

The Rise and Decline of General Laws of Capitalism[†]

Daron Acemoglu and James A. Robinson

Economists have long been drawn to the ambitious quest of discovering the general laws of capitalism. David Ricardo, for example, predicted that capital accumulation would terminate in economic stagnation and inequality as a greater and greater share of national income accrued to landowners. Karl Marx followed him by forecasting the inevitable immiseration of the proletariat. Thomas Piketty's (2014) tome, *Capital in the Twenty-First Century*, emulates Marx in his title, his style of exposition, and his critique of the capitalist system. Piketty is after general laws that will demystify our modern economy and elucidate the inherent problems of the system—and point to solutions.

But the quest for general laws of capitalism is misguided because it ignores the key forces shaping how an economy functions: the endogenous evolution of technology and of the institutions and the political equilibrium that influence not only technology but also how markets function and how the gains from various different economic arrangements are distributed. Despite his erudition, ambition, and creativity, Marx was led astray because of his disregard of these forces. The same is true of Piketty's sweeping account of inequality in capitalist economies.

In the next section, we review Marx's conceptualization of capitalism and some of his general laws. We then turn to Piketty's approach to capitalism and his general laws. We will point to various problems in Piketty's interpretation of the economic relationships underpinning inequality, but the most important shortcoming is that,

■ *Daron Acemoglu is Elizabeth and James Killian Professor of Economics, Massachusetts Institute of Technology, Cambridge, Massachusetts. James A. Robinson is Wilbur A. Cowett Professor of Government, Harvard University, Cambridge, Massachusetts. Their email addresses are daron@mit.edu and jrobinson@gov.harvard.edu.*

[†]To access the Appendix and Data Appendix, visit <http://dx.doi.org/10.1257/jep.29.1.3>

though he discusses the role of certain institutions and policies, he allows neither for a systematic role of institutions and political factors in the formation of inequality nor for the endogenous evolution of these institutional factors. This implies that his general laws have little explanatory power. We illustrate this by first using regression evidence to show that Piketty's central economic force, the relationship between the interest rate and the rate of economic growth, is not correlated with inequality (in particular, with a key variable he focuses on, the share of national income accruing to the richest 1 percent, henceforth, the top 1 percent share). We then use the examples of the South African and Swedish paths of inequality over the 20th century to demonstrate two things: First, that using the top 1 percent share may miss the big picture about inequality. Second, it is impossible to understand the dynamics of inequality in these societies without systematically bringing in institutions and politics and their endogenous evolution. We conclude by outlining an alternative approach to inequality that eschews general laws in favor of a conceptualization in which both technology and factor prices are shaped by the evolution of institutions and political equilibria—and institutions themselves are endogenous and are partly influenced by, among other things, the extent of inequality. We then apply this framework to the evolution of inequality and institutions in South Africa and Sweden.

We should note at this point that we do not believe the term capitalism to be a useful one for the purposes of comparative economic or political analysis. By focusing on the ownership and accumulation of capital, this term distracts from the characteristics of societies which are more important in determining their economic development and the extent of inequality. For example, both Uzbekistan and modern Switzerland have private ownership of capital, but these societies have little in common in terms of prosperity and inequality because the nature of their economic and political institutions differs so sharply. In fact, Uzbekistan's capitalist economy has more in common with avowedly noncapitalist North Korea than Switzerland, as we argued in Acemoglu and Robinson (2012). That said, given the emphasis in both Marx and Piketty on capitalism, we have opted to bear with this terminology.

Capital Failures

Though many important ideas in social science can be traced to Karl Marx's oeuvre, his defining approach was to seek certain hard-wired features of capitalism—what Marx called general laws of capitalist accumulation. This approach was heavily shaped by the historical context of the middle 19th century in which Marx lived and wrote. Marx experienced first-hand both the bewildering transformation of society with the rise of industrial production, and the associated huge social dislocations.

Marx developed a rich and nuanced theory of history. But the centerpiece of this theory, historical materialism, rested on how material aspects of economic life, together with what Marx called forces of production—particularly technology—shaped all other aspects of social, economic, and political life, including the relations of production. For example, Marx famously argued in his 1847 book *The Poverty of*

Philosophy that “the hand-mill gives you society with the feudal lord; the steam-mill society with the industrial capitalist” (as reprinted in McLellan 2000, pp. 219–220). Here the hand-mill represents the forces of production while feudalism represents the relations of production, as well as a specific set of social and political arrangements. When the forces of production (technology) changed, this destabilized the relations of production and led to contradictions and social and institutional changes that were often revolutionary in nature. As Marx put it in 1859 in *A Contribution to the Critique of Political Economy* (McLellan 2000, p. 425):

[T]he sum total of these relations of production constitutes the economic structure of society—the real foundation, on which rise legal and political superstructures and to which correspond definite forms of social consciousness. The mode of production of material life conditions the general character of the social, political and spiritual processes of life. At a certain state of their development the material forces of production in society come into conflict with the existing relations of production or—what is but a legal expression of the same thing—with the property relations within which they had been at work before. From forms of development of the forces of production these relations turn into fetters. Then comes the epoch of social revolution. With the change of the economic foundation the entire immense superstructure is more or less rapidly transformed.

Marx hypothesized that the forces of production, sometimes in conjunction with the ownership of the means of production, determined all other aspects of economic and political institutions: the de jure and de facto laws, regulations, and arrangements shaping social life. Armed with this theory of history, Marx made bold predictions about the dynamics of capitalism based just on economic fundamentals—without any reference to institutions or politics, which he generally viewed as derivative of the powerful impulses unleashed by the forces of production.¹

Most relevant for our focus are three of these predictions concerning inequality. In *Capital* (1867, Vol. 1, Chap. 25), Marx developed the idea that the reserve army of the unemployed would keep wages at subsistence level, making capitalism inconsistent with steady improvements in the living standards of workers. His exact prediction here is open to different interpretations. Though Marx (1867, Vol. 1,

¹ There is no consensus on Marx’s exact formulation of the relationship between the “substructure,” comprising productive forces and sometimes the relations of production, and the “superstructure” which includes what we call political institutions and most aspects of economic institutions. In Chapter I of the *Communist Manifesto*, Marx and Engels wrote that “The history of all hitherto existing society is the history of class struggles.” But the idea here, so far as we understand, is not that “class struggle” represents some autonomous historical dynamic, but rather that it is an outcome of the contradictions between the forces of production and the ownership of the means of production. In some writings, such as *The Eighteenth Brumaire of Louis Napoleon*, Marx also allowed for feedback from politics and other aspects of society to the forces of production. But it is clear from his work that he regraded this as second order (see Singer 2000, chapter 7 for a discussion of this). Marx never formulated an approach in which institutions play the central role and themselves change endogenously.

Chapter 25, Section 3) viewed capitalism as the harbinger of “misery, agony of toil, slavery, ignorance, brutality, and mental degradation” for working men, it is less clear whether this was meant to rule out real wage growth. Blaug (1996) states that Marx never claimed that real wages would be stagnant, but rather that the share of labor in national income would fall since Marx (1867, Vol 1., Chapter 24, Section 4) says “real wages . . . never rise proportionately to the productive power of labor.” Foley (2008, Chapter 3), on the other hand, argues that Marx did start by asserting that real wages would not rise under capitalism, but then weakened this claim to a falling labor share when he realized that wages were indeed increasing in Britain. This motivates us to state this law in both a strong and a weak form. Under either its strong or weak form, this law implies that any economic growth under capitalism would almost automatically translate into greater inequality—as capitalists benefit and workers fail to do so. We combine this with a second general law of capitalism from Volume III of *Capital* and a third law, less often stressed but highly relevant, presented in Volume I of *Capital*. Thus, three key predictions from Marx are:

- 1) *The General Law of Capitalist Accumulation*. Strong Form: Real wages are stagnant under capitalism. Weak Form: The share of national income accruing to labor would fall under capitalism.
- 2) *The General Law of Declining Profit*: as capital accumulates, the rate of profit falls.
- 3) *The General Law of Decreasing Competition*: capital accumulation leads to increased industrial concentration.

Marx’s general laws did not fare well. As Marx was writing, real wages, which had been constant or falling during the first decades of the 19th century, had already been rising, probably for about two decades (Allen 2001, 2007, 2009a; Clark 2005; Feinstein 1998). The share of labor in national income, which had fallen to under half by 1870, also started to increase thereafter, reaching two-thirds in the 20th century. Allen’s (2009a) calculation of the real rate of profit suggests that the profit rate was comparatively low at the end of the 18th century and rose until around 1870 reaching a maximum of 25 percent, but then fell back to around 20 percent, where it stabilized until World War I. Matthews, Feinstein, and Odling-Smee (1982, pp. 187–88) suggest that these rates did not fall in the 20th century, though there is a lot of heterogeneity across sectors. (The third law’s performance was no better as we discuss below.)

Why did Marx’s general laws fail? Mostly because they ignored both the endogenous evolution of technology (despite his great emphasis on the forces of production) and also the role of institutions and politics that shape markets, prices, and the path of technology. The increase in real wages in Britain, for example, was in part a consequence of the change in the pace and nature of technological change, rapidly increasing the demand for labor (Crafts 1985; Allen 2009b; Mokyr 2012).

The rationalization of property rights, dismantling of monopolies, investment in infrastructure, and the creation of a legal framework for industrial development, including the patent system, were among the institutional changes contributing to rapid technological change and its widespread adoption in the British economy (Acemoglu and Robinson 2012; Mokyr 2012).

The distribution of the gains from new technologies was also shaped by an evolving institutional equilibrium. The Industrial Revolution went hand-in-hand with major political changes, including the development of the state and the Reform Acts of 1832, 1867, and 1884, which transformed British political institutions and the distribution of political power. For example, in 1833 a professional factory inspectorate was set up, enabling the enforcement of legislation on factory employment. The political fallout of the 1832 democratization also led in 1846 to the repeal of the Corn Laws (tariffs limiting imports of lower-priced foreign corn), lowering the price of bread, raising real wages, and simultaneously undermining land rents (Schonhart-Bailey 2006). The Factory Act of 1847 took the radical step of limiting working hours in the textile mills to ten hours per day for women and teenagers. The Reform Act of 1867 led to the abolition of the Masters and Servants Acts in 1875—which had imposed on workers legally enforceable duties of loyalty and obedience, and limited mobility—illustrating the role of pro-worker labor market legislation that increased real wages (Naidu and Yuchtman 2013).

Another telling example is the failure of Marx's third general law in the United States: the prediction of increased industrial concentration. After the end of the US Civil War came the age of the robber barons and the huge concentration of economic ownership and control. By the end of the 1890s, companies such as Du Pont, Eastman Kodak, Standard Oil, and International Harvester came to dominate the economy, in several cases capturing more than 70 percent of their respective markets (Lamoreaux 1985, pp. 3–4). It looked like a Marxian prediction come true—except that this situation was transitory and was duly reversed as popular mobilization, in part triggered by the increase in inequality, changed the political equilibrium and the regulation of industry (Sanders 1999). The power of large corporations started being curtailed with the Interstate Commerce Act of 1887 and then the Sherman Anti-Trust Act of 1890, which were used in the early 20th-century trust-busting efforts against Du Pont, the American Tobacco Company, the Standard Oil Company, and the Northern Securities Company, then controlled by J.P. Morgan. The reforms continued with the completion of the break-up of Standard Oil in 1911; the ratification of the Sixteenth Amendment in 1913, which introduced the income tax; and the Clayton Anti-Trust Act in 1914 and the founding of the Federal Trade Commission. These changes not only stopped further industrial concentration but reversed it (Collins and Preston 1961; Edwards 1975). White (1981) shows that US industrial concentration in the post–World War II period changed little (see White 2002 for an update).

Crucially, the political process that led to the institutional changes transforming the British economy and inequality in the 19th century was not a forgone conclusion. Nor was the rise in inequality in 19th century United States after its Civil War

an inevitable consequence of capitalism. Its reversal starting in the early 1900s was equally dependent on an evolving institutional equilibrium. In fact, while the power of monopoly and inequality were being curtailed in the United States, inequality continued to increase rapidly in neighboring Mexico under the authoritarian rule of Porfirio Diaz, culminating in revolution and civil war in 1910, and demonstrating the central role of the endogenous and path-dependent institutional dynamics.

Marx's general laws failed for the same reason that previous general laws by other economists also performed poorly. These laws were formulated in an effort to compress the facts and events of their times into a grand theory aiming to be applicable at all times and places, with little reference to institutions and the (partly institutionally determined) changing nature of technology. For example, when David Ricardo published the first edition of *On the Principles of Political Economy and Taxation* in 1817, and predicted that a rising share of national income would accrue to land, he had indeed been living through a period of rapidly rising land rents in Britain. But soon thereafter, the share of national income accruing to land started a monotonic decline, and by the 1870s real rents started a rapid fall, which would last for the next 60 years (Turner, Beckett, and Afton 1999; Clark 2002, 2010).

In short, Marx's general laws, like those before him, failed because they relied on a conception of the economy that did not recognize the endogenous evolution of technology and the role of changing economic and political institutions, shaping both technology and factor prices. In fact, even Marx's emphasis on the defining role of the forces of production, so emblematic of his approach, was often inadequate not only as the engine of history, but also as a description of history, including his paradigmatic example of hand-mills and steam-mills. For example, Bloch (1967) argued persuasively that the hand-mill did not determine the nature of feudal society, nor did the steam-mill determine the character of the post-feudal world.

Seeking 21st-Century Laws of Capitalism

Thomas Piketty is also an economist of his milieu, with his thinking heavily colored by increasing inequality in the Anglo-Saxon world and more recently in continental Europe—and in particular compared to the more equal distribution of labor and total incomes seen in France in the 1980s and 1990s. A large literature in labor economics had done much to document and dissect the increase in inequality that started sometime in the 1970s in the United States (see the surveys and the extensive references to earlier work in Katz and Autor 1999 and Acemoglu and Autor 2011). This literature has demonstrated that the increase in inequality has taken place throughout the income distribution and that it can be explained reasonably well by changes in the supply and demand for skills and in labor market institutions. Piketty and Saez (2003) brought a new and fruitful perspective to this literature by using data from tax returns, confirming and extending the patterns the previous literature had uncovered and placing a heavy emphasis on rising inequality at the very top of the income distribution.

In *Capital in the Twenty-first Century*, Piketty goes beyond this empirical and historical approach to offer a theory of the long-run tendencies of capitalism. Though Piketty's data confirm the finding of the previous literature that widening inequality in recent decades, at least in advanced economies, had been driven by rising inequality of labor incomes, his book paints a future dominated by capital income, inherited wealth, and rentier billionaires. The theoretical framework used to reach this conclusion is a mix of Marxian economics with Solow's growth model. Piketty defines capitalism in the same way that Marx does, and has a similarly materialist approach linking the dynamics of capitalism to the ownership of the means of production (in particular capital) and the ironclad nature of technology and exogenous growth dynamics. It is true that Piketty sometimes mentions policies and institutions (for example, the wealth tax and the military and political developments that destroyed capital and reduced the ratio of wealth to income during the first half of the 20th century). But their role is ad hoc. Our argument is that, to explain inequality, these features and their endogenous evolution have to be systematically introduced into the analysis.

This approach shapes Piketty's analysis and predictions about the nature of capitalism. *Capital in the Twenty-first Century* starts by introducing two "fundamental laws," but the more major predictions flow from what Piketty calls a "fundamental force of divergence" (p 351) or sometimes the "fundamental inequality" (p. 25), comparing the (real) interest rate of the economy to the growth rate.

The first fundamental law is just a definition:

$$\text{capital share of national income} = r \times (K/Y),$$

where r is the net real rate of return on capital (which can be viewed as a real interest rate), K is the capital stock, and Y is GDP (or equivalently, national income as the economy is taken to be closed).

The second fundamental law is slightly more substantial. It states that

$$K/Y = s/g,$$

where s is the saving rate and g is the growth rate of GDP. As we explain in the online Appendix (available with this paper at <http://e-jep.org>), a version of this law does indeed follow readily from the steady state of a Solow-type model of economic growth (but see Krusell and Smith 2014; Ray 2014). At an intuitive level, the growth rate of the capital stock K will be given by net investment, which in a closed economy will be equal to saving, sY . Thus, the ratio K/Y will reflect the ratio "change in K to change in Y " over time due to economic growth, which is s/g .

Let us follow Piketty here and combine these two fundamental laws to obtain

$$\text{capital share of national income} = r \times (s/g).$$

Piketty posits that, even as g changes, r and s can be taken to be approximate constants (or at least that they will not change as much as g). This then leads to

what can be thought of as his first general law, that when growth is lower, the capital share of national income will be higher.

This first law is not as compelling as one might at first think, however. After all, one must consider whether a change in the growth rate g might also alter the saving rate s or the rate of return r , because these are all endogenous variables that are linked in standard models of economic growth. Piketty argues that r should not change much in response to a decline in g because the elasticity of substitution between capital and labor is high, resulting in an increase in the capital share of national income.²

However, the vast majority of existing estimates indicate a short-run elasticity of substitution significantly less than one (for example, Hamermesh 1993; Mairesse, Hall, and Mulkay 1999; Chirinko, Fazzari, and Meyer 1999; Krusell, Ohanian, Rios-Rull, and Violante 2000; Chirinko 1993; Antràs 2004; Klump, McAdam, and Willman 2007; Oberfield and Raval 2014). This is also the plausible case on intuitive grounds: given technology, the ability to substitute capital for labor would be limited (for example, if you reduce labor to zero, for a given production process, one would expect output to fall to zero also). Though this elasticity could be higher in longer horizons, Chirinko (2008) and Chirinko and Mallick (2014) find it to be significantly less than one also in the long run. One reason why the long-run elasticity of substitution might be greater than one is the endogeneity of technology (for example, Acemoglu 2002, 2003). In this context, it is worth noting that the only recent paper estimating an elasticity of substitution greater than one, Karabarbounis and Neiman (2014), uses long-run cross-country variation related to changes in investment prices, making their estimates much more likely to correspond to endogenous-technology elasticities. Nevertheless, as Rognlie (2014) points out, even an elasticity of substitution significantly greater than one would not be sufficient to yield the conclusions that Piketty reaches.

Moreover, though it is true that there has been a rise in the capital share of national income, this does not seem to be related to the forces emphasized in *Capital in the Twenty-First Century*. In particular, Bonnet, Bono, Chapelle, and Wasmer (2014) demonstrate that this rise in the capital share is due to housing and the increased price of real estate, shedding doubt on the mechanism Piketty emphasizes.

The second general law of *Capital in the Twenty-First Century* is formulated as

$$r > g,$$

stating that the (real) interest rate exceeds the growth rate of the economy. Theoretically, in an economy with an exogenous saving rate, or with overlapping generations (for example, Samuelson 1958; Diamond 1965), or with incomplete markets

² However, the interest rate and the growth rate are linked from both the household side and the production side. For example, with a representative household, we have that $r = \theta g + \rho$, where θ is the inverse of the intertemporal elasticity of substitution and ρ is the discount rate. The fact that the representative household assumption may not be a good approximation to reality does not imply that r is independent of g . On the production side, g affects r through its impact on the capital stock, and it is the second channel that depends on the elasticity of substitution between capital and labor.

(for example, Bewley 1986; Aiyagari 1994), the interest rate need not exceed the growth rate. It will do so in an economy that is *dynamically efficient*, meaning in an economy in which it is impossible to increase the consumption at all dates (thus achieving a Pareto improvement). Whether an economy is dynamically efficient is an empirical matter—for example, Geerolf (2013) suggests that several OECD economies might be dynamically inefficient—and dynamic inefficiency becomes more likely when the capital-output ratio is very high as *Capital in the Twenty-first Century* predicts it to be in the future.

Finally, Piketty's third and most important general law is that whenever $r > g$, there will be a tendency for inequality to rise. This is because capital income will tend to increase at the rate of interest, r , while national income (and the income of noncapitalists) increases at the rate g . Because capital income is unequally distributed, this will translate into a capital-driven increase in inequality, taking us back to the age of Jane Austen and Honoré Balzac. In the words of Piketty (pp. 25–26): “This fundamental inequality [$r > g$] 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, then it logically follows that inherited wealth grows faster than output and income.”

He elaborates on this point later, writing: “The primary reason for the hyperconcentration of wealth in traditional agrarian societies and to a large extent in all societies prior to World War I is that these were low-growth societies in which [sic] the rate of return on capital was markedly and durably higher than the rate of growth” (p. 351). Based on this, he proposes an explanation for the rise in inequality over the next several decades: “The reason why wealth today is not as unequally distributed as in the past is simply that not enough time has passed since 1945” (p. 372).³

As with the first two general laws, there are things to quibble with in the pure economics of the third general law. First, as already mentioned, the emphasis on $r - g$ sits somewhat uneasily with the central role that labor income has played in the rise in inequality. Second, as we show in the online Appendix, $r > g$ is fully consistent with constant or even declining inequality. Third, $r - g$ cannot be taken as a primitive on which to make future forecasts, as both the interest rate and the growth rate will adjust to changes in policy, technology, and the capital stock. Finally, in the presence of a modest amount of social mobility, even very large values of $r - g$ do not lead to divergence at the top of the distribution (again, as we show in the online Appendix).

But our major argument is about what the emphasis on $r > g$ leaves out: institutions and politics. Piketty largely dismisses the importance of institutions against the

³ It is unclear whether $r > g$ is a force towards divergence of incomes across the distribution of income, or towards convergence to a new and more unequal distribution of income. In many places, including those we have already quoted, Piketty talks of divergence. But elsewhere, the prediction is formulated differently, for example, when he writes: “With the aid of a fairly simple mathematical model, one can show that for a given structure of . . . [economic and demographic shocks]. . . , the distribution of wealth tends towards a long-run equilibrium and that the equilibrium level of inequality is an increasing function of the gap $r - g$ between the rate of return on capital and the growth rate” (p. 364). In the online Appendix, we discuss a variety of economic models linking $r - g$ to inequality.

crushing force of the fundamental inequality, writing that “the fundamental inequality $r > g$ can explain the very high level of capital inequality observed in the 19th century, and thus in a sense the failure of the French Revolution. The formal nature of the regime was of little moment compared with the inequality $r > g$ ” (p. 365). In passing, we should note that the available empirical evidence suggests that the French Revolution not only led to a decrease in inequality (Morrisson and Snyder 2000), but also profoundly changed the path of institutional equilibria and economic growth in Europe (Acemoglu, Cantoni, Johnson, and Robinson 2011).

If the history of grand pronouncements of the general laws of capitalism repeats itself—perhaps first as tragedy and then farce as Marx colorfully put it—then we may expect the same sort of frustration with Piketty’s sweeping predictions as they fail to come true, in the same way that those of Ricardo and Marx similarly failed in the past. We next provide evidence suggesting that this is in fact quite likely as the existing evidence goes against these predictions.

Cross-Country Data on $r > g$ and Top-Level Inequality

The major contribution of Piketty, often together with Emmanuel Saez, has been to bring to the table a huge amount of new data on inequality (Piketty and Saez 2003). The reader may come away from these data presented at length in Piketty’s book with the impression that the evidence supporting his proposed laws of capitalism is overwhelming. However, Piketty does not present even basic correlations between $r - g$ and changes in inequality, much less any explicit evidence of a causal effect. Therefore, as a first step we show that the data provide little support for the general laws of capitalism he advances.

We begin by using as a dependent variable the top 1 percent share (see Alvaredo, Atkinson, Piketty, and Saez’s World Top Incomes Database at <http://topincomes.parisschoolofeconomics.eu/>). We combine this variable with GDP data from Madison’s dataset. For the first part of our analysis, we do not use explicit data on interest rates, which gives us an unbalanced panel spanning 1870–2012. For the rest of our analysis, our panel covers the post–World War II period and uses GDP data from the Penn World Tables.⁴

⁴ The number of countries varies depending on the measure of the interest rate used and specification. In columns 1–3 panel A, we have 27 countries: Argentina, Australia, Canada, China, Colombia, Denmark, Finland, France, Germany, India, Indonesia, Ireland, Italy, Japan, Malaysia, Mauritius, Netherlands, New Zealand, Norway, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, United Kingdom, and United States. In column 2 panel B, we lose China and Colombia, and additionally Portugal in column 3. In column 4 panel A, we lose the non-OECD countries, China, Colombia, India, Indonesia, Malaysia, Mauritius, and Singapore relative to columns 1–3, and additionally Germany in columns 5 and 6. In panel B, we additionally lose Portugal in columns 4 and 5, and Portugal and Germany in column 6. In column 7 panel B, we have Uruguay in addition to the 27 countries in column 1. In columns 8 and 9, we lose Germany and Uruguay. In panel B, we lose Uruguay in column 7 relative to panel A, and additionally China and Colombia in column 8, and Argentina, China, Colombia, Indonesia, and Portugal in column 9.

Table 1 reports regressions using three different measures of $r - g$. First, we assume that all capital markets are open and all of the countries in the sample have the same (possibly time-varying) interest rate. Under this assumption, cross-country variation in $r - g$ will arise only because of variation in the growth rate, g . The first three columns in panel A of this table then simply exploit variation in g using annual data (that is, we set $r - g = -g$ by normalizing $r = 0$). Throughout, the standard errors are corrected for arbitrary heteroskedasticity and serial correlation at the country level; and because the number of countries is small (varying between 18 and 28), they are computed using the pairs-cluster bootstrap procedure proposed by Cameron, Gelbach, and Miller (2008), which has better finite-sample properties than the commonly used clustered standard errors. (The same results with “traditional” standard errors that assume no heteroskedasticity and residual serial correlation are reported in Appendix Table A1 and show very similar patterns.) In column 1, we look at the relationship between annual top 1 percent share and annual growth in a specification that includes a full set of year dummies and country dummies—so that the pure time-series variation at the world level is purged by year dummies and none of the results rely on cross-country comparisons. Piketty’s theory predicts a positive and significant coefficient on this measure of $r - g$: that is, in countries with higher g , the incomes of the bottom 99 percent will grow more, limiting the top 1 percent share.⁵ Instead, we find a negative estimate that is statistically insignificant.

In column 2, we include five annual lags of top 1 percent share on the right-hand side to model the significant amount of persistence in measures of inequality. Though specifications that include the lagged dependent variable on the right-hand side are potentially subject to the Nickell (1981) bias, given the length of the panel here this is unlikely to be an issue (since this bias disappears as the time dimension becomes large). The test at the bottom of the table shows that lagged top 1 percent share is indeed highly significant. In this case, the impact of $r - g$ is negative and significant at 10 percent—the opposite of the prediction of *Capital in the Twenty-First Century*. Column 3 includes five annual lags of GDP as well as five lags of top 1 percent share simultaneously. There is once more no evidence of a positive impact of $r - g$ on top inequality. On the contrary, the relationship is again negative, as shown by the first lag and also by the long-run cumulative effect reported at the bottom.

What matters for inequality may not be annual or five-year variations exploited in panel A, but longer-term swings in $r - g$. Panel B investigates this possibility by looking at 10-year (columns 1, 2, 4, 5, 7, 8) and 20-year data (columns 3, 6, 9).⁶

⁵ With returns to capital determined in the global economy, that is, $r_{it} = r_t$ (where i refers to country and t the time period), variation in r_t is fully absorbed by the time effects in these regression models, making the $r = 0$ normalization without any loss of generality. Note, however, that what determines the dynamics of inequality in a country according to Piketty’s general law is that country’s growth rate, supporting the methodology here, which exploits country-specific variation in growth rates (conditional on country and time fixed effects).

⁶ To avoid the mechanical serial correlation that would arise from averaging the dependent variable, we take the top 1 percent share observations every 10 or 20 years. If an observation is missing at those dates and there exists an observation within plus or minus two years, we use these neighboring observations. The results are very similar with averaging.

Table 1

Regression Coefficients of Different Proxies of $r - g$
(dependent variable is the top 1 percent share of national income)

	No cross-country variation in r			OECD data on interest rates			$r = \text{MPK} - \delta$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Panel A: Estimates using annual panel</i>									
Estimate of $r - g$ at t	-0.006 (0.012)	-0.018* (0.010)	-0.018* (0.011)	-0.066** (0.027)	-0.038** (0.017)	-0.040* (0.021)	0.029 (0.033)	-0.004 (0.009)	-0.011 (0.008)
Estimate of $r - g$ at $t - 1$			0.001 (0.009)			-0.003 (0.015)			0.005 (0.014)
Estimate of $r - g$ at $t - 2$			0.005 (0.008)			0.010 (0.019)			-0.012 (0.008)
Estimate of $r - g$ at $t - 3$			-0.002 (0.008)			-0.012 (0.024)			0.014* (0.008)
Estimate of $r - g$ at $t - 4$			-0.005 (0.007)			-0.005 (0.013)			0.006 (0.010)
Joint significance of lags [p -value]			4.55 [0.47]			7.47 [0.19]			12.40 [0.03]
Long-run effect [p -value estimate > 0]		-0.16 [0.13]	-0.18 [0.15]		-0.39 [0.29]	-0.47 [0.34]		-0.04 [0.68]	0.03 [0.89]
Persistence of top 1 percent share [p -value estimate < 1]		0.89 [0.00]	0.89 [0.00]		0.90 [0.31]	0.89 [0.30]		0.90 [0.11]	0.92 [0.18]
Observations	1,646	1,233	1,226	627	520	470	1,162	905	860
Countries	27	27	27	19	18	18	28	26	26

(continued)

These specifications do not provide any evidence of a positive relationship between this measure of $r - g$ and top 1 percent share either.

In columns 4–6 in panel A, we work with a different measure of $r - g$ based on the realized interest rate constructed from data on nominal yields of long-term government bonds and inflation rates from the OECD. The relationship is again negative and now statistically significant at 5 percent in columns 4 and 5, and at 10 percent in column 6. In panel B, when we use 10- and 20-year panels, the relationship continues to be negative but is now statistically insignificant.

One concern with the results in columns 4–6 is that the relevant interest rate for the very rich may not be the one for long-term government bonds. Motivated by this possibility, columns 7–9 utilize the procedure proposed by Caselli and Feyrer (2007) to estimate the economy-wide marginal product of capital minus the depreciation rate using data on aggregate factors of production, and construct $r - g$ using these estimates. Now the relationship is more unstable. In some specifications it becomes positive but is never statistically significant.

Appendix Tables A2 and A3 show that these results are robust to including, additionally, GDP per capita (as another control for the business cycle and its impact on the top 1 percent share), population growth, and country-specific trends, and

Table 1—Continued

	No cross-country variation in r			OECD data on interest rates			$r = \text{MPK} - \delta$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Panel B: Estimates using 10-year (columns 1, 2, 4, 5, 7, 8) and 20-year (columns 3, 6, 9) panels</i>									
Average $r - g$	0.055 (0.110)	-0.036 (0.118)	-0.252 (0.269)	-0.114 (0.138)	-0.121 (0.132)	-0.110 (0.320)	0.069 (0.118)	0.148 (0.100)	0.238 (0.164)
Long-run effect		-0.05			-0.25			0.29	
[p -value estimate > 0]		[0.76]			[0.44]			[0.22]	
Persistence of top 1 percent share		0.32			0.52			0.48	
[p -value estimate < 1]		[0.00]			[0.02]			[0.00]	
Observations	213	181	106	82	80	43	135	124	61
Countries	27	25	24	18	18	17	27	25	22

Notes: The table presents estimates of different proxies of $r - g$ on the top 1 percent share of national income. The dependent variable is available from 1871 onwards for the countries covered in the World Top Incomes Database. We use different proxies of $r - g$: Columns 1 to 3 use growth rates from Madisson, and assume no variation in real interest rates across countries. These data are available from 1870 onwards. Columns 4 to 6 use real interest rates computed by subtracting realized inflation from nominal yields on long-term government bonds, and growth rates from the Penn World Tables. These data are only available since 1955 for OECD countries. Columns 7 to 9 use $r = \text{MPK} - \delta$, constructed as explained in the text using data from the Penn World Tables, and growth rates from the Penn World Tables. These data are available for 1950 onwards. Panel A uses an unbalanced yearly panel. Columns 2, 5, and 8 add five lags of the dependent variable and report the estimated persistence of the top 1 percent share of national income and the estimated long run effect of $r - g$ on the dependent variable. Columns 3, 6, and 9 add four lags of $r - g$ on the right-hand side, and also report the long-run effect of a permanent increase of 1 percent in $r - g$ and a test for the joint significance of these lags (with its corresponding χ^2 statistic and p -value). Panel B uses an unbalanced panel with observations every 10 years or 20 years (columns 3, 6, 9). Columns 1, 2, 4, 5, 7, and 8 present estimates from a regression of the top 1 percent share of national income at the end of each decade in the sample (that is, 1880, 1890, . . . , 2010, depending on data availability) on the average $r - g$ during the decade. Columns 2, 5, and 8 add one lag of the dependent variable on the right-hand side. Finally, columns 3, 6, and 9 present estimates from a regression of the top 1 percent share of national income at the end of each 20-year period in the sample (that is, 1890, 1910, . . . , 2010, depending on data availability) on the average $r - g$ during the period. All specifications include a full set of country and year fixed effects. Standard errors allowing for arbitrary heteroskedasticity and serial correlation of residuals at the country level are computed using the pairs-cluster bootstrap procedure proposed by Cameron, Gelbach, and Miller (2008) and are reported in parentheses.

*, **, and *** indicate 10, 5, and 1 percent levels of significance, respectively.

to the use of the top 5 percent measure of inequality as the dependent variable. Appendix Table A4 verifies that the results are similar if we limit the analysis to a common sample consisting of OECD countries since 1950, and Appendix Table A5 shows that focusing on the capital share of national income, rather than the top 1 percent share, leads to a similar set of results, providing no consistent evidence of an impact from $r - g$ to inequality.⁷

⁷ This table uses two alternative measures of the capital share of national income from the Penn World Tables and from the OECD. We do not present regressions using the marginal product of capital from Caselli and Feyrer (2007) as this measure is computed using the capital share of national income, making it mechanically correlated with the dependent variable in this table.

Although this evidence is tentative and obviously we are not pretending to estimate any sort of causal relationship between $r - g$ and the top 1 percent share, it is quite striking that such basic conditional correlations provide no support for the central emphasis of *Capital in the Twenty-first Century*.⁸ This is not to say that a higher r is not a force towards greater inequality in society—it probably is. It is just that there are many other forces promoting inequality and our regressions suggest that, at least in a correlational sense, these are quantitatively more important than $r - g$.

A Tale of Two Inequalities: Sweden and South Africa

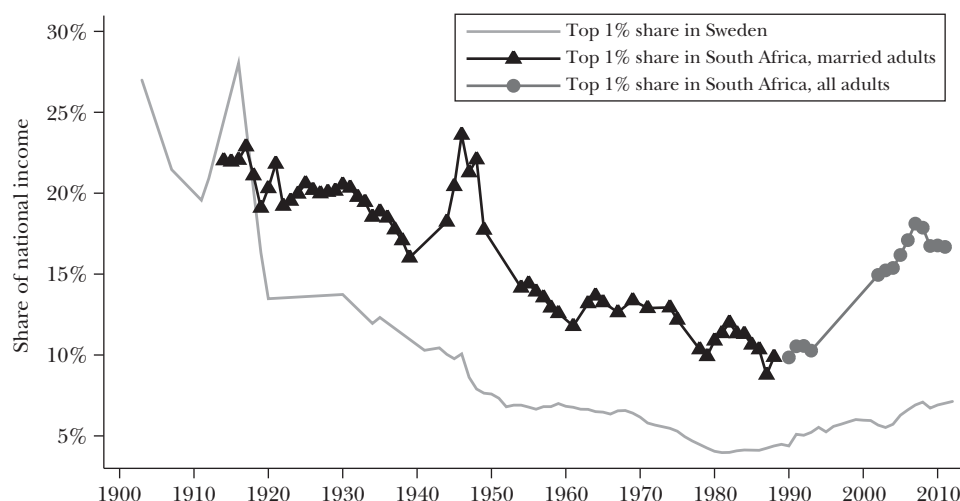
We now use the histories of inequality during the 20th century in Sweden and South Africa to illustrate how the dynamics of inequality appear linked to the institutional paths of these societies—rather than to the forces of $r > g$. In addition, these cases illustrate that the share of national income going to the top 0.1 percent or top 1 percent can give a distorted view of what is actually happening to inequality more broadly. Indeed, this focus on inequality at the top inevitably leads to a lesser and insufficient focus on what is taking place in the middle or the bottom of the income distribution.

Figure 1 shows the evolution of the share of the top 1 percent in national income in Sweden and South Africa since the early 20th century. There are of course some differences. Sweden started out with a higher top 1 percent share than South Africa, but its top 1 percent share fell faster, especially following World War I. The recent increase in the top 1 percent also starts earlier in Sweden and is less pronounced than what we see in South Africa in the 1990s and 2000s. But in broad terms, the top 1 percent share behaves similarly in the two countries, starting high, then falling almost monotonically until the 1980s, and then turning up. Such common dynamics for the top 1 percent share in two such different countries—a former colony with a history of coerced labor and land expropriation, ruled for much of the 20th century by a racist white minority, on the one hand, and the birthplace of European social democracy, on the other—would seem to bolster Piketty’s case that the general laws of capitalism explain the big swings of inequality, with little reference to institutions and politics. Perhaps one could even claim, as in Piketty’s example of the French Revolution, that the effects of apartheid and social democracy are trifling details against the fundamental force of $r > g$.

Except that the reality is rather different. In South Africa, for example, the institutionalization of white dominance after 1910 quickly led to the Native Land Act in 1913 which allocated 93 percent of the land to the “white economy” while

⁸ One important caveat is that the ex post negative returns that may have resulted from stock market crashes and wars are not in our sample, because our estimates for r are from the post–World War II sample. Nevertheless, if $r - g$ is indeed a fundamental force towards greater inequality, we should see its impact during the last 60 years also.

Figure 1

Top 1 Percent Shares of National Income in Sweden and South Africa

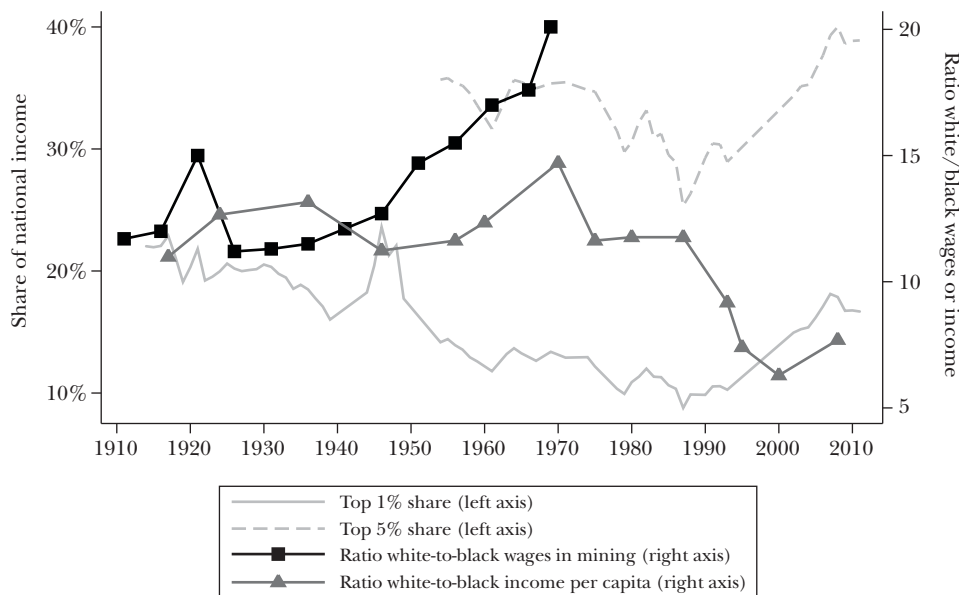
Sources: The data series for South Africa is from Alvaredo and Atkinson (2010). The data series for Sweden is from Roine and Waldenström (2009).

Note: The figure plots the top 1 percent share of national income for South Africa and Sweden.

the blacks (around 59 percent of the population) got 7 percent of the land. In the white economy, it became illegal for blacks to own property or a business, and many types of contractual relations for blacks were explicitly banned. By the 1920s, the “color bar” blocked blacks from practically all skilled and professional occupations (van der Horst 1942; Feinstein 2005, chap. 2–4). After 1948, the apartheid state became even stronger, implementing a wide array of measures to enforce social and educational segregation between whites and blacks. Finally, in 1994, the apartheid institutions collapsed as Nelson Mandela became South Africa’s first black president. However, a naïve look at Figure 1 would seem to suggest that South Africa’s apartheid regime, which was explicitly structured to keep black wages low and to benefit whites, was responsible for a great decrease in inequality, while the end of apartheid caused an explosion in inequality!

How can this be? The answer is that measuring inequality by the top 1 percent share can give a misleading picture of inequality dynamics in some settings. Figure 2 shows the top 1 percent share together with other measures of inequality in South Africa, which behave quite differently. Inequality between whites and blacks was massively widening during the 20th century as measured by the ratio of white-to-black wages in gold mining, a key engine of the South African economy at the time (from the wage series of Wilson 1972); this represents a continuation of 19th-century trends (discussed in de Zwart 2011). This pattern is confirmed by the white-to-black per capita income ratio from census data, which has some ups

Figure 2

Top Income Shares and Between-Group Inequality in South Africa

Sources and Notes: The left axis shows the top 1 and 5 percent shares of national income for South Africa on the left axis, obtained from Alvaredo and Atkinson (2010). The right axis shows the ratio between whites' and blacks' wages in mining (obtained from Wilson, 1972), and the ratio between whites' and blacks' income per capita (obtained from Leibbrandt, Woolard, Finn, and Argent 2010).

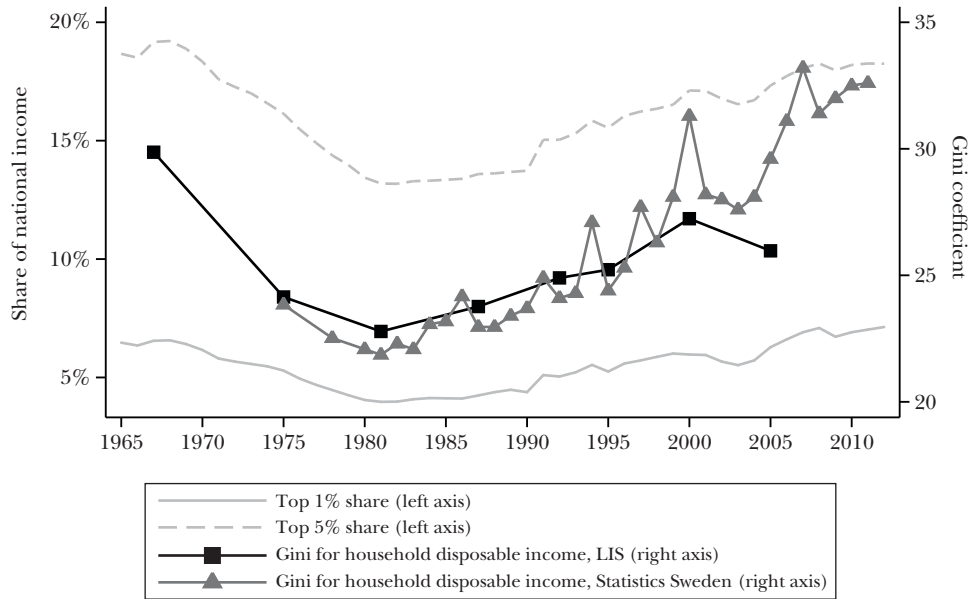
and downs but exhibits a fairly large increase from about 11-fold to 14-fold from 1911 until 1970. Thereafter, it shows a rapid decline. Even the top 5 percent share behaves somewhat differently than the top 1 percent share (though available data for this variable start only in the 1950s).

If one wanted to understand economic inequality in South Africa, changes in labor market institutions and political equilibria appear much more relevant than r and g . Indeed, the alternative measures of inequality in Figure 2 show that during the time the share of the top 1 percent was falling, South Africa became one of the most unequal countries in the world. As we will discuss, the turning points in inequality in South Africa in fact have institutional and political roots.

Figure 3 shows that in Sweden, the decline in the top 1 percent share from 1965 to 1980 is accompanied by a much more pervasive fall in inequality as measured by the Gini coefficient for household disposable income. And over the entire period, the two series for the Gini index have similar trends to the top 1 percent and the top 5 percent shares. However, in the Swedish case as well, the story of inequality seems related not to supposed general laws of capitalism and changes in r and g , but rather to institutional changes (Bengtsson 2014). The initial fall in the top 1 percent share coincided with

Figure 3

Top Income Shares and Overall Inequality in Sweden



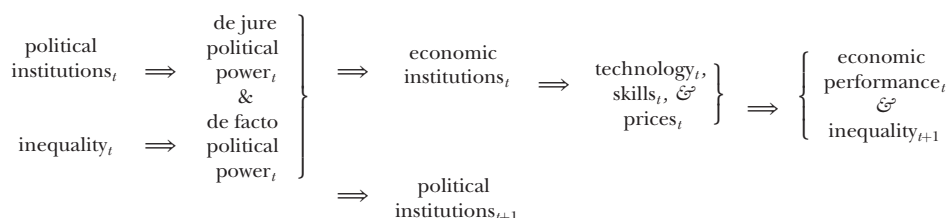
Notes: The figure plots the top 1 and 5 percent shares of national income for Sweden on the left vertical axis, obtained from Roine and Waldenström (2009). The right axis plots the Gini coefficient for household disposable income, from the Luxembourg Income Study (Milanovic 2013), and from Statistics Sweden (SCB).

large changes in government policy: for example, a rapid increase in redistribution in the 1920s from practically nothing in the 1910s (Lindert 1994), and an increase in top marginal tax rates from around 10 percent in 1910 to 40 percent by 1930 and 60 percent by 1940 (Roine, Vlachos, and Waldenström 2009, p. 982). The expanding role of the government and of redistributive taxation plausibly had a negative impact on the top 1 percent share. The data in Figures 1 and 3 are for pre-tax inequality, but these are likely to be affected by taxes, which influence effort and investment (see the evidence in Roine, Vlachos, and Waldenström 2009), and also directly by the wage compression created by Sweden's labor market institutions. Indeed, union density rose rapidly from around 10 percent of the labor force during World War I to 35 percent by 1930 and to over 50 percent by 1940 (Donado and Wälde 2012).

Piketty emphasizes the role of the destruction of the capital stock and asset price falls in the aftermath of the two world wars as key factors explaining the decline of top inequality during much of the 20th century. But such factors can hardly account for the trends in Sweden or South Africa. Sweden was neutral in both wars, and though South Africa provided troops and resources for the Allied powers in both, neither economy experienced any direct destruction of their capital stock.

Towards an Institutional Framework

A satisfactory framework for the analysis of inequality should take into account both the effect of different types of institutions on the distribution of resources and the endogenous evolution of these institutions. We now flesh out such a framework and then apply it to the evolution of inequality—and institutions—in Sweden and South Africa. The framework we present is based on the one we proposed in Acemoglu, Johnson, and Robinson (2005). Adapting Figure 1 from that paper, our framework can be represented schematically as follows:



In this approach, the prevailing political institutions at a certain time determine the distribution of de jure political power (Acemoglu and Robinson 2000, 2008; Acemoglu 2008; Acemoglu, Egorov, and Sonin 2012, forthcoming): for example, which groups are disenfranchised, how political power is contested, how constrained the economic and political elites are, and so on. Political institutions also affect, together with inequality in society, the distribution of de facto political power. For instance, de facto power—which designates political power and constraints generated by access to the means of violence, collective action, informal institutions, and social norms—depends on the extent to which different social and economic groups are organized and how they resolve their collective action problems and how resources influence their ability to do so. De facto and de jure power together determine economic institutions and also the stability and change of political institutions.

In turn, economic institutions affect the supply of skills—a crucial determinant of inequality throughout history and even more so today. Economic institutions also, through regulation of both prices and market structure, by taxation, or by affecting the bargaining power of different factors of production and individuals, influence goods and factor prices. Finally, economic institutions affect technology, including whether and how efficiently existing technologies are utilized, as well as the evolution of technology through endogenous innovations and learning by doing. For example, Zeira (1998) and Acemoglu (2010) show how low wages, resulting from either supply or institutional factors, can sometimes reduce technology adoption or even technological progress, and Hornbeck and Naidu (2014) provide evidence consistent with this pattern. Through their joint impact on technology, the supply of skills, and relative prices, economic institutions affect not only r and g , but more importantly, inequality. In this approach, inequality should not be thought of as always summarized by a single statistic, such as the Gini index or the top 1 percent

share. Rather, the economic and political factors stressed here determine the distribution of resources more generally.

We do not mean to suggest that this framework determines the evolution of institutions, technology, and inequality deterministically. The arrows designate influences, which are mediated by various stochastic events and political economy interactions, and similar economic developments will result in very different institutional responses depending on the prevailing political equilibrium, as evidenced by the contrasting histories of Mexico and the United States in the 20th century (noted earlier). Nor do we imply that the framework captures all economic implications of import—or all of those that are relevant for inequality. Most centrally, technology will evolve over time not only because of institutional factors, but also due to scientific developments and because it responds to other economic changes, including factor prices, the abundance and scarcity of different types of skills and market structure (for example, Acemoglu 2002, 2003, 2010). It is possible as well that technological developments could in turn affect institutional dynamics (for example, Acemoglu, Aghion, and Violante 2001; Hassler, Rodriguez Mora, Storlesletten, and Zilibotti 2003). Nevertheless, this simple framework is useful for highlighting the potentially important role of institutional equilibria, and their changes, in shaping inequality.

Let us now apply it to South Africa. Before 1910, non-whites could vote in the Cape and Natal as long as they fulfilled certain wealth, income, or property restrictions (though this was more heavily restricted in Natal). After 1910, a specifically white franchise was established in the Transvaal and Orange Free State, and then gradually extended to the rest of the country with blacks finally being definitively disenfranchised in the Cape in 1936. The *de jure* institutions of the apartheid state cemented the political power of the white minority, and segregationist laws and other aspects of the regime created economic institutions, such as the skewed distribution of land and the “color bar,” aimed at furthering the interests of the white minority. So then why did this and the flourishing of social apartheid after 1948 lead to a fall in the top 1 percent share?

The primary reason is that political dynamics in South Africa at this time cannot be fully captured as a conflict between monolithic groups of whites and blacks. Rather, apartheid should be viewed as a coalition between white workers, farmers, and mine-owners—at the expense of blacks but also white industrialists who had to pay very high wages for white workers (Lundahl 1982; Lipton 1985). Thus, one reason for a reduction in the top 1 percent share was that profits were squeezed by wages for white labor. Moreover, by depriving industrialists of a larger pool of skilled workers, and tilting the price of white labor higher (because the supply of labor was artificially restricted), these rules further stunted South African economic development.

In addition, there were forces within apartheid for redistribution from the very rich towards poorer whites. Indeed, South Africa’s political discussions in the 1920s that led to the further spread of the “color bar” and subsequently to the victory of the National Party in 1948 were related to what was called the “poor white problem,”

highlighting the importance of the specific coalition underpinning apartheid. Alvaredo and Atkinson (2010) discuss other factors such as the gold price.

The compression of the huge wage gaps between South Africa's whites and blacks starting in the 1970s (see Figure 2) should be viewed within the context of the political weakening of the apartheid regime and its increasing economic problems (Wilson 1980; Mariotti 2012). The domestic turning point was the ability of black workers to organize protests and riots, and exercise their *de facto* power, particularly after the Soweto uprising of 1976, which led to the recognition of black trade unions. This process was aided by mounting international pressure, which induced British and US firms based in South Africa to push back against workplace discrimination. Ultimately, this *de facto* power forced the collapse of the apartheid regime, leading to a new set of political institutions and the enfranchisement of black South Africans. The new set of economic institutions, and their consequences for inequality, flowed from these political changes. Consistent with our framework, the institutions of apartheid may have also fed back into the evolution of technology, for example in impeding the mechanization of gold mining (Spandau 1980). As the power of apartheid started to erode in the 1970s, white businessmen responded rapidly by substituting capital for labor and moving technology in a labor-saving direction (Seekings and Nattrass 2005, p. 403).

As can be seen from Figure 1, the top 1 percent share in South Africa shows a steep rise after 1994, coinciding with the final overthrow of the formidable extractive institutions of apartheid. No clear consensus has yet emerged on the causes of the post-apartheid increase in inequality, but one reason relates to the fact that after the end of apartheid, the artificially compressed income distribution of blacks started widening as some portion of the population started to benefit from new business opportunities, education, and aggressive affirmative action programs (Leibbrandt, Woolard, Finn, and Argent 2010). Whatever the details of these explanations, it is hard to see the post-1994 rise in the top 1 percent share as representing the demise of a previously egalitarian South Africa.

The role of *de facto* and *de jure* political power in shaping political and economic institutions is no less central in Sweden, where the important turning point was created by the process of democratization. Adult male suffrage came in 1909, but true parliamentary democracy developed only after the Reform Act of 1918, with significant curbs on the power of the monarchy and more competitive elections. Both the 1909 reform and the emergence of parliamentary democracy in 1918 were responses to unrest, strikes, and the *de facto* power of disenfranchised workers, especially in the atmosphere of uncertainty and social unrest following World War I (Tilton 1974). Collier (1999, p. 83) explains: "[I]t was only after the economic crisis of 1918 and ensuing worker protests for democracy led by Social Democrats that the Reform Act was passed. Indeed, in November 1918, labor protests reached such a point as to be perceived as a revolutionary threat by Sweden's Conservative Party and upper classes."

Swedish democracy then laid the foundations for modern labor market institutions and the welfare state, and created powerful downward pressure on inequality,

including the top 1 percent share. However, democratic conflict in Sweden was not a simple contest between monolithic groups of workers and businesses either. As Moene and Wallerstein (1995, 2006) characterize it, social democracy was a coalition of the ends of the income distribution—businessmen and unskilled workers—against the middle class and skilled workers (for theories about the emergence of such political coalitions, see also Saint-Paul 2000; Gourevitch 1986; Luebbert 1991). In consequence, Swedish economic institutions strongly compressed skilled wages relative to unskilled wages, underpinning the rapid decline in broad-based measures of inequality. Some businesses benefitted from these arrangements, particularly those in sectors exposed to international competition, which used centralized wage bargaining as a tool to stop wage push from nontraded sectors, such as construction (Swenson 1991, 2002). Swedish labor market institutions also likely affected the path of technology. For instance, Moene and Wallerstein (1997) emphasize that wage compression acted as a tax on inefficient plants and stimulated new entry and rapid technological upgrading. In the face of high unskilled wages and the institutions of the welfare state, it is not a surprise that the top 1 percent share declined in Sweden as well, even if businessmen also did well with some aspects of Swedish labor market institutions.

What explains the fact that the top 1 percent share appears to increase not just in South Africa and Sweden, but in almost all OECD economies over the last 20 years or so? Factors left out of our framework—globalization, skill-biased technological changes, and the increase in the size of large corporations—are likely to be important. But these forces are themselves not autonomous but have likely responded to other changes in the world economy. For example, Acemoglu (2002) argues that skill-biased technological change cannot be understood without the increase in the supply of skilled workers in the United States and the world economy, making these types of technologies more profitable; and globalization and the increasing size of global corporations are themselves consequences of regulatory and technological changes of the last several decades. This simply underscores that the framework presented here cannot capture the dynamics of all dimensions of inequality—or the rich dynamics of political and economic institutions for that matter. Nevertheless, the basic forces that it stresses appear to be important not just in the context of Sweden and South Africa, but much more generally (as we argue in Acemoglu and Robinson 2006, 2012).

This framework also helps to clarify the reasons why we might care about inequality at the very top of the income and wealth distributions. Most relevant is that the factors undergirding a high share of income for the top 1 percent might also represent a lack of equality of opportunity or a lack of a level playing field. Extending the framework presented above, we argued in Acemoglu and Robinson (2012) that lack of a level playing field, including limited social mobility, is likely to hold back countries in their investments, innovation, and the efficiency of resource allocation. However, the top 1 percent share may not be the most relevant dimension of the distribution of income for evaluating equality of opportunity and barriers to the efficient allocation of talent and resources in society. For example, if a small

number at the top became wealthier—say, if Bill Gates and Warren Buffett became twice as wealthy—at the expense of other rich individuals, would that make US society notably less meritocratic? This seems unlikely. Indeed, Chetty, Hendren, Kline, and Saez (2014) and Chetty, Hendren, Kline, Saez, and Turner (2014) show that social mobility at the commuting zone level in the United States is unrelated to income inequality, especially inequality at the top. Their evidence that US social mobility has stayed the same even as the top 1 percent share has increased rapidly over the last several decades further corroborates this intuition. Other types of inequalities, such as the gap between whites and blacks as in South Africa or between the bottom and the middle class in the United States, may be more relevant for thinking about whether there have been changes in social mobility and the angle of the playing field.

But one dimension of political economy where the top 1 percent share may be central is the health of political institutions. It may be difficult to maintain political institutions that create a dispersed distribution of political power and political access for a wide cross-section of people in a society in which a small number of families and individuals have become disproportionately rich. A cautionary tale about the dangers created by this type of inequality is discussed in Puga and Trefler (2014) and Acemoglu and Robinson (2012): the story of late medieval Venice. Here, the economic power of the most prosperous and well-established families ultimately made it possible for them to block the access of others to political power, and once they thus monopolized political power, they could change economic institutions for their benefit by blocking the entry of other families into lucrative businesses and banning contracts that had previously made it possible for individuals with limited capital to enter into partnerships for long-distance trade. This change in political institutions, feeding into a deterioration of economic institutions, heralded the economic decline of Venice.

Yet if the primary threat from the top 1 percent share is political, then the main response should be related to monitoring and containing the political implications of the increase in top-level inequality—not necessarily catch-all policies such as the wealth taxes advocated by Piketty. Such policies should be explicitly related to the institutional fault lines of the specific society and should be conceived in the context of strengthening institutional checks against any potential power grab.

Conclusion

Thomas Piketty's (2014) ambitious work proffers a bold, sweeping theory of inequality applicable to all capitalist economies. Though we believe that the focus on inequality and the ensuing debates on policy are healthy and constructive, we have argued that Piketty goes wrong for exactly the same reasons that Karl Marx, and before him David Ricardo, went astray. These quests for general laws ignore both institutions and politics, and the flexible and multifaceted nature of technology, which make the responses to the same stimuli conditional on historical, political, institutional, and contingent aspects of the society and the epoch, vitiating

the foundations of theories seeking fundamental, general laws. We have argued, in contradiction to this perspective, that any plausible theory of the nature and evolution of inequality has to include political and economic institutions at the center stage, recognize the endogenous evolution of technology in response to both institutional and other economic and demographic factors, and also attempt to model how the response of an economy to shocks and opportunities will depend on its existing political and institutional equilibrium.

■ We thank David Autor, Amy Finkelstein, Johan Fourie, Bengt Holmstrom, Chang Tai Hsieh, Chad Jones, Matthew Kustenda, Naomi Lamoreaux, Ulrike Malmendier, Kalle Moene, Joel Mokyr, Suresh Naidu, Jim Poterba, Matthew Rognlie, Ragnar Torvik, Laurence Wilse-Samson, Francis Wilson, and Timothy Taylor for their comments and Pascual Restrepo for extensive discussions, comments, and superb research assistance.

References

- Acemoglu, Daron. 2002. "Directed Technical Change." *Review of Economic Studies* 69(4): 781–809.
- Acemoglu, Daron. 2003. "Labor- and Capital-Augmenting Technical Change." *Journal of the European Economic Association* 1(1): 1–37.
- Acemoglu, Daron. 2008. "Oligarchic versus Democratic Societies." *Journal of the European Economic Association* 6(1): 1–44.
- Acemoglu, Daron. 2010. "When Does Labor Scarcity Encourage Innovation?" *Journal of Political Economy* 118(6): 1037–78.
- Acemoglu, Daron, Philippe Aghion, and Giovanni L. Violante. 2001. "Deunionization, Technical Change and Inequality." *Carnegie-Rochester Conference Series on Public Policy* 55(1): 229–64.
- Acemoglu, Daron, and David Autor. 2011. "Skills, Tasks and Technologies: Implications for Employment and Earnings." In *Handbook of Labor Economics Volume 4B*, edited by Orley Ashenfelter and David Card, 1043–171. Elsevier, North-Holland.
- Acemoglu, Daron, Davide Cantoni, Simon Johnson, and James A. Robinson. 2011. "The Consequences of Radical Reform: The French Revolution." *American Economic Review* 101(7): 3286–3307.
- Acemoglu, Daron, Georgy Egorov, and Konstantin Sonin. 2012. "Dynamics and Stability of Constitutions, Coalitions, and Clubs." *American Economic Review* 102(4): 1446–76.
- Acemoglu, Daron, Georgy Egorov, and Konstantin Sonin. Forthcoming. "Political Economy in a Changing World." *Journal of Political Economy*.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2005. "Institutions as a Fundamental Cause of Long-Run Growth." In *Handbook of Economic Growth Volume 1A*, edited by Philippe Aghion and Steven N. Durlauf, 385–472. Elsevier, North-Holland.
- Acemoglu, Daron, and James A. Robinson. 2000. "Why Did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective." *Quarterly Journal of Economics* 115(4): 1167–99.
- Acemoglu, Daron, and James A. Robinson. 2006. *Economic Origins of Dictatorship and Democracy*. New York: Cambridge University Press.
- Acemoglu, Daron, and James A. Robinson. 2008. "Persistence of Power, Elites, and Institutions." *American Economic Review* 98(1): 267–93.
- Acemoglu, Daron, and James A. Robinson.

2012. *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. New York: Crown.
- Aiyagari, S. Rao.** 1994. "Uninsured Idiosyncratic Risk and Aggregate Saving." *Quarterly Journal of Economics* 109(3): 659–84.
- Allen, Robert C.** 2001. "The Great Divergence in European Wages and Prices from the Middle Ages to the First World War." *Explorations in Economic History* 38(4): 411–47.
- Allen, Robert C.** 2007. "Pessimism Preserved: Real Wages in the British Industrial Revolution." Oxford University Department of Economics Working Paper 314. <http://www.nuffield.ox.ac.uk/users/Allen/unpublished/pessimism-6.pdf>.
- Allen, Robert C.** 2009a. "Engels' Pause: Technological Change, Capital Accumulation, and Inequality in the British Industrial Revolution." *Explorations in Economic History* 46(4): 418–35.
- Allen, Robert C.** 2009b. *The British Industrial Revolution in Global Perspective*. New York: Cambridge University Press.
- Alvaredo, Facundo, and Anthony B. Atkinson.** 2010. Colonial Rule, Apartheid and Natural Resources: Top Incomes in South Africa, 1903–2007. Centre for Economic Policy Research Discussion Paper 8155. http://www.parisschoolofeconomics.eu/IMG/pdf/DP8155_SouthAfrica.pdf.
- Alvaredo, Facundo, Tony Atkinson, Thomas Piketty, and Emmanuel Saez, compilers.** World Top Incomes Database, <http://topincomes.parisschoolofeconomics.eu/>.
- Antràs, Pol.** 2004. "Is the U.S. Aggregate Production Function Cobb–Douglas? New Estimates of the Elasticity of Substitution." *Contributions to Macroeconomics* 4(1): Article 4.
- Bengtsson, Erik.** 2014. "Labour's Share in Twentieth Century Sweden: A Reinterpretation." *Scandinavian Economic History Review* 62 (3): 290–314.
- Bewley, Truman F.** 1986. "Stationary Monetary Equilibrium with a Continuum of Independently Fluctuating Consumers." In *Contributions to Mathematical Economics in Honor of Gérard Debreu*, edited by Werner Hildenbrand and Andreu Mas-Colell, 79–102. Elsevier North-Holland.
- Blaug, Mark.** 1996. *Economic Theory in Retrospect*, 5th Edition. Cambridge University Press.
- Bloch, Marc.** 1967. *Land and Work in Medieval Europe: Selected Papers*. Translated by J. E. Anderson. New York: Harper Torchbooks.
- Bonnet, Odran, Pierre-Henri Bono, Guillaume Chapelle, and Étienne Wasmer.** 2014. "Does Housing Capital Contribute to Inequality? A Comment on Thomas Piketty's Capital in the 21st Century." SciencesPo Discussion Paper 2014-07.
- Cameron, A. Colin, Jonah B. Gelbach, and Douglas L. Miller.** 2008. Bootstrap-Based Improvements for Inference with Clustered Errors." *Review of Economics and Statistics* 90(3): 414–27.
- Caselli, Francesco, and James Feyrer.** 2007. "The Marginal Product of Capital." *Quarterly Journal of Economics* 122(2): 535–68.
- Chetty, Raj, Nathaniel Hendren, Patrick Kline, and Emmanuel Saez.** 2014. "Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States." *Quarterly Journal of Economics* 129(4): 1553–623.
- Chetty, Raj, Nathaniel Hendren, Patrick Kline, Emmanuel Saez, and Nicholas Turner.** 2014. "Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility." *American Economic Review* 104(5): 141–47.
- Chirinko, Robert S.** 1993. "Business Fixed Investment Spending: Modeling Strategies, Empirical Results, and Policy Implications." *Journal of Economic Literature* 31(4): 1875–1911.
- Chirinko, Robert S.** 2008. "σ: The Long and Short of It." *Journal of Macroeconomics* 30(2): 671–86.
- Chirinko, Robert S., Steven M. Fazzari, and Andrew P. Meyer.** 1999. "How Responsive Is Business Capital Formation to Its User Cost? An Exploration with Micro Data." *Journal of Public Economics* 74(1): 53–80.
- Chirinko, Robert S., and Debdulal Mallick.** 2014. "The Substitution Elasticity, Factor Shares, Long-Run Growth, and the Low-Frequency Panel Model." https://ideas.repec.org/p/ces/ceswps/_4895.html.
- Clark, Gregory.** 2002. "Land Rental Values and Agrarian History: England and Wales, 1500–1912." *European Review of Economic History* 6(3): 281–308.
- Clark, Gregory.** 2005. "The Condition of the Working Class in England, 1209–2004." *Journal of Political Economy* 113(6): 1307–40.
- Clark, Gregory.** 2010. "The Macroeconomic Aggregates for England, 1209–2008." In *Research in Economic History Volume 27*, edited by Alexander J. Field, 51–140. Emerald Publishing Group.
- Collier, Ruth B.** 1999. *Paths toward Democracy: Working Class and Elites in Western Europe and South America*. New York: Cambridge University Press.
- Collins, Norman R. and Lee E. Preston.** 1961. "The Size Structure of the Largest Industrial Firms, 1909–1958." *American Economic Review* 51(5): 986–1011.
- Crafts, N. F. R.** 1985. *British Economic Growth during the Industrial Revolution*. Oxford: Clarendon Press.
- de Zwart, Pim.** 2011. "South African Living Standards in Global Perspective, 1835–1910." *Economic History of Developing Regions* 26(1): 49–74.

- Diamond, Peter A.** 1965. "National Debt in a Neoclassical Growth Model." *American Economic Review* 55(5): 1126–50.
- Donado, Alejandro, and Klaus Wälde.** 2012. "How Trade Unions Increase Welfare." *Economic Journal* 122(563): 990–1009.
- Edwards, Richard C.** 1975. "Stages in Corporate Stability and the Risks of Corporate Failure." *Journal of Economic History* 35(2): 428–57.
- Feinstein, Charles H.** 1998. "Pessimism Perpetuated: Real Wages and the Standard of Living in Britain During and After the Industrial Revolution." *Journal of Economic History* 58(3): 625–58.
- Feinstein, Charles H.** 2005. *An Economic History of South Africa: Conquest, Discrimination and Development*. New York: Cambridge University Press.
- Foley, Duncan K.** 2008. *Adam's Fallacy: A Guide to Economic Theology*. Cambridge: Belknap Press.
- Geerolf, François.** 2013. "Reassessing Dynamic Efficiency." https://dl.dropboxusercontent.com/u/7363883/Efficiency_Emp.pdf.
- Gourevitch, Peter.** 1986. *Politics in Hard Times: Comparative Responses to International Economic Crises*. New York: Cornell University Press.
- Hamermesh, David S.** 1993. *Labor Demand*. Princeton: Princeton University Press.
- Hassler, Jon, José V. Rodríguez Mora, Kjetil Storesletten, and Fabrizio Zilibotti.** 2003. "The Survival of the Welfare State." *American Economic Review* 93(1): 87–112.
- Hornbeck, Richard, and Suresh Naidu.** 2014. "When the Levee Breaks: Black Migration and Economic Development in the American South." *American Economic Review* 104(3): 963–90.
- Karabarbounis, Loukas, and Brent Nieman.** 2014. "The Global Decline of the Labor Share." *Quarterly Journal of Economics* 129(1): 61–103.
- Katz, Lawrence F., and David H. Autor.** 1999. "Changes in the Wage Structure and Earnings Inequality." In *Handbook of Labor Economics Volume 3A*, edited by Orley C. Ashenfelter and David Card, 1463–555. Elsevier, North-Holland.
- Klump, Rainer, Peter McAdam, and Alpo Willman.** 2007. "Factor Substitution and Factor-Augmenting Technical Progress in the United States: A Normalized Supply-Side System Approach." *Review of Economics and Statistics* 89(1): 183–92.
- Krusell, Per, Lee E. Ohanian, José-Víctor Ríos-Rull, and Giovanni L. Violante.** 2000. "Capital-Skill Complementary and Inequality: A Macroeconomic Analysis." *Econometrica* 68(5): 1029–53.
- Krusell, Per, and Anthony A. Smith, Jr.** 2014. "Is Piketty's 'Second Law of Capitalism' Fundamental?" <http://aida.wss.yale.edu/smith/piketty1.pdf>.
- Latimoreaux, Naomi R.** 1985. *The Great Merger Movement in American Business, 1895–1904*. New York: Cambridge University Press.
- Leibbrandt, Murray, Ingrid Woolard, Arden Finn, and Jonathan Argent.** 2010. "Trends in South African Income Distribution and Poverty since the Fall of Apartheid." OECD Social, Employment and Migration Working Papers, No. 101. OECD Publishing.
- Lindert, Peter H.** 1994. "The Rise of Social Spending, 1880–1930." *Explorations in Economic History* 31(1): 1–37.
- Lipton, Merle.** 1985. *Capitalism and Apartheid: South Africa, 1910–84*. London: Gower/Maurice Temple Smith.
- Luebbert, Gregory M.** 1991. *Liberalism, Fascism, or Social Democracy: Social Classes and the Political Origins of Regimes in Interwar Europe*. New York: Oxford University Press.
- Lundahl, Mats.** 1982. "The Rationale of Apartheid." *American Economic Review* 72(5): 1169–79.
- Mairesse, Jacques, Bronwyn H. Hall, and Benoit Mulkey.** 1999. "Firm-Level Investment in France and the United States: An Exploration of What We Have Learned in Twenty Years." *Annales d'Economie et de Statistique* 55–56(December): 27–67.
- Mariotti, Martine.** 2012. "Labour Markets during Apartheid in South Africa." *Economic History Review* 65(3): 1100–22.
- Marx, Karl.** 1847. *The Poverty of Philosophy*.
- Marx, Karl.** 1859. *A Contribution to the Critique of Political Economy*.
- Marx, Karl.** 1867. *Capital: Critique of Political Economy*, vols I, II, and III.
- Mathews, R. C. O., C. H. Feinstein, and J. C. Odling-Smee.** 1982. *British Economic Growth, 1856–1973: The Post-War Period in Historical Perspective*. Stanford University Press.
- McLellan, David, ed.** 2000. *Karl Marx: Selected Writings*. 2nd Edition. New York: Oxford University Press.
- Milanovic, Branko.** 2013. All the Ginies Dataset. The World Bank.
- Moene, Karl Ove, and Michael Wallerstein.** 1995. "How Social Democracy Worked: Labor-Market Institutions." *Politics and Society* 23(2): 185–211.
- Moene, Karl Ove, and Michael Wallerstein.** 1997. "Pay Inequality." *Journal of Labor Economics* 15(3): 403–30.
- Moene, Karl Ove, and Michael Wallerstein.** 2006. "Social Democracy as a Development Strategy." Chap. 6 in *Globalization and Egalitarian Redistribution*, edited by Pranab Bardhan, Samuel Bowles, and Michael Wallerstein. Princeton University Press/Russell Sage Foundation.
- Mokyr, Joel.** 2012. *The Enlightened Economy: An Economic History of Britain 1700–1850*. New Haven: Yale University Press.
- Morrisson, Christian, and Wayne Snyder.** 2000. "The Income Inequality of France in Historical

Perspective." *European Review of Economic History* 4(1): 59–83.

Naidu, Suresh, and Noam Yuchtman. 2013. "Coercive Contract Enforcement: Law and the Labor Market in Nineteenth Century Industrial Britain." *American Economic Review* 103(1): 107–44.

Nickell, Stephen. 1981. "Biases in Dynamic Models with Fixed Effects." *Econometrica* 49(6): 1417–26.

Oberfield, Ezra, and Devesh Raval. 2014. "Micro Data and Macro Technology." Unpublished paper, Princeton University. <http://economics.mit.edu/files/9861>.

Piketty, Thomas. 2014. *Capital in the Twenty-First Century*. Harvard University Press.

Piketty, Thomas, and Emmanuel Saez. 2003. "Income inequality in the United States, 1913–1998." *Quarterly Journal of Economics* 118(1): 1–39.

Puga, Diego, and Daniel Trefler. 2014. "International Trade and Institutional Change: Medieval Venice's Response to Globalization." *Quarterly Journal of Economics* 129(2): 753–821.

Ray, Debraj. 2014. "Nit-Piketty: A Comment on Thomas Piketty's *Capital in the Twenty First Century*." <http://www.econ.nyu.edu/user/debraj/>.

Ricardo, David. 1817. *On the Principles of Political Economy and Taxation*, 1st edition.

Rognlie, Matthew. 2014. "A Note on Piketty and Diminishing Returns to Capital." http://www.mit.edu/~mrognlie/piketty_diminishing_returns.pdf.

Roine, Jesper, Jonas Vlachos, and Daniel Waldenström. 2009. "The Long-Run Determinants of Inequality: What Can We Learn from Top Income Data?" *Journal of Public Economics* 93(7–8): 974–88.

Roine, Jesper, and Daniel Waldenström. 2009. "Wealth Concentration over the Path of Development: Sweden, 1873–2006." *Scandinavian Journal of Economics* 111(1): 151–187.

Saint-Paul, Gilles. 2000. *The Political Economy of Labour Market Institutions*. New York: Oxford University Press.

Samuelson, Paul A. 1958. "An Exact Consumption-Loan Model of Interest With or Without the Social Contrivance of Money." *Journal of Political Economy* 66(6): 467–82.

Sanders, Elizabeth. 1999. *Roots of Reform: Farmers,*

Workers, and the American State, 1877–1917. Chicago: University of Chicago Press.

Schonhardt-Bailey, Cheryl. 2006. *From the Corn Laws to Free Trade: Interests, Ideas, and Institutions in Historical Perspective*. Cambridge: MIT Press.

Seekings, Jeremy, and Nicoli Nattrass. 2005. *Class, Race, and Inequality in South Africa*. New Haven: Yale University Press.

Singer, Peter. 2000. *Marx: A Very Short Introduction*. New York: Oxford University Press.

Spandau, A. 1980. "Mechanization and Labour Policies on South African Mines." *South African Journal of Economics* 48(2): 110–20.

Swenson, Peter. 1991. "Bringing Capital Back In, or Social Democracy Reconsidered: Employer Power, Cross-Class Alliances, and Centralization of Industrial Relations in Denmark and Sweden." *World Politics* 43(4): 513–44.

Swenson, Peter A. 2002. *Capitalists against Markets: The Making of Labor Markets and Welfare States in the United States and Sweden*. New York: Oxford University Press.

Tilton, Timothy A. 1974. "The Social Origins of Liberal Democracy: The Swedish Case." *American Political Science Review* 68(2): 561–71.

Turner, M. E., J. V. Beckett, and B. Afton. 1999. *Agricultural Rent in England, 1690–1914*. New York: Cambridge University Press.

van der Horst, Shelia T. 1942. *Native Labour in South Africa*. London: Frank Cass and Co., Ltd.

White, Lawrence J. 1981. "What Has Been Happening to Aggregate Concentration in the United States?" *Journal of Industrial Economics* 29(3): 223–30.

White, Lawrence J. 2002. "Trends in Aggregate Concentration in the United States." *Journal of Economic Perspectives* 16(4): 137–60.

Wilson, Francis. 1972. *Labour in the South African Gold Mines, 1911–1969*. New York: Cambridge University Press.

Wilson, Francis. 1980. "Current Labor Issues in South Africa." Chap. 4 in *The Apartheid Regime: Political Power and Racial Domination*, edited by Robert M. Price and Carl G. Rosberg. University of California Press.

Zeira, Joseph. 1998. "Workers, Machines, and Economic Growth." *Quarterly Journal of Economics* 113(4): 1091–117.