

## Yes, $r > g$ . So What?<sup>†</sup>

By N. GREGORY MANKIW\*

Thomas Piketty's book *Capital in the Twenty-First Century* captured the public's attention in a way that few books by economists have. Though its best-seller status was a surprise, probably even to its author, it has the ingredients that foster wide appeal. The book addresses a pressing issue of the day in a manner that is learned, literary, speculative, provocative, and fascinating from beginning to end. While largely a work of economic history, it does not stop there. Piketty ultimately leads the reader to a vision of what the future may hold and advice about what policymakers should do about it. That vision is a dystopia of continually increasing economic inequality due to the dynastic accumulation of capital, leading to a policy recommendation of a steeply progressive global tax on wealth.

Although I admire Piketty and his book, I am not persuaded by his main conclusions. A chain is only as strong as its weakest links, and several links in Piketty's chain of argument are especially fragile. Other aspects of Piketty's book may well pass the test of time, but the bottom line—his vision of the future and the consequent policy advice—most likely will not.

The book documents that the rate of return on private capital  $r$  exceeds the economy's growth rate  $g$ , and it argues that this will likely continue to be the case, perhaps by a larger amount in the future. Piketty (2014, p. 571) boldly calls this fact "the central contradiction of capitalism." He reasons that if  $r > g$ , the wealth of the capitalist class will grow faster than the incomes of workers, leading to an "endless inegalitarian spiral" (p. 572). To someone who views relatively unfettered capitalism as one of

the great achievements of human history and the best way to organize a society, as I do, these conclusions present a significant challenge.

The first thing to say about Piketty's logic is that it will seem strange to any economist trained in the neoclassical theory of economic growth. The condition  $r > g$  should be familiar. In the textbook Solow growth model, it arrives naturally as a steady-state condition as long as the economy does not save so much as to push the capital stock beyond the Golden Rule level (Phelps 1961). In this model,  $r > g$  is not a problem, but  $r < g$  could be. If the rate of return is less than the growth rate, the economy has accumulated an excessive amount of capital. In this dynamically inefficient situation, all generations can be made better off by reducing the economy's saving rate. From this perspective, we should be reassured that we live in a world in which  $r > g$  because it means we have not left any dynamic Pareto improvements unexploited.

There is, moreover, good reason to doubt that  $r > g$  leads to the "endless inegalitarian spiral" that Piketty describes. Imagine a wealthy person living in an  $r > g$  economy who wants to ensure that he has an endless stream of wealthy descendants. He can pass his wealth on to his children, but to ensure that his descendants remain wealthy, he faces three obstacles.

First, his heirs will consume some of the wealth they inherit. For this purpose, the relevant measure of consumption includes not only food, shelter, and riotous living but also political and philanthropic contributions, which can be sizable for wealthy families. A plausible estimate of the marginal propensity to consume out of wealth, based on both theory and empirical evidence, is about 3 percent. Thus, if wealth earns a rate of return of  $r$ , wealth accumulates at a rate of about  $r - 3$ .

Second, as wealth is passed down from generation to generation, it is divided among a growing number of descendants. (This would not be a problem for the wealthy patron if his

\*Department of Economics, Harvard University, Cambridge, MA 02138 (e-mail: [ngmankiw@harvard.edu](mailto:ngmankiw@harvard.edu)). I am grateful to Laurence Ball, Ben Friedman, David Laibson, Lisa Mogilanski, Lawrence Summers, Gabriel Unger, and Matthew Weinzierl for comments.

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heirs' mating were perfectly assortative—that is, if they all married someone of equal wealth. But matters of the heart are rarely so neat.) To get a rough calibration of this effect, suppose everyone has a typical family of two children, so the number of descendants doubles every generation. Because generations are about 35 years apart, the number of descendants grows at a rate of 2 percent per year. Thus, if family wealth accumulates at a rate of  $r - 3$ , wealth per descendant grows at a rate of  $r - 5$ .

Third, many governments impose taxes on both bequests and capital income. In the United States today, the estate tax rate is 40 percent (above a threshold). In Massachusetts, where I live, the state imposes an additional estate tax with a top rate of 16 percent. As a result, at the margin, about half of a family's wealth is taxed away by the government once every generation. If we again assume a generation is 35 years, then estate taxation reduces the accumulation of dynastic wealth by about 2 percent per year. In addition, capital income taxation during a person's life reduces capital accumulation even further. This effect is roughly an additional 1 percent per year, making the total drag of taxes about 3 percent per year. Let's assume, however, that our dynasty has especially good tax planning and put the total tax effect at only 2 percent. Thus, taking taxation into account, wealth per descendant grows at a rate of about  $r - 7$ .

We can now recalibrate Piketty's logic taking these three effects into account. Piketty reasons that resources of the wealthy would grow relative to the labor income if  $r > g$ . We can now see, however, that this condition is not sufficient once consumption, procreation, and taxation are accounted for. Instead, to obtain the worrisome "endless inegalitarian spiral," we would need the return on capital  $r$  to exceed the economy's growth  $g$  by at least 7 percentage points per year.

This scenario is far from what we have experienced. Piketty estimates the real rate of return to be about 4 or 5 percent, which seems plausible for a typical balanced portfolio. Meanwhile, the average growth rate of the US economy has been about 3 percent. So Piketty is right that  $r$  has exceeded  $g$ , but it has done so by only about 2 percentage points, not the more than 7 percentage points necessary for the creation of Piketty's imagined dystopia.

Moreover, while economists are notoriously bad at predicting the future, especially over long

horizons, it seems unlikely that, looking forward,  $r$  will start exceeding  $g$  by more than 7 percentage points. If the real return remains stable at 5 percentage points, the economy's growth rate would need to become a negative 2 percent. Secular stagnation would not be enough; we would need secular decline. Alternatively, if future growth is 2 percent per year, the real rate of return to capital would need to rise from its historical 5 percent to more than 9 percent. That figure is nowhere near the return that pension and endowment managers are now projecting from a balanced portfolio of stocks and bonds.

Hence, the forces of consumption, procreation, and taxation are, and will probably continue to be, sufficient to dilute family wealth over time. As a result, I don't see it as likely that the future will be dominated by a few families with large quantities of dynastic wealth, passed from generation to generation, forever enjoying the life of the rentier.

But suppose I am wrong. Suppose the dynastic accumulation of capital describes the future, as Piketty suggests. I would nonetheless remain skeptical of Piketty's proposal to place an additional tax on wealth. A simple, standard neoclassical growth model illustrates the problem with this policy.

Consider an economy composed of two kinds of people—workers and capitalists. Many workers supply labor inelastically and immediately consume their earnings. A few capitalists own the capital stock and, because they represent an infinitely-living dynasty, set their consumption according to the standard model of an optimizing infinitely-lived consumer (as in the Ramsey model). Workers and capitalists come together to produce output, using a production function that experiences labor-augmenting technological progress, and they earn the value of their marginal product. In addition, following the advice of Piketty, the government imposes a tax on capital equal to  $\tau$  per period, the revenue from which is transferred to workers.

To oversimplify a bit, let's just focus on this economy's steady state. Using mostly conventional notation, it is described by the following equations:

$$(1) \quad c_w = w + \tau k$$

$$(2) \quad c_k = (r - \tau - g)nk$$

$$(3) \quad r = f'(k)$$

$$(4) \quad w = f(k) - rk$$

$$(5) \quad g = \sigma(r - \tau - \rho),$$

where  $c_w$  is consumption of each worker,  $c_k$  is the consumption of each capitalist,  $w$  is the wage,  $r$  is the (before-tax) rate of return on capital,  $k$  is the capital stock per worker,  $n$  is the number of workers per capitalist (so  $nk$  is the capital stock per capitalist),  $f(k)$  is the production function for output (net of depreciation),  $g$  is the rate of labor-augmenting technological change and thus the steady-state growth rate,  $\sigma$  is the capitalists' intertemporal elasticity of substitution, and  $\rho$  is the capitalists' rate of time preference. Equation (1) says that workers consume their wages plus what is transferred by the government. Equation (2) says that capitalists consume the return on their capital after paying taxes and saving enough to maintain the steady-state ratio of capital to effective workers. Equation (3) says that capital earns its marginal product. Equation (4) says that workers are paid what is left after capital is compensated. Equation (5) is derived from the capitalists' Euler equation; it relates the growth rate of capitalist's consumption (which is  $g$  in steady state) to the after-tax rate of return.

Because the steady-state return on capital in this economy is  $r = g/\sigma + \tau + \rho$ , the condition  $r > g$  arises naturally. A plausible calibration might be  $g = 2$ ,  $\tau = 2$ ,  $\rho = 1$ , and  $\sigma = 1$ , which leads to  $r = 5$ . In this economy, even though  $r > g$ , there is no "endless inegalitarian spiral." Instead, there is a steady-state level of inequality. (Optimizing capitalists consume enough to prevent their wealth from growing faster than labor income.) If we assume the number of workers per capitalist  $n$  is large, then capitalists will enjoy a higher standard of living. In this natural case,  $c_w/c_k$ , the ratio of workers' consumption to capitalists' consumption, can be used as a proxy for inequality. A more egalitarian outcome is then associated with a higher ratio  $c_w/c_k$ .

Now consider the policy question: What level of capital taxation  $\tau$  should the government set? Not surprisingly, the answer depends on the objective function.

If policymakers want to maximize the consumption of workers  $c_w$  subject to equations (1) through (5) as constraints, they would choose

$\tau = 0$ . This result of zero capital taxation is familiar from the optimal tax literature (Chamley 1986; Judd 1985; and Atkeson, Chari, and Kehoe 1999, recently reconsidered by Straub and Werning 2014). In this economy, because capital taxation reduces capital accumulation, labor productivity, and wages, it is not desirable even from the standpoint of workers who hold no capital and who get the subsidies that capital taxation would finance.

By contrast, suppose the government in this economy were a plutocracy, concerned only about the welfare of the capitalists. In this case, it would choose  $\tau$  to maximize  $c_k$  subject to the above five equations as constraints. The best plutocratic policy is a capital subsidy financed by taxes on workers. That is, plutocrats would make  $\tau$  as negative as it can be. If there is some minimum subsistence level for workers, the labor tax and capital subsidy would be driven so high as to push workers' consumption down to subsistence.

Now consider a government concerned about inequality between workers and capitalists. In particular, suppose that policymakers want to increase the ratio  $c_w/c_k$ . In this case, a positive value for the capital tax  $\tau$  is optimal. Indeed, if maximizing  $c_w/c_k$  is the only goal, then the capital tax should be as large as it can be. Taxing capital and transferring the proceeds to workers reduces the steady-state consumption of both workers and capitalists, but it impoverishes the capitalists at a faster rate. For a standard production function ( $f' > 0$  and  $f'' < 0$ ), a higher capital tax always raises  $c_w/c_k$ .

Thus, in this simple neoclassical growth model, a positive tax on capital has little to recommend it if we care only about levels of consumption, but it may look attractive if we are concerned about disparities. To misquote Winston Churchill: the inherent vice of the free-market equilibrium is the unequal sharing of blessings; the inherent virtue of capital taxation is the more equal sharing of miseries.

So far, I have included only one policy instrument—the one recommended by Piketty—but we can consider others. A better way to pursue equality in this model economy, and I believe the real economy as well, is a progressive tax on consumption. Such a tax could equalize living standards between workers and capitalists without distorting the intertemporal margin and thereby discouraging capital accumulation. Under a progressive consumption tax, the

capitalists would be just as wealthy as they are without it, but they would not fully enjoy the fruits of their wealth.

With this model as background, let's move to the big question: Why should we be concerned about inequality in wealth? Why should anyone care if some families have accumulated capital and enjoy the life of the rentier? Piketty writes about such inequality as if we all innately share his personal distaste for it. But before we embark on policies aimed at reducing wealth inequality, such as a global tax on capital, it would be useful to explore why this inequality matters.

One place to look for answers is Occupy Wall Street, the protest movement that drew attention to growing inequality. This movement was motivated, I believe, by the sense that the affluence of the financial sector was a threat to other people's living standards. In the aftermath of a financial crisis followed by a deep recession, this sentiment was understandable. Yet the protesters seemed not to object to affluence itself. If they had, Occupy Wall Street would have been accompanied by Occupy Silicon Valley, Occupy Hollywood, and Occupy Major League Baseball. From this perspective, the rentier lifestyle of capitalists should not be a concern. As we have seen, in a standard neoclassical growth model, the owners of capital earn the value of their marginal contribution to the production process, and their accumulation of capital enhances the productivity and incomes of workers.

Another possibility is that we object to wealth inequality because it is not fair. Why should someone be lucky enough to be born into a family of capitalists whereas someone else is born into a family of workers? The disparity between workers and capitalists is inconsistent with the ideal of equal opportunity. Yet that ideal conflicts with another—the freedom of parents to use their resources to help their children (Fishkin 1984). Moreover, in considering Piketty's proposal of a global capital tax, we have to ask: Would you rather be born into a world in which we are unequal but prosperous or a world in which we are more equal but all less prosperous? Even if equal opportunity is a goal, one might still prefer unequal opportunities to be rich over equal opportunities to be poor.

A final possibility is that wealth inequality is somehow a threat to democracy. Piketty alludes to this worry throughout his book. I

am less concerned. The wealthy includes supporters of both the right (the Koch brothers, Sheldon Adelson) and the left (George Soros, Tom Steyer), and despite high levels of inequality, in 2008 and 2012 the United States managed to elect a left-leaning president committed to increasing taxes on the rich. The fathers of American democracy, including George Washington, Thomas Jefferson, John Adams, and James Madison, were very rich men. With estimated net worth (in today's dollars) ranging from \$20 million to \$500 million, they were likely all in the top 0.1 percent of the wealth distribution, demonstrating that the accumulation of capital is perfectly compatible with democratic values. Yet, to the extent that wealth inequality undermines political ideals, reform of the electoral system is a better solution than a growth-depressing tax on capital.

My own view—and I recognize that this is a statement of personal political philosophy more than economics—is that wealth inequality is not a problem in itself. And I do not see anything objectionable if the economically successful use their good fortune to benefit their children rather than spending it on themselves. As a society, we should help those at the bottom of the economic ladder through such policies as a well-functioning educational system and a robust social safety net (funded with a progressive consumption tax). And we should help people overcome impediments to saving, thereby allowing more workers to become capitalists. But if closing the gap between rich and poor lowers everyone's standard of living, as I believe Piketty's global tax on capital would do, I see little appeal to the proposal.

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