper, based closely on a 2014 article in *Tax Notes*,[1] reviews the book *Capital in the Twenty-First Century*, by Thomas Piketty. Piketty, a professor at the Paris School of Economics, presents data going back more than a hundred years on income and wealth inequality in several developed countries. After compiling statistics from historical and recent tax records for France, Great Britain, and the United States (and, to lesser extents, Germany, Sweden, and other countries), Piketty makes bold projections that apparent recent trends of increasing inequality will continue and deepen. Based on his interpretation of the data, Piketty gives strong prescriptions to substantially increase marginal tax rates on income and to institute a global tax on capital.

In this review, I will first summarize Piketty's economic theories, then his data presentation and discussion, and finally his projections for the future and his recommendations for tax policy. In the second part of the review, I will cover the main critiques of Piketty's book, both my own and others'.

PIKETTY'S ECONOMIC THEORIES

Piketty organizes his analysis around two simple equations, which he calls fundamental laws of capitalism. The first equation is an accounting definition: the share of capital in national income equals the product of the return on capital and the capital/income ratio. While tautological, the equation is nonetheless informative because it expresses an important relationship among key variables, each of which can be measured and explained, sometimes independently and often from various data sources. For example, if the capital/income ratio is 600 percent and the return is 5 percent, then the share of capital in national income is 30 percent. Piketty defines and measures capital as all forms of real property (including housing) and financial and professional capital (plants,

1. Mark Warshawsky, "Capital Taxation in the 21st Century?," *Tax Notes*, June 30, 2014, 1547–57.

“The ownership of capital is often quite concentrated among a relatively small portion of the population. Hence, study of the path of capital is considered essential to the study of inequality.”

infrastructure, machinery, inventory, patents, and so on) used by companies and government, all of which can be owned and exchanged on some market. Thus, capital is measured, to a large extent, at market prices.

The second equation, or fundamental law of capitalism, is that the capital/income ratio is equal in the long run to the savings rate divided by the economic growth rate in inflation-adjusted terms. For example, if the savings rate is 10 percent and the growth rate is 2 percent, then in the long run, the capital/income ratio must be 500 percent.

While these equations are elementary concepts in the theories of economic growth and development, their relevance to the study of inequality is that the ownership of capital is often quite concentrated among a relatively small portion of the population. Hence, study of the path of capital is considered essential to the study of inequality. Moreover, labor income can be unequally distributed as well. Finally—and these are key points—Piketty believes that the return to capital has held fairly steady over time and will continue to do so, while the rate of economic growth is declining as the population (that is, labor force) stops increasing and even declines in many European and Asian countries. Piketty also thinks that the savings rate is fairly steady, regardless of changes in economic conditions, because it is mainly influenced by the desire of the rich to leave bequests to their children. As we will see, these beliefs lead to a strong prediction of an increasing role for capital in the future, and therefore more inequality arising from bequests, which Piketty views quite negatively.

CAPITAL RATIOS AND INCOME FACTOR SHARES

Measuring the capital/income ratio over three centuries, Piketty finds that through 1910, the ratio in both Great Britain and France was steady at about 700 percent, but in the aftermath of World War I, it plummeted to about 300 percent and remained at that low level, even declining a bit more, until 1950, when it began to climb, reaching 500 percent in Britain and 600 percent in France by 2010.

Looking at component parts, at least part of the plunge after World War I was the result of spending a significant amount of net foreign capital to pay for the war, and at least part of the recent rise is the result of substantial increases in housing. In Germany, the trajectory is largely the same, except that the fall after World War I continued through 1950 as physical capital was destroyed in World War II, which resulted in a capital/income ratio of only about 200 percent by the end of that war. The subsequent increase is significant, to just over 400 percent in 2010, but to a lower level than in Great Britain and France; the increase is again largely because of housing assets.

By contrast, in the United States, the capital/income ratio increased steadily from about 300 percent in 1770 to 500 percent in 1910, falling only slightly after World War I, increasing again with the stock market boom through 1930, falling to below 400 percent by 1950, and thereafter increasing only slightly through 2010 to about 430 percent. Using decade average statistics, Piketty finds that the run-up in housing is much less pronounced in the United States than in France, although the short-term drop in the United States from 550 percent in 2007 to 430 percent in 2010 surely reflects the volatility of both the housing and stock markets. Income growth, partly due to rapid population growth from immigration, is also higher in the United States than in Europe, which increases the denominator and therefore lowers the long-run capital/income ratio.

From this and other data, Piketty makes some truly bold assumptions and takes two gigantic leaps: He creates a world capital/income ratio from 1870 to 2010, and then projects that ratio through 2100! While some would view this exercise as almost a work of fiction, Piketty is quite serious about the results. He says that the world ratio was 500 percent in 1910, dropped to 260 percent in 1950, and increased to about 440 percent by 2010. He projects that it will continue to increase, reaching 600 percent by 2060 and 670 percent by 2100. One must credit Piketty for taking a global view, because capital markets have indeed become quite open and linked in most countries. However, the simplicity of using the second equation and assuming in the long run an average world savings rate of 10 percent and an economic growth rate of 1.5 percent in order to project the global capital/income ratio is fairly breathtaking.

Piketty then moves from the capital/income ratio to the share of capital income in total national income, employing the first fundamental law of capitalism as explanation. He shows that there has been an overall downward trend in both Britain and France, from about 40 percent in the 19th century to about 20 to 25 percent or even less in most of the 20th century, increasing recently to 25 percent or a bit higher. Piketty attributes most of this trend to the changes in the capital/income ratio over time, but he also allows for some changes in the rate of return, with return increases in the mid-20th century and declines in the late 20th and early 21st centuries. Looking over a shorter and more recent time period, the capital share in the United States increased from 21 percent in 1975 to 29 percent in 2010, with considerable volatility in between, apparently related to the stock market. With the exception of Canada, the other developed countries have seen similar share increases for capital over this period.

Despite recent lows in interest rates, Piketty says that the total rate of return on capital, averaging across risk types, is still and will continue to be about 4 to 5 percent in inflation-adjusted terms. These rates are not much changed from the rates of return on agricultural land and government bonds implicit in Jane Austen's depiction of Mr. Darcy's estate income or in Honoré de Balzac's description of the dowries of Pere Goriot's daughters in the 1810s. So, according to Piketty, while rates of return may fall somewhat as capital increases, most of the projected increase in the capital/income ratio will flow through to the capital share of income. In other words, if the return to capital falls less than proportionately as the capital/labor ratio increases, then capital's share increases. Piketty is making the controversial claim that the elasticity of substitution between capital and labor exceeds one.

Piketty concludes this section of the book by projecting that, with a capital/income ratio of 700 to 800 percent and a rate of return of 4 to 5 percent, capital's share in national income will increase to 30–40 percent, levels close to those of the inegalitarian, inheritance-influenced days of Austen and Balzac. Again, these projection calculations are extremely rough and indeed seem quite exaggerated. Piketty nonetheless uses them to advance his central argument that income inequality arising from the increasing role of capital in an environment of economic stagnation is growing and will continue to grow, with little in the way of natural checks except for government intervention.

INEQUALITY

The main way Piketty measures inequality, whether of income, labor earnings, or capital ownership, is to calculate the share of various top percentiles of the population in the quantity in question—income, etc.—for various countries and time periods. For example, he reports that the top percentile in Scandinavia in the 1970s and 1980s got 5 percent of total labor income, while the next 9 percent got 15 percent. For the same region and time period, capital ownership was more concentrated, with the top percentile owning 20 percent and the next 9 percent owning 30 percent. These data are based mostly on annual observations, either from tax records or surveys, and there is no assurance that they represent the same people or families over long periods of time (even generations), particularly if there is a lot of mobility and volatility in the society and economy. Nonetheless, Piketty calls the top 1 percent the dominant class, the next 9 percent the well-to-do class, the middle 40 percent the middle class, and the bottom 50 percent the lower class. These clearly are arbitrary categories that may or may not correspond to recognizable social and political groupings; for example, the British hereditary nobility in the 1860s were unquestionably the highest class in society but were not necessarily its wealthiest members, as Anthony Trollope wryly observed.

As is usual in *Capital*, Piketty starts and concentrates his review of data with France. Here, the upper decile's share of national income decreased from 40 to 50 percent in the 1910s to mid-1930s to 30 to 35 percent today. The drop occurred almost entirely just before and during World War II. By contrast, the wage share has been fairly flat over the entire century, at about 25 percent of total labor income. The collapse in income for the top percentile started earlier, after World War I, and was more dramatic—from 20 percent in 1910 to 8 percent by 1945, increasing slightly to 9 percent by 2010—while top wage shares are remarkably stable at 6 percent over a hundred years. Piketty also shows that the share of income of the top 0.5 percent coming from capital and labor inverted between 1932 and 2005. He calls these trends the fall of the rentier and the rise of a society of managers. Note, however, that these data exclude capital gains.

Piketty then presents comparable data for the United States. The share of the top decile in total income was about 40 percent in the 1910s, increased to 45 percent in the 1920s and 1930s, plummeted to just above 30 percent during World War II, remained at that level through 1980, and then climbed back to 45 percent by 2010. If capital gains are included, the income levels are somewhat higher, on average, and much more volatile. Piketty attributes much of the plunge in income inequality during World War II to the federal government's restriction of wage increases. Given Piketty's ultimate focus on tax policy, it is surprising that he ignores the potentially more significant changes in tax law and administration during the war.

Piketty's data show that most of the increase in income inequality in the United States from the mid-1980s forward is owing to the top percentile, some to the top 1 to 5 percent, and almost nothing to the top 5 to 10 percent. Indeed, the share of the top percentile in total income jumped from 9 percent in 1986 to 13 percent in 1988, after passage of the Tax Reform Act of 1986. Thereafter it followed the up-and-down path of asset markets, increasing to 17 percent by 2010. Furthermore, focusing on labor income data, Piketty attributes about two-thirds of the increase to the rise of wage inequality, which he assigns to the advent of "supermanagers." Note that wages include all bonuses and stock options.

Looking at other countries, Piketty finds that increases in income inequality are generally similar to but smaller than those in the United States. Note that among the developed countries surveyed, France had the smallest increase in income inequality despite a large increase in the capital/income ratio. By contrast, the increases in reported income inequality were large in the United States and United Kingdom, while the capital/income ratio remained flat in the United States and increased in the United Kingdom (but to a lesser extent than in France). These observations are inconsistent with Piketty's central thrust that we need to be very concerned about the growth of capital and tax it heavily because of the dire implications for income inequality.

Piketty next turns to the inequality of capital ownership. In France, he finds that the top decile owned 90 percent of capital in 1910, but this share dropped steadily to 60 percent in 1970 and thereafter remained steady. According to Piketty, a similar pattern and similar levels may be found for the United Kingdom and Sweden, although there were small increases in both countries since 1980. For the United States, the highest level of ownership of capital by the top decile was only 80 percent, reached in 1910; it fell to 65 percent by 1970 and then increased slightly to 70 percent by 2010. Taking these statistics at face value, their connection to Piketty's central hypothesis is unclear—the concentration of capital ownership has remained flat or increased slightly, while changes in capital/income ratios and income inequality have diverged across countries. Piketty explains that progressive capital taxation is the reason why the concentration of capital ownership has not increased more, but he does not analyze this view deeply, for example, by examining tax policy differences across countries.

Finally, relying mainly on French data, Piketty looks at the role of inheritance versus saving in the accumulation of private wealth. For France, he finds that the annual inheritance flow was about 20 to 25 percent of national income during the 19th century and up until 1914; it then fell to less than 5 percent by the 1950s and increased to about 15 percent by 2010. (A similar trend is apparent in German data.) Assuming that the rate of return on capital exceeds the rate of economic growth (which is asserted repeatedly in the book), Piketty projects that inheritance flows will continue to increase, perhaps to as much as 23 percent of income by 2100. If this happens, more than 90 percent of the wealth in France will be inherited, an increase from the current 70 percent.

Because, according to Piketty, rentiers are the enemies of democracy, this would be a bad outcome for society.

It may seem strange to Americans that bequests and not retirement savings, which are generally used up in a worker's lifetime, are credited with the creation of most wealth. Of course, retirement from work is a fairly recent social creation, coincident with increases in life expectancies, income, and leisure time in the years before and after World War II. Still, it is surprising that Piketty does not give retirement savings a greater role in explaining recent trends and in projecting the future. Recall, though, that in France and Germany, pay-as-you-go public retirement income and health programs are quite generous, providing the resources for most workers to have long and comfortable retirements. So retirement asset savings in those countries will account for much less than in the United States, United Kingdom, Canada, and other countries where privately (and sometimes publicly) funded retirement plans and accounts are widespread. My above-mentioned article shows that retirement-related assets (such as employer-provided pension entitlements, annuities, IRAs, and so on) represented about a third of household net worth in the United States over the 1981–2013 period.[2]

Moreover, even housing functions as a type of retirement savings in these Anglo-Saxon countries that lack complete social insurance programs covering end-of-life needs. Many households in the middle class and above use housing equity to pay for home health care and nursing home care; these costs, which usually come at the end of life, can be quite expensive and lengthy. More broadly, households use other types of nonspecialized assets—mutual funds, deposits, and so on—to finance retirement spending. Retirement savings may explain (by rough estimate) at least half of capital accumulation in the United States, which undercuts Piketty's explanation that the primary motive of the rich is stockpiling a large inheritance for future generations.

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2. Warshawsky, "Capital Taxation in the 21st Century?"

To an American audience, Piketty also severely understates the role of entrepreneurs and overstates the role of inheritance in the creation of wealth. For example, in the United States, mega-billionaires like Bill Gates and Warren Buffet did not inherit their assets and are setting up charitable foundations to receive those assets for the benefit of future generations, as did Carnegie and Rockefeller in the past. Piketty may include the entrepreneurial effect in a high average return on capital, but that approach ignores the truly unique and personal catalyzing and organizing contribution of the individuals involved in setting up new businesses, raising capital, hiring workers, and creating and marketing new technologies.

PIKETTY'S PRESCRIPTIONS FOR TAX POLICY

"Without taxes, society has no common destiny, and collective action is impossible" (page 493). With these stirring but somewhat debatable words, Piketty gives his recommendations for tax policy, beginning with a historical review of the ratio of tax revenues to national income in France, Sweden, Great Britain, and the United States. He finds that from 1870 through 1910, the tax ratio was flat, at about 10 percent, and was used to fund "regalian" functions; that is, police, courts, roads, army, and so on. From 1910 through 1950, the tax ratio increased to 25–35 percent as social spending rose rapidly, for example, on public pensions and education. The tax ratio continued to increase through 1980, to between 30 and 55 percent, as health care was added to social insurance, but it flattened out thereafter, to 30, 40, 50, and 55 percent for the United States, Britain, France, and Sweden, respectively. In Piketty's view, European levels of tax revenues are probably close to the upper limit because of a public reluctance to pay higher taxes when income growth is slowing and because of the productive inefficiency of the public sector. Still, to counteract the increase in inequality of income and capital ownership that Piketty sees and foresees, he recommends an increase in the progressivity of taxation, on income, on inheritances, and on capital directly.

Piketty claims that progressive income and estate taxation has a direct and positive impact, reducing the inequality of income and capital ownership. In particular, he says that the "spectacular decrease in the progressivity of the income tax in the US and Britain since 1980 . . . probably explains much of the increase in the very highest earned incomes" (page 495). Piketty has to be arguing loosely here because the top inheritance tax rate in France has been consistently and significantly below that in the United States from 1980 through 2010, even as the concentration of capital ownership—according to his own calculations—increased in the United States and remained flat in France. In addition, the top US income tax rate increased from 28 percent in 1988 to nearly 40 percent through 2000, even as the share of reported income (including capital gains) of the top percentile rose from 16 to 22 percent over that same period. Moreover, income tax rates at the state level have steadily increased over much of this period, not necessarily having any impact on income shares. Piketty is also quite concerned that tax competition between countries in Europe has led to cuts in corporate tax rates and to the exemption of capital income from the progressive income tax.

Based on these interpretations, arguments, and considerations, Piketty recommends the following tax policy, in particular for the United States. The top income tax rate should be 80 percent, levied on incomes over $500,000 or $1 million. Also, "to develop the meager US social state and invest more in health and education" (page 513), tax rates of 50 or 60 percent should be imposed on incomes above $200,000.[3] Piketty acknowledges the difficulty of making these changes and attributes the difficulty to the political process being captured by the 1 percent and to a drift toward oligarchy. He "gives little reason for optimism about where the US is headed" (page 514).

Piketty's boldest recommendation is a progressive global tax on capital, coupled with a high level of international financial transparency to enable the collection of the tax. This annual tax would be in addition to current income, social insurance, and inheritance and other capital taxes. As mentioned above, Piketty is motivated by what he sees as harmful tax competition among countries in Europe in an endless, inegalitarian spiral and a lack of transparency, leading to the widespread use of illegal tax shelters. He also believes that for the wealthy, capital—not measured income—is the best way to assess contributive capacity.

Piketty proposes a tax schedule applicable to all wealth around the world; the resulting revenues would somehow be apportioned among and within countries. Piketty suggests the following annual schedule: 0.1 percent for net assets below €200,000, 0.5 percent between €200,000 and €1 million, 1 percent between €1 million and €5 million, 2 percent between €5 million and €1 billion, and 5 to 10 percent above €1 billion. All types of assets would be included at market value. Part of the motivation for the higher tax rate on the wealthy is Piketty's view that the wealthy get a much higher real return on capital: 6 to 7 percent. This estimate is quite rough, based on anecdotal data

3. It is hard to imagine why the United States would want to spend more on health care when it already devotes a far larger share of its income there than any other developed country.

from the annual *Forbes* survey of the world's billionaires, and does not control for exposure to risk.

Piketty places a high premium on financial transparency in order to expand knowledge of inequality of capital ownership; to improve financial regulation, especially in handling banking crises; and to force governments to broaden international agreements on the automatic sharing of financial data. Thus, the national tax authorities would receive all the necessary information—even from countries such as the Cayman Islands and Switzerland—to accurately compute the net worth of every citizen. Public transparency would be required of corporations and of individuals "in situations where there is no other way to establish trust" (page 570). How that approach would be consistent with respect for privacy and even for the safety of the rich individuals and their families is not clear.

To reduce public debt, Piketty suggests a progressive, one-time tax on private capital or a boost in inflation.

ECONOMIC CRITIQUES

In the summary of *Capital* above, I have already begun to critique some aspects of the book. There are, however, two major areas that warrant further critical comment: the rate of return on capital (and the claimed inference of a rapid growth of capital) and the measurement of US income (wage) inequality.

Piketty underplays the fact that in the United States, short-term interest rates have been zero for several years, long-term interest rates on nominal government bonds are less than 3 percent, and rates on inflation-indexed securities have been or are close to negative. These rates are available to all income and wealth groups, not just the lower ones. According to universally accepted finance theory, rates on these low-risk securities serve as the base, determining the expected rates of return on other, riskier types of capital, so that as these rates decline, so do all other rates of return.

As further evidence of the current low rates of return, I have presented data on yields on long-term British government bonds.[4] We do indeed see the 5 percent yield in the 1810s experienced by Mr. Darcy, although contrary to Piketty's assertion, inflation was relevant even then, at least during wartime. In any event, the yield is almost always lower than 5 percent in most historical times, and it certainly is lower in real terms, especially from 2013 until today, when due consideration is given to trends in inflation. Looking directly at the real—

4. Warshawsky, "Capital Taxation in the 21st Century?"

that is, inflation-adjusted—low-risk rate, I show the yield on inflation-indexed, very long-maturity UK government bonds.[5] In recent periods, the yield is negative and has generally been around 1 percent. Therefore, Piketty's assertion of a fairly constant 4 to 5 percent real rate of return on capital flies in the face of past, recent, *and* current experience, and it would certainly be unlikely to hold if the capital/income ratio increased further.

As a related matter, most scholarly evidence shows that the elasticity of substitution between capital and labor is less than one, particularly if housing is included in the measure of capital. In the United States, the savings rate has declined in recent decades, while corporate stock and housing prices have increased, leading to greater household wealth. So there are indeed automatic mechanisms in market systems that apply to the two fundamental laws of capitalism to prevent the continual expansion in the capital/income ratio and any income inequality that would arise therefrom.

Finally, getting into the methodological weeds, there may be another artificiality introduced into Piketty's results owing to fluctuations in the percentage of the adult population ("tax units") filing income tax returns. Since the full-scale implementation of income tax withholding during World War II, the units filing income tax returns have averaged about 90 percent. But that percentage fluctuates significantly; for example, from 2000 to 2012, it declined from 96 percent to 90 percent. Still, Piketty assumes that the income of all nonfilers is consistently a constant 20 percent of average income. This is somewhat arbitrary, since one might have expected the income of nonfilers to increase somewhat as the percentage of filing declines, particularly if the decline is due to changes in tax administration and law intended to remove low-income earners from filing status. Hence the rise in inequality is probably overstated. Note that this criticism holds in the opposite direction as well: When the percentage of filers exploded during World War II—from 14 percent in 1939 to 85 percent in 1945—it is likely that the average income represented by new filers declined, so that the rapid decline in inequality during the war reported by Piketty is probably overstated.

RECENT ACADEMIC CRITICAL COMMENTARY

Subsequent to its publication and blockbuster book sales, *Capital in the Twenty-First Century* got a lot of attention—some laudatory, some critical—from political and pundit circles, as well as from academics and think tank scholars.

5. Ibid.

“There is a strong element of stock market performance in both the income (including capital gains) and wage (including stock options) data reported by Piketty, spiking with the booms and falling with the busts.”

Included in the latter category was a formal panel discussion at the American Economic Association’s annual meeting in early January 2015. The academics offered some criticisms and Professor Piketty replied. Overall, in my opinion, the reviews, commentary, and exchanges further weaken Piketty’s assertions and recommendations.

Professor Martin Feldstein questioned the US data produced by Piketty and made the following three points in a May 14, 2014, editorial in the *Wall Street Journal*:

1. The Tax Reform Act of 1986 (TRA ’86) lowered the top rate on all income from 50 percent to 28 percent and considerably expanded the tax base by reducing the use of deductions and exclusions, importantly limiting the use of top-hat pension plans and other forms of deferred compensation. Because the top income earners and the corporations that pay them are quick to react to changes in tax rules, this tax reform caused more income to be paid as taxable salaries, but it did not increase the total resources available to these earners.

2. TRA ’86 “also repealed the General Utilities doctrine, a provision that had encouraged high-income individuals to run their business and professional activities as Subchapter C corporations, which were taxed at a lower rate than their personal income. This corporate income of professionals and small businesses did not appear in the income-tax data used by Piketty. The repeal of the General Utilities doctrine and the decline in the top personal tax rate to less than the corporate rate caused high-income taxpayers to shift their business income out of taxable corporations and onto their personal tax returns. Some of this transformation was achieved by paying themselves interest, rent or salaries from their corporations. Alternatively, their entire corporation could be converted to a Subchapter S corporation whose profits are included with other personal taxable income. These changes in taxpayer behavior substantially increased the amount of income included on the returns of high-income individuals. This creates

the false impression of a sharp rise in the incomes of high-income taxpayers even though there was only a change in the legal form of that income." Indeed, Piketty's data show a particularly rapid rise in inequality in the immediate years after the passage of TRA '86.

3. Social Security and health benefits (both from the government and from employers) are a large and growing part of the personal incomes of low- and middle-income households. But while they are considered earned, they are mostly not taxed. "Comparing the incomes of the top 10% of the population with the total personal incomes of the rest of the population [including these benefits] would show a much smaller rise in the relative size of incomes at the top."[6]

Scott Winship has made another criticism of the way Piketty interprets his own findings: "Because tax returns count all gains when they are realized and members of the top 1 percent strategically time the sale of their assets after holding them for years, all of the gains accruing over time are counted on a single tax return in years close to asset-market peaks. This increases the share of capital income accrued by the top of the income strata, since it's concentrated in one year."[7] Indeed, there is a strong element of stock market performance in both the income (including capital gains) and wage (including stock options) data reported by Piketty, spiking with the booms and falling with the busts. Winship also attributes some of the trend in the reported increase in income inequality to a decline in household size over recent decades—as marriage rates dropped, divorce rates rose, and elderly widowhood increased—and to a conflation of tax returns with households and persons.

Professor David Weil questioned Piketty's measurement of capital.[8] Piketty used the total market value of everything owned by the residents and government of a country at a given point as the simultaneous measure of productive capital and wealth. Weil agrees that this approach has advantages, particularly in its inclusion of past value-creating expenditures that are not measured through the perpetual inventory method of the National Income and Product Accounts produced by the Bureau of Economic Analysis. The market approach also reflects well the impact of changes in technology, price, and consumer preferences. But Weil also notes some significant drawbacks to the approach. He states that much of the observed increase in capital in France is due to capital gains, in turn caused mainly by a decline in discount rates,

6. Martin Feldstein, "Piketty's Numbers Don't Add Up," *Wall Street Journal*, May 14, 2014.
7. Scott Winship, "Inequality and the Fate of Capitalism," *National Review* 66, no. 9 (May 19, 2014).
8. David N. Weil, "Capital and Wealth in the Twenty-First Century," *American Economic Review* 105, no. 5 (2015): 34–37.

originating in part from the growing security of capital holders that their assets were safe from confiscations and violent destruction. Weil questions whether this type of revaluation is relevant to the measurement of productive capital and economic capacity, even as it is obviously relevant to the measurement of wealth. Weil also criticizes Piketty for ignoring the accumulation of human capital through more education and training, thereby erroneously asserting that the capital/income ratio is generally stable when it is actually increasing as larger and larger segments of the population have more and more education. He questions whether, in fact, wealth inequality is increasing when it may be stable because human capital is more evenly distributed than physical capital.

Professor Alan Auerbach and American Enterprise Institute scholar Kevin Hassett focus their critical comments on the relationship between the return to capital, r, and the economic growth rate, g, which is so central to Piketty's analysis.[9] They also critique Piketty's recommendation for a global wealth tax. In particular, Auerbach and Hassett say that Piketty's measurement of r is wrong because it ignores the risk premium commonly present in asset prices that reflects market risk and risk aversion. Furthermore, they say that Piketty should have focused on the after-tax return measured with top marginal, not average, tax rates. Auerbach and Hassett calculate an alternative time series of r that reflects marginal taxes and the risk premium. The authors find that it is low, indeed lower than the economic growth rate. They also note that much of the increase in before-tax income inequality in the United States is attributable to increases in labor income inequality, which would not be reduced by increases in capital taxation. Auerbach and Hassett also say that, because much of the increase in Piketty's measure of wealth originates in housing (which presumably is a poor substitute for labor), Piketty's recommendation of a wealth tax is again misplaced, whereas some reduction in the tax advantages of owning housing and liberalization of land-use regulations may be better policies. They also believe that consumption inequality rather than pretax income inequality is a better focus for policy making. Finally, Auerbach and Hassett note that the general consensus of the public finance literature is that consumption taxation is generally more efficient than capital taxation, and it also serves as a mechanism to reduce inequality.

Professor N. Gregory Mankiw questions whether $r > g$ necessarily leads to increased inequality, as asserted by Piketty.[10] Mankiw notes three obstacles

9. Alan J. Auerbach and Kevin Hassett, "Capital Taxation in the Twenty-First Century," *American Economic Review* 105, no. 5 (2015): 38–42.
10. N. Gregory Mankiw, "Yes, $r > g$. So What?," *American Economic Review* 105, no. 5 (2015): 43–47.

to the descendants of the wealthy remaining rich: First, heirs consume wealth; second, the number of descendants grows at the rate of population growth; and third, the existing tax regime redistributes wealth through inheritance and capital income taxes. Mankiw also employs the neoclassical growth model to show that, even with an outcome of $r > g$, inequality will not be increasing over time, and that while a capital tax will reduce inequality, it also reduces growth; a progressive tax on consumption is more efficient. Finally, Mankiw questions Piketty's focus on inequality in wealth rather than on inequality of opportunity, and he regards the claimed threats to democracy and fairness as overblown and unreasonable.

Professor Piketty responds to all the above critiques in a 2015 article.[11] He emphasizes that his book is mainly an explanation of historical trends in income and wealth across countries. Piketty now claims that institutional changes and political shocks—not $r > g$—largely account for the past path of inequality and its future evolution. In particular, he attributes the rise of top income shares in the United States over the 1980–2010 period mainly to rising inequality in access to skills and higher education. (Piketty relies on a study by Claudia Golden and Lawrence Katz[12] for evidence of these latter trends and of a relationship between such trends and income inequality, but there are serious methodological and data issues with this study.[13]) In fact, enrollment in and spending on higher education has grown more widespread and egalitarian over time. Regarding the relationship between $r - g$ and inequality, Piketty seems to backtrack somewhat from his earlier claims and now says that it is an *increasing* $r - g$ spread that leads to increasing inequality. He then argues (unconvincingly, in my view) that a slowdown in population growth and rising global competition to attract capital will lead to an increasing spread in the future. Piketty defends a progressive tax on net wealth over a consumption tax because wealth is easier to define, measure, and monitor, although he also calls for more financial transparency in order to learn more about income and wealth dynamics. Finally, he acknowledges a problem with assuming a high elasticity of substitution between capital and labor, which he used in *Capital,* and he now refers to a multisector model of capital accumulation and nonspecific arguments about movements in relative prices and variations in bargaining power over time.

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11. Thomas Piketty, "About *Capital in the Twenty-First Century*," *American Economic Review* 105, no. 5 (2015): 48–53.
12. Claudia Golden and Lawrence F. Katz, *The Race between Education and Technology* (Cambridge, MA: Belknap Press, 2008).
13. Mark Warshawsky and Ross Marchand, "Financing of Higher Education" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, forthcoming).

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