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Can we reform capitalism for its own good? A roadmap to sustainability

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Abstract:

An intensifying combination of instability, inequality, and environmental degradation obliges us to consider how best to reform capitalism. The question of the system's reformability has deep historic roots in capitalism's long-wave dynamic where periods of crises have recurrently set in motion ambitious reform programs such as the New Deal in the 1930s or the Reagan/Thatcher Revolution in the 1980s. But there is nothing mechanical about this process. The same crisis dynamic also triggers destabilizing polarization in the body politic which hinders consensus for broad reform. And any such reform program must also address the transformational requirements of the moment. France's Régulation Theory (RT) can be quite helpful in this regard with its unique institutionalist approach to capitalism's historic evolution and its typology of crises. Using RT we identify the basic outlines of a progressive reform program rooted in sustainable development and global public goods.

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Modern-day capitalism is driven by innovation, competition, and the profit motive. That combination fuels continuous search for gain among its individual actors. But their success depends on social validation by others, since in this system no income gets earned without someone else's willful decision to spend. Everybody is subjected to the monetary constraint of having to sell before being able to buy, and this interdependence motivates much effort and utility.[1] Capitalism, with its relentless dynamic of striving for more and better, thus creates a lot of jobs as well as vast wealth. Rooting its modus operandi in respect for private property and enforceability of contracts, it is also likely to thrive with more individual rights and deeper democracy. The system needs widespread confidence in its benefits and virtues to work well.

Such confidence is not always assured. Capitalism also carries the flaws reflective of mankind. Homo sapiens is driven by greed and fear, often zig-zagging from one to the other in short order. Being highly mimetic social animals, we humans polarize our attitudes and behavior in groups by collective imitation. That makes for innate instability! Once sufficiently

[1] Adam Smith (1759), a utilitarian with great powers of conviction in his pen, made a compelling case that the pursuit of self-interest for gain (of money, of power, etc.) can, if properly constrained and channeled by competition and dependence on others for social validation, produce also outstanding social benefits shared with others.

polarized into manic euphoria, greed-driven group behavior drives bubbles which, when becoming unsustainable, burst in a bout of panic, whereupon fear takes over! Capitalism is thus profoundly cyclical, and its cycles shape its history.

Moreover, our profit-oriented system also nourishes profound inequality between groups. At the heart of this is an inherently uneven distribution of opportunity and chance, buttressed by a power structure doing its best to make it so. Those in power use their muscle in support of rent-seeking behavior that yields them extra profit.[2] Instability and inequality make for a volatile mixture, rocking capitalist societies in regular outbursts of crisis and conflict. In their wake, adversarial relations among competing power centers can get to a point of opting for war.

Yet another flaw of the capitalist system, reflecting our continuous search for mastering nature, is its operation of environmental degradation. We think of nature as a fortuitous collection of resources we can extract for satisfaction of our needs (food, energy, etc.) as well as a heap for our waste. We have thus ended up running a huge, steadily growing consumption and production machine that draws low-entropy resources out of the environment and injects high-entropy waste back into it.[3] That self-perpetuating increase in entropy, now so eerily crystallized in the unrelenting rise of greenhouse gas emissions that are pushing our planet into a hothouse, will sooner or later upend our planet's ecological balance. We have already reached the edge of this prospect. There is not much time left to avoid long-lasting disaster!

We thus face a dilemma. Capitalism may be worth saving, and yet it is also destroying us in its current configuration of fossil fuels as primary energy source and profit-led growth. Assuring our rights and freedoms, thriving on our ingenuity, and facilitating democratic representation, capitalism is arguably better in meeting our basic needs than any other economic system to date, certainly better than slavery, feudalism, or Soviet-style communism. Yet, at the same time, after 40 years of pretty much being allowed to run its course full-steam ahead, capitalism has bred inequality to a point of high tension and also subjected us recently to lots of instability – from the Great Recession of 2008-09 to the Global Pandemic of 2020-22. Climate change is already rearing its ugly head, giving us a terrifying preview of being overpowered by fire and water. Deteriorating relationships pitting human against human, raising the prospect of war in the streets, as well as between human and nature, raising the prospect of hell on earth, now pose existential threats to the very survival of our species.

Whether that threat of annihilation arises from weapons of mass destruction, famine, deadly pandemics, or climate-induced destruction of our habitat does not really matter when you face the prospect of death. What matters is how to avoid any of that. We need to change the path we are on. The question is how. How can we reform capitalism for its own good? Is that even possible? Capitalism's evolutionary dynamic shows enough of a historical pattern to allow us useful reflection as to what can be done when the system requires reform for reorganization.

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[2] See Tollison (1982) for an explanation of rent-seeking behavior in search of extra profit beyond the norm; for example, through the exercise of monopoly power or reaping first-comer advantages in the wake of an innovation.

[3] Precisely this devastating logic of the capitalist production process, seeking to maximize resource extraction and waste injection at the same time, prompted Nicholas Georgescu-Roegen (1971), the founder of ecological economics, to evoke the second law of thermodynamics of steadily rising entropy, and thus disorder, as the central core of our system.

1. Revolution or reform?

The question of capitalism's reformability arose early, and with a bang. Three successful violent uprisings against the established political order in succession – America's independence (1776), the storming of the Bastille (1789), and Haiti's slave rebellion (1804) – had opened the prospect of revolutionary change. Fast forward a few decades of accelerating industrialization and chaotic urbanization to find yourself, during 1848, in a wave of revolutionary unrest spreading across the entire continent of Europe like wildfire. While much of the protest aimed to topple suffocatingly obsolete structures of absolute monarchy, in the process bringing industrial workers and the bourgeoisie together in a potent coalition, the workers themselves were pushing for economic change in a first effort to reshape the emerging capitalist order.[4]

Entering the stage of history at that fraught moment was a stunningly prolific and articulate German philosopher about to become an influential economist and political leader of mass revolt, Karl Marx. Belonging to the Young Hegelians, a group of radical thinkers turning the legacy of their mentor Georg Wilhelm Friedrich Hegel on its head, Marx had just introduced his vision of history as a succession of modes of production transformed by crisis and revolution. Marx's historic materialism, focusing on class struggle within a given division of labor, grounded social and political change in underlying economic conditions. History is shaped by the struggle between antagonistic social classes rooted in the underlying economic base, which comprises the forces of production (labor, technology, capital goods) and the relations of production (class relations separating producers from controlling the means of production). These are often in contradiction with each other. Marx also makes here the crucial point that the prevailing economic base shapes the political/ideological super-structure of political institutions, laws, customs, ways of thinking, culture, sense of morality, societal norms of behavior, and so forth. Marx had worked out this unique theory of history in several writings published during the 1840s, notably in his *Economic and Philosophic Manuscripts of 1844* and, together with his life-long collaborator Friedrich Engels, in *The German Ideology* ([1846] 1932). But it was the monograph *The Communist Manifesto* ([1848] 1850) that the two published amidst the continental uprising of 1848 which laid out, in highly polemic yet captivating fashion, the history of modes of production all the way to predicting that capitalism would eventually be overthrown to give way to a new, altogether humanly liberating "communist" mode of production. In the end, the 1848 revolutions were brutally suppressed. Marx then spent the next three decades coming to grips with capitalism's economic laws while actively agitating for revolutionary change, mostly in London within the International Workmen's Association he helped found, from 1864 to 1876.

There was one more revolutionary moment of explosive force, that of the Paris Communards taking over the capital in the wake of France's defeat by Bismarck's Prussian army in March 1871. For two short months, a coalition of anarchist, feminist, socialist, and communist activists making up the Paris Commune decreed radical reforms, including the end of child labor, waivers of rent, self-governance, self-policing, separation of church and state, free public education, adequate wages for civil servants, take-overs of abandoned factories by worker-led cooperatives, and a fixed price for bread. Even though this reformist experiment ended in a bloodbath committed by the vengeful French army retaking the city by force, it set

[4] See Hayat (2018) on the French workers' anti-capitalist militancy during the 1848 revolution.

the seeds for a new idea: to benefit the needs of the working class within the framework of democratic capitalism. Thus, social democracy was born in the ashes of a ransacked Paris.[5]

Bismarck's victory over the French forced the unification of the fractured bits of the Roman Holy Empire, destroyed by Napoleon in 1806, into a new power at the center of Europe. The rise of a unified Germany immediately changed political winds. In 1875 reformist currents came together to found the Social Democratic Workers' Party of Germany (SDAP). In his last major piece of writing before his death, *Critique of the Gotha Programme* ([1875] 1891), Marx bitterly criticized the SDAP's turn away from revolutionary change and then spelled out in some detail his alternative vision of transition from capitalism to communism by the creation of a "dictatorship of the proletariat." Sixteen years later, freed from the long shadow of Marx and emerging from the wilderness of illegality imposed by Bismarck's Anti-Socialism Laws, the now renamed Social Democratic Party of Germany (SPD) committed itself in its Erfurt Program (1891) even more explicitly to pursuing pro-worker reforms strictly through legal political means.[6] By 1919 the SPD was ready to enter the government in the post-war Weimar Republic.

When revolution finally did succeed in overthrowing capitalism, it happened not in one of the most advanced capitalist economies, as Marx's theory of history had predicted, but in Russia, a relatively backward and still mostly agrarian country, with the Bolshevik Revolution of October 1917. Its leader, Vladimir Lenin, understood that a revolution in a more or less pre-industrial society, like Russia, would require a two-step process to avoid scarcity and backwardness stifling the initial revolutionary fervor into bureaucracy. As long as the workers were guaranteed their democratic rights and representation while also making common cause with the peasants, they could already push transformative steps to build "socialism" (see Lenin, [1917] 1919). This gave the idea of socialism a whole different meaning than had been implied by the leaders of Germany's SPD, namely that of a post-revolutionary transition period on the way to communism. Confusion between these alternative understandings of what socialism means has reigned ever since.

But one can also see this ambiguity in defining socialism as creative tension. If socialism means stabilizing reform to make capitalism work better for most of us, so be it! But if that does not happen, the instability of the system will press towards more fundamental change, whereupon socialism may well become a program for transition to a different mode of production. Since we have arguably failed so far to advance reforms addressing our triple threat of environmental degradation, inequality, and instability, we will surely have a moment, lived collectively in shared horror, when we realize climate change is both an imminent and existential threat that needs addressing now. The later that moment, the more radical its implications! We will then possibly revisit the question of revolution or reform, in the process clarifying whether socialism means social democracy, a program of reform, or an alternative to the unreformable capitalism we have to transform in order to survive.

2. The long waves of capitalism

[5] See New World Encyclopedia (2019) and Grams (2021) for a discussion of the 1871 Paris Commune and its radical reforms as the founding moment of social democracy.

[6] Karl Kautsky ([1892] 1910), who, together with August Bebel and Eduard Bernstein, is one of the key architects of the SPD's Erfurt Program, provided one of the most widely read and translated texts on the Left's strategy to reform capitalism from "within".

Back to revolutionary Russia. In the aftermath of the October Revolution, as Lenin tried desperately to stave off collapse following a horrific civil war (1917-1922), he introduced a mixed-economy reform program in 1922, known as the New Economic Policy (NEP). That same year he appointed the brilliant young economist Nikolai Kondratiev to head the newly formed Institute of Conjuncture for the study of business cycles. Kondratiev put together a multivariate study of a century and a half of price and output movements in Britain, France and the United States, from which he derived a theory of long waves.[7] Based on patterns he identified in this longitudinal study, Kondratiev traced a roughly half-century cycle comprising an upswing, characterized by strong growth that was only rarely interrupted by short and shallow recessions, followed by a downswing phase, which typically began with a massive financial crisis that pushed the economy into a slow-growth pattern of deflationary pressures. That period of relative stagnation would typically end in yet another crisis, mostly a depression that served as a cleansing process for the rebalancing of built-up excesses, which thereby set the stage for a renewed period of expansion. Kondratiev specified three such long waves. A first one in the wake of the Industrial Revolution lasted from 1790 to 1849, with a turning point in 1815. A second one, from 1850 to 1896, peaked in 1873. He supposed that a new cycle had started in 1896, which presumably was already in its downswing phase by the time he published his empirical long-wave findings in the mid-1920s.

Kondratiev's work added a whole new twist to our understanding of capitalism, highlighting its ability to get out of crises by reorganizing itself. This was not a message that the rigid Marxist-Leninists around new Soviet leader Joseph Stalin (Lenin had died in 1924) wanted to hear. Kondratiev was sacked from the institute in 1928, tried in 1930, imprisoned in 1932, and executed in 1938 during Stalin's Great Purge. A year later, the great Austrian-American economist Joseph Schumpeter (1939) gave Kondratiev's work renewed prominence, pointing to the role of innovation clusters maturing into growth industries during the upswing and then exhausting themselves amidst spreading obsolescence of outdated practices and structures. Schumpeter (1942) further refined this technology-driven explanation around the crucial notion of "creative destruction". In transitions from one phase to another, or from one wave to the next, we need to pay close attention to the precise configuration of whatever S-curve dynamic the currently prevailing creative-destruction dialectic is throwing at us.

The fact that capitalism's long waves typically face their turning point from upswing phase to downswing phase amidst a major financial crisis, as in 1873, 1920-21, 1971-73, or 2007-08, forces us to consider financial factors in the long-wave dynamic. This realization dawned on Hyman Minsky (1964), who laid out an argument as to why periods of continuous stability, as is the case during long-wave upswings, breed instability. Lasting phases of strong growth encourage increasing levels of risk-taking and indebtedness, to the point where highly leveraged actors become more vulnerable to disruption due to rising debt servicing charges. When their capacity for income generation deteriorates after the accumulation of lots of debt, some of them get pushed to the point of default. It is typically the sudden bankruptcy of a well-known actor that signals to the rest of us how much once-favorable conditions have deteriorated. That realization then sets off a panic-stricken tightening of credit conditions just

[7] See Kondratiev (1925a, [1925b] 1984 [1926] 1935) for a summary of his major findings and theoretical explanations concerning long waves.

when many overextended debtors are struggling to make ends meet. Soon enough a full-blown financial crisis is on![8]

Complementing Minsky's analysis of how we get to the point of triggering a major financial crisis at the peak of a long wave is Irving Fisher's (1933) analysis of what happens after financial instability has taken us into its grip. Struggling debtors will try to save themselves from insolvency and/or illiquidity, come what may. They hoard cash, cut back spending to the bare minimum, and sell off assets into rapidly declining markets. Such panicky retrenchment, by both stricken debtors struggling to survive and worried creditors running for safety ("flight to safety"), makes everyone worse off. As the panic spreads by force of contagion, it multiplies losses in the credit system from defaults and asset devaluations. Watching the Great Depression unfold from the stock-market crash of October 1929 to the collapse of the gold standard in September 1931, followed by the progressive disintegration of the banking system until March 1933, Fisher (1933) was able to depict the different facets of a debt-deflation spiral driving the economy rapidly into depression. If such a spiral is not stopped in its tracks by massive and effective state intervention, it renders the triggering financial crisis systemic and the economy in depression.

While the technological as well as the financial factors behind long waves are important forces to consider, there are additional factors driving the long waves. Those will help us understand better how capitalism moves from one long wave to the next. One such factor of a more structural nature concerns Kondratiev's hunch that the second crisis, the one typically found at the end of a long wave's downswing, serves as the engine of a rebalancing process, without which the economy does not move to a new upswing phase. Marx addressed precisely this issue in chapters 13 and 14 of volume 3 of *Das Kapital* (Marx, [1894] 1967). There he offered a radical reinterpretation of what he had elsewhere characterized as "in every respect the most important law of modern political economy" (Marx, [1939] 1973), namely the tendency of the rate of profit to fall (TRPF). In the face of relentless competitive pressures, capitalists automate production for faster productivity gains, in the process replacing human labor with machinery. Yet the source of profit depends on workers creating surplus-value appropriated by the capitalists for whom they work. With rising mechanization of production, there is less surplus-creating living labor relative to the productive capital (i.e., plant and equipment) it has to support. The profit rate, dividing profits (a function of surplus value) by capital, thus goes down as its denominator (capital) outgrows its numerator (profit). At the same time Marx also identified "counteracting influences" working against this TRPF. Here he listed as section headings "increasing intensity of exploitation, depression of wages below the value of labour-power, cheapening of elements of constant capital, relative over-population, foreign trade, the increase of stock capital". (Marx [1894] 1967, Ch. 14).

Ernest Mandel (1980) reframed Marx's argument into a long-wave context. He shows that TRPF has recurrently been the decisive factor in triggering the long-wave turning points from upswing to downswing, presumably also laying the groundwork for the systemic financial crisis we typically witness at that point. Marx's counter-tendencies get mobilized in far more concentrated fashion once the economy has turned down. At that point capitalists will try to make workers work harder and/or accept lower wages, and there will be sharply rising

[8] Minsky returned later, near the end of his career, to the financial factors in capitalism's long-wave dynamic (see, for example, Minsky, 1995). In Ferri and Minsky (1992), he also pointed to the need for "floors and ceilings". By these, he meant institutionalized crisis-management stabilizers: either a "Big Bank" (i.e., a central bank as a lender of last resort) or "Big Government" (i.e., Keynesian macro-economic stabilization via deficit spending) or both.

unemployment (“relative overpopulation”) on hand to frighten workers into accepting either. Deflationary conditions in the highly cyclical capital-goods sectors or acceleration in the adoption of efficiency-enhancing production methods may bring about that “cheapening of elements of constant capital” from which follows the restoration of profitability. Producers will push more aggressively into foreign markets (“foreign trade") when faced with declining domestic sales. And stock capital, after a long period of decline, will turn around its issue and valuation of shares as a harbinger of the upswing to come. Mandel thus provides here a detailed description of how crises unfold as rebalancing (or “adjustment”) processes.

Still, the intensity of negative multiplier forces in play from cutbacks begetting more cutbacks makes it not so obvious how you get the economy, on its own, out of a crisis and back into an upswing. Mandel concluded that there was an asymmetry between an economy going into crisis gripped by overproduction and/or collapsing profitability and an economy coming out of a crisis in the wake of the counter-tendencies adjusting the initial imbalances. He argued that it typically took “…exogenous ‘system shocks’ of various kinds to propel the system out of its depressive phase” (Mandel, 1981, p. 332). He includes in this category socio-political forces mobilizing for change as well as non-economic factors such as war or pandemic. These are all ‘exogenous’, inasmuch as they operate beyond the confines of Marx’s tightly structured TRPF dynamic. But, in reality, many such ‘system shocks’ are endogenous in the broadest sense of the capitalist system’s transformative qualities. This is especially true for social movements and political mobilization leading to new institutions and arrangements. And these forces become decisive in the transition from one long wave to the next, especially in terms of shifting policy in desired directions to move us into a new upswing phase. Without that push from below, and possibly also from above once reform becomes policy, capitalism will fail its test of reformability.

One theoretical approach that has had quite a bit to say about this is the French “théorie de la régulation”. Its foundational text, a brilliant analysis of the US economy’s post-war boom and stagflation crisis by Michel Aglietta ([1976] 1979), provides us with an institutionalist approach to long-wave dynamics. The Régulationists, among whom I can also recommend Robert Boyer ([1986] 1990), Robert Boyer and Yves Saillard ([1995] 2002), and Alain Lipietz ([1983] 1985; [1985] 1987) for introduction, think of long waves as distinct chapters in the capitalist system’s long-run evolution that they characterize in terms of successive “accumulation regimes,” each with its own unique “mode of régulation”.[9] Most of their work has focused on what they have termed the Fordist accumulation regime, so named after Henry Ford’s 1914 five-dollars-a-day idea of paying high-productivity workers much more, so that there was a better chance that all those mass-produced Ford Model T cars could be sold thanks to the workers’ improved purchasing power. At the core of post-war Fordism was the formula, first anchored in the historic 1948 agreement between General Motors and the United Automobile Workers, of raising the money wage in compensation for inflation through automatic cost-of-living adjustments and then, in addition, in proportion to realized productivity gains. Besides highlighting this new way of regulating the wage-labor nexus so that mass production technologies and social norms of mass consumption finally matched, the Régulationists also focused: on the forms of competition in Fordism, notably broad adoption of administered cost-plus pricing that shifted competition to product differentiation; on money

[9] I am using the accented letter “é” in “régulation” to distinguish this concept from the English word ‘regulation’, which implies government constraints imposed on markets and/or firms. “Régulation” refers instead to the self-balancing capacity of a system reproducing itself successfully in forward motion through historic time.

and banking describing a tightly regulated, nationally administered credit system first put in place by the Glass-Steagall Act of 1933; on state intervention crystallized in Keynesian macro-economic stabilization policies of demand management; and on the international economic order under US hegemony as exercised after 1945 within the so-called Bretton Woods system. The stagflation crisis, which took hold when the balance between real-wage growth and productivity gains started breaking down in the late 1960s, then destroyed each of these five institutional pillars of the post-war Fordist accumulation regime in succession – its productivist wage-labor nexus, its product-oriented forms of competition, nationally administered money and banking, Keynesian demand-management intervention of the state, and Bretton Woods.

3. Finance-led capitalism and its demise

I have argued elsewhere that the stagflation-induced deregulation of money and banking in several steps from 1973 to 1982 induced a transformation of finance in support of a new finance-dominated accumulation regime after 1982 (Guttmann, 1994; 2016). The emergence of finance-led capitalism necessitated additional institutional pillars of support for its completion into a full-bodied new accumulation regime. Attacks on trade unions, weakened by advanced capitalist economies moving to a post-industrial structure, combined with new labor-market segmentations around high value-added services and exploitative marginal-services labor. The ensuing high profitability, locked in for the duration thanks to steadily falling wage shares, compensated for by a steady stream of new sources of external demand amidst relentless globalization, accommodated large rent extraction and capital income shares going to interest, dividends, and capital gains. Key sectors moved towards a structure of global oligopoly (from cars to finance), giving rise to a new international division of labor organized by means of global supply chains and fully globalized portfolio finance. The Reagan/Thatcher Revolution of 1979-1982 put in place a combination of privatization, deregulation, cuts in the social safety net, lower taxes for the wealthy and corporations, and fiscal austerity. This neo-liberal policy regime also reshaped the international dimension, as a large number of developing countries emerging from either political or financial crisis were forced to follow pro-market policy prescriptions imposed as the “Washington Consensus” by the US Treasury, expressing America’s hegemonic influence, the International Monetary Fund’s so-called “structural adjustment” programs, and the World Bank shaping development priorities.[10] The upswing phase of finance-led capitalism’s long wave combined US excess spending with export-led growth strategies of many industrial and emerging-market economies. Americans’ ability to serve as the “buyer of last resort” for the rest of the world was fueled by the wealth effect of recurrent asset bubbles (in the stock market during the 1980s, the dot-com bubble of the late 1990s, and real estate during the 2000s). Since the dollar standard gave America the ability to borrow from the rest of the world in its own currency, it could cover its often-large twin (trade, budget) deficits year after year.[11]

[10] The term “Washington Consensus,” first coined by John Williamson in 1989, encompassed a ten-point program of pro-market reforms deemed essential to push developing economies into a different economic development path that corresponded to the mode of regulation of finance-led capitalism and its neo-liberal policy regime. See Irwin and Ward (2021) for more on this remarkable policy regime and its checkered history.

[11] For more on the dollar standard, the international monetary system of finance-led capitalism emerging from America’s aggressive “Reaganomics”-driven exit from the stagflation crisis, see Guttmann (2022).

That formidable pro-growth and pro-globalization configuration broke down in the Great Financial Crisis of 2007-08, marking the turn to finance-led capitalism's downswing phase. Since then, we have gone through currency wars in the form of: competitive devaluations transmitted through waves of "quantitative easing" by one central bank after another between 2009 and 2015 (first the dollar, then the euro, then the yuan); trade wars between 2016 and 2020; de-globalization trends of retrenchment throughout the 2010s; affecting trade, foreign investments, reshoring of supply chains, and macro-economic decoupling; and finally a global pandemic in 2020-21. The SARS2-CoV virus emerged after five near-misses over the past two decades (SARS, MERS, Ebola, Zika, and bird flu). This recurrence of pandemic threats is an indication of socio-ecological changes, from habitat destruction to increased meat consumption, that interact to generate more human exposure to new infections. In that sense, this new coronavirus is not, strictly speaking, an 'exogenous system shock' a la Mandel; it is endemic to the environment-degrading capitalism we have today. Covid-19 was indeed a system shock, a stress test for societies having to manage, at the same time: a public-health emergency; overwhelmed health care systems; extraordinary fiscal and monetary measures of macro-economic stabilization amidst lockdowns, putting economic activity into a coma; business-model adjustments to lower activity levels; and a radical leap forward in our daily uses of the digital economy. But this disruption, as traumatic as it has been, is only the beginning of a much deeper and longer systemic crisis of the environment, as crystallized around the rapidly intensifying destabilization of our weather patterns and meteorological phenomena from a warming planet.[12] If that is indeed an accurate assessment, then we are at the onset of that second crisis of the long-wave downswing, which Kondratiev evoked as a transformative force, and we thus face the challenge of how best to transition to a new accumulation regime. I have argued this to be necessarily an ecologically embedded accumulation regime built around mitigating and adapting to climate change, which I have referred to elsewhere as eco-capitalism (see Guttmann, 2018).

4. Political challenges

Before discussing what eco-capitalism might look like and how it could become operational, we have to reflect a bit more about the politics of getting there. For that purpose, let us go back to a key point stressed by Karl Marx in his discussion of historic materialism: that the economic base shapes the political/ideological super-structure.[13] This dynamic will obviously also play out over the long wave. How it unfolds, however, is anything but predictable, because of conflicting pressures unleashed during the downswing phase of the long wave.

On the one hand, there is a clearly established pattern concerning Ernest Mandel's idea of an asymmetry between going into a long-wave downturn and coming out of it. The latter has always required the introduction of a new policy regime, helping to give birth to the next

[12] I have contextualized the global pandemic and the balancing acts of what I have referred to as "virus economics" in the current long-wave context in Guttmann (2021).

[13] Karl Polanyi's (1944)'s key concepts of "embeddedness" and "double movement" imply, reversely, that we cannot understand the economy, its institutions and organization, disconnected from the wider social world within which it is placed to operate. There is thus a dialectic process between the social, economic, and environmental spheres.

accumulation regime propelling the upswing. Reforms in the prevailing power centers (Britain, USA) are of particular relevance here as pace-setters for the rest of the world.

- In the transition from the competitive to a monopolistic accumulation regime during the last quarter of the 19th century, Britain extended voting rights to key segments of its population, legalized unions, and built a public health care system. The United States, an emerging industrial power, faced the tremendous leap in the concentration of productive capital in the hands of trusts dominating strategic sectors like railroads, steel, or oil by introducing an anti-trust policy to regulate industry structures and competition (Sherman Antitrust Act of 1890, Clayton Act of 1914).
- Roosevelt's ambitious 'New Deal' reform program of 1933-35, putting into practice the Keynesian Revolution (see Keynes, 1936), paved the way for the policy framework of post-war Fordism created with: the Bretton Woods agreement of July 1944; America's and Britain's respective Employment Act(s) of 1946; the GM-UAW collective bargaining agreement of 1948; and Europe's social and economic reforms after World War II.
- The Thatcher/Reagan Revolution of the early 1980s, an anti-Keynesian counter-revolution combining tax cuts, deregulation, attacks on unions, and fixed policy rules (e.g., balanced budgets, steady money-supply growth), introduced the neo-liberal policy regime that nourished finance-led capitalism during the last quarter of the 20th century.

I am going to make a case in the remainder of this article that now, coming out of the pandemic and in the face of rapidly intensifying polarization, is as propitious a moment as any for a broadly based reform program addressing the urgent challenges of environmental degradation, inequality and instability on a global scale, in order to create a different kind of globalization that is centered around the shared pursuit of sustainable development objectives.[14]

Confirming Mandel's (1980) crucial long-wave insight that the downturn is inevitable while the upturn is open-ended, such regime-transforming reform programs are never preordained. Instead, they arise amidst heightened tensions when a systemic crisis, be it financial instability or military conflict, ends up destroying boom-fueled confidence in the nation's social contract. The ensuing splintering of dominant class coalitions and their political representation in ruling parties then comes to shape the downswing phases of long waves as a matter of polarizing domestic politics. Reform programs emerge out of this friction. There is clearly a pattern here:

- Before America's reformative Progressive Era (1896-1916), you had a clash of regional interests, following the collapse of bimetallism in 1873 ("Crime of '73"), that pitted the industrial North, favoring gold, against the frontier economy of the West and the agrarian economy of the South, both of which felt deprived of the "easy" money support they had enjoyed with silver.
- The rise of Fascism in Europe after 1922-23[15] rapidly grew into a civil-war type confrontation with the Left, which at that point also split between Socialists and the Communists beholden to Stalin's dictates (Spain's and France's Popular Front coalitions taking power in 1936 being exceptions).

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[14] Martin Sandbu (2021) makes the relevant point that the EU governments' extraordinary income-maintenance measures during the pandemic have primed them to rediscover their foundations in the "social market economy".

[15] In October 1922, after the March on Rome, the founder of Fascism, Benito Mussolini, took power in Italy. In November 1923 Adolf Hitler launched a coup d'état with the Beer Hall Putsch in Munich. While it failed, Hitler emerged at that moment as a fascist political leader who was able to take power in Germany a decade later.

- The rise of the New Left in the US and Western Europe during the late 1960s and early 1970s set off the conservative counter-reaction, bringing us Thatcher (1979) and Reagan (1980).
- And, not surprisingly, we have seen such crisis-fed polarization of domestic politics once again during the most recent downswing phase from 2008 to 2022, with dramatic advances for right-wing nativist movements bringing to power autocrats such as Donald Trump in the United States and Jair Bolsonaro in Brazil.

Why have we once again faced the rise of right-wing movements, just as we experienced during the inter-war period (between the two world wars) or amidst the neo-liberal Thatcher/Reagan Revolution after the stagflation crisis had disintegrated the Fordist accumulation regime in the 1970s? There are clearly socio-economic drivers at work during the downswing phase of long waves that put enormous stress on the body politic of crisis-ridden societies. Crisis breeds economic hardship, fear and conflict over how to cut up the shrinking pie, all conditions likely to threaten the social peace as engines of mounting anger. Getting hit seemingly out of the blue with a massive financial crisis, as is characteristic of the onset of the depressive phase, is a traumatizing event often accompanied by sudden losses of income and wealth, followed by spending cutbacks and forced asset sales. Even if unconventional monetary policy, such as having the central bank pump massive amounts of reserves into the shaken banking system through large-scale asset purchases ("quantitative easing"), manages to moderate the otherwise violent debt-deflation spiral *à la* Irving Fisher (1933), the aftermath of a systemic financial crisis, such as the one of 2007-08, plays out slowly and painfully. Overextended debtors have to deleverage. Creditors have to write off their losses. Both sides have to do their respective balance-sheet repair work sufficiently slowly so as not to let this necessary adjustment process push them to the brink of default.[16]

It surely does not help that banks, at the center of the seismic financial crisis they are often seen as having caused in the first place, get bailed out by the government while those regarded as their "victims" suffer the consequences. That perceived injustice alone suffices to make a lot of people angry at the elites. A schism opens up between an elite comprising bankers, industrialists, civil servants, media, and well-paid professionals, all concentrated in the leading metropolitan areas of the country, and the rest of the population. After long periods of rapid globalization, an unfailing characteristic of the upswing phases of long waves is that many people turn anti-globalist once the crisis has brought that process to a sudden end. To the extent that the globalization push is always driven by a catching-up process that brings new powers to the fore (United States and Germany before World War I, Germany and Japan by the end of the post-war boom, China now), anti-globalist sentiments get directed most scornfully against specific countries that suddenly loom large on the horizon as competitors and rivals. Their status threatened and fearful of foreigners taking away the share to which they feel entitled by privilege or hard work, nativists find themselves getting riled up about immigrants invading their turf. And for many troubled and suffering people, religion holds the promise of order and redemption, and thus a way out of chaos. This potent mix of anti-elite anger, distrust of all that is foreign, isolationist nationalism, and religious fervor allows clever demagogues promising easy solutions to take power on a wave of electoral mass mobilization. Today this process of mobilization on the Right gets super-charged by the social media on the internet.

[16] Koo (2015) has aptly characterized this post-crisis adjustment process of balance-sheet repair by overextended debtors as a "balance-sheet recession".

Whether it's QAnon's conspiracy theorists, the Islamist extremists of ISIS, or any other iteration of virtual networking towards the extremes, online radicalization is the order of the day![17]

So we have now ended up with large segments of the population in many countries disaffected, angry, and ready for nationalistic demagoguery by autocratic leaders evoking racial or religious supremacy. Some autocrats have already grabbed power, as in four out of five BRICS countries (Brazil under Jair Bolsonaro from 2019 to 2023, Russia under Putin, India under Modi, and China under Xi). The United States, after four years of chaos and division under Trump, is in a decisive battle for its soul! The ensuing confrontation between democracy and autocracy, thrown into sharp relief in late February 2022 by Russia's invasion of Ukraine and the global supply shock it triggered for energy, food, weaponry, and finance, is the fateful background against which any and all progressive reform movements have to make their mark.

How then do you implement a regime-transforming reform program when political passions are aroused and social movements are pushing in all kinds of directions, many of which are arguably more counter-productive than constructive? The answer is as obvious in theory as it is difficult in practice. Systemic reform of a progressive nature can only come about by democratic means, as the result of successful mass mobilization around a vision of a better society that captures the hearts and minds of many as they confront the fateful choices we face. Ideally, as a movement for such reform takes hold and grows in scale, it can already act here and there as a "coalition of the willing" to affect positive change and so convince others of its comparative advantages. Such a self-reinforcing dynamic underpinning the reform movement's expansion capacity is especially useful when facing a steadily intensifying crisis, as we are bound to do going forward.

Climate change alone is already worsening much more rapidly than we have been willing to act against. As we lag behind, we are letting this environmental crisis reach far more dangerous levels of intensity. This is not a crisis moving in linear fashion. We are rapidly approaching key tipping points, whether it is: the melting of the ice mass of the Antarctica and/or Greenland, resulting in proportionately much higher rises in sea levels; the melting of glaciers whose feeding of rivers used to keep those healthy; the destruction of the rainforest (e.g., Amazon) which serves as the planet's "lungs"; or the thawing of the permafrost (in Siberia, in Canada), threatening to release trillions of tons of the extremely potent greenhouse gas methane. Each and any of these tipping points threaten to make matters far worse in a hurry. We are arguably already facing a crisis of the accumulation regime, where we need to move beyond fossil fuels as an energy source and profit-led growth feeding the winners of finance-led capitalism. If we continue our present course of inaction, the crisis will soon enough intensify into a crisis of the mode of production, where the entire fate of capitalism is at stake as a system bound to destroy us. Such a disturbing prospect of aggravation to the point of existential threat should mobilize forces favoring collective self-preservation of planet and species. Lots of people will soon realize that capitalism needs to be reformed from the ground up. They will then want to know how. What we need to do now, befitting the urgency of the moment as it builds, is to launch the regime-transforming reform program and get it ready for such mass mobilization.

[17] QAnon holds that Trump is engaged in a secret battle against a cabal of Satan-worshipping, children-trafficking pedophiles who control the government, the media, and financial centers. This antisemitic conspiracy theory circulating on the internet is apparently supported, according to studies cited by Smith (2022), by 17 percent of adult Americans who see a "storm" coming and believe that violence may be necessary to save the country.

5. Eco-capitalism and sustainable development

The planet needs a new policy regime addressing our multiple crises of instability, inequality, and environmental degradation. At its core must be the zero-carbon transition aimed at cutting greenhouse gas emissions to "net zero" levels by 2050, for which the Paris Climate Accord of 2015 has created a global governance mechanism.[18] This transition, akin to a far-reaching make-over of our economy, replaces fossil fuels (coal, oil, gas) with renewables (solar, wind, hydro), phases out gasoline or diesel vehicles in favor of electric vehicles, favors provision of public transport, provides for "smart" electrical grids, improves energy efficiency, introduces climate-smart agriculture and food consumption, revamps land use practices, cleans up "dirty" industrial processes (e.g., chemicals), insulates building structures for better temperature control, and pushes for more sustainable norms of consumption, including better recycling practices for more efficient waste management (as encapsulated in the notion of the "circular economy"). We are talking here about a society-transforming public investment program on a global scale, for which we need to mobilize an estimated $9 trillion annually for the next decade and beyond, equivalent to about 7.5 percent of global GDP.[19] Finding the funding for it is, in essence, what the Paris Agreement's clause of a "flows-consistent finance" meant to imply, the mobilization of a "sustainable" finance that supplants the short-termism and excessive rent-seeking of finance-led capitalism's financialization of life (I have some further thoughts on that, which are summarized in the following section).

The transition to a carbon-neutral economy will catapult social aspects of economic activity to the foreground. For example, intellectual property rights designed to give innovators a monopoly right over their ideas (e.g., patents, copyrights) make little sense in a climate emergency when we have to transform the global economy in a hurry to make it less destructive environmentally. At that point we want to diffuse knowledge quickly, which makes the case for open-source dissemination. But then there is always the free-rider problem, against which we can build knowledge commons where access to information is bound by certain rules. That is just one example of how the social dimension, and with it the public-good aspects of economic activity, will come more to the foreground in the upcoming accumulation regime. The more complicated aspect of the social dimension coming to the foreground is how best to be prescriptive, as when having to stop certain behavior, either by regulation or disincentives. Much of this can be handled better by means of focused public education that creates a new normative context, reinforced by socially effective and balanced incentive structures, rather than through regulatory restraint.

The zero-carbon transition will also oblige us to rely a lot more on the state as coordinator, risk underwriter, loan guarantor, entrepreneur, or crisis cartel manager.[20] Generalized fear of such expansive state intervention is what has motivated many on the Right to oppose the prioritization of climate change and/or to call for rule by a "strong leader" in pursuit of the

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[18] The Paris Climate Agreement (see Guttmann, 2018) aims to keep the cumulative rise in temperature below two degrees Celsius from pre-industrial 1850 levels. Towards that objective, national governments will publish gradually more ambitious emission reduction plans, put a steadily rising price on carbon, assure adequate resource transfers from rich to poor nations, and make financial flows consistent with the agreement's objectives. "Net zero" refers to a level low enough to allow remaining greenhouse gases to be absorbed by natural carbon "sinks" (e.g., forests) or by technology such as carbon capture and storage.

[19] See McKinsey Global Institute (2022) for cost and benefit estimates of the zero-carbon transition.

[20] I am reminded here of the excellent analysis by Mariana Mazzucato (2013) of the state's new role and capacities, which she aptly characterized as "the entrepreneurial state", fostering innovation and industrial development in needed directions.

"national" interest. The best answer to such fears is to insist on strengthening all the other layers of our day-to-day existence and so extending democratic means of control to the level of the individual, the group, the neighborhood, the city, the region, the province, and beyond the state to the world at large or at least to alliances of nations. The nation-state too can be reconfigured, by democratic means of citizen engagement, transparency, and oversight, into a much more responsive and balanced body of collective decision-making. Generally high confidence in the state as capable defender of the public good is quintessential for eco-capitalism to work. Add to this a pragmatic sense of problem solving when deciding what should be done on micro-, meso-, macro-, and meta-levels.

The likely expansion of the state will most likely coincide with a greater policy focus on the supply side of the economy. The zero-carbon transition itself is a massive supply-side renewal and transformation program, even though it will surely also ask us to make significant changes in our social consumption norms, hence impacting the structure of aggregate demand, especially in rich countries. Already, in the first crisis of the transition period, the energy and food shocks following Russia's invasion of Ukraine, we can see desperate scrambles by national governments to secure resource supplies or accelerate changes in their energy mix. The shift in policy emphasis is also the result of largely successful experiences with unprecedented measures, both fiscal and monetary, of the macro-economic stabilization of aggregate demand during the heights of the pandemic. Whether such extraordinary macro-policy innovation can be normalized into a renewed full-employment policy commitment, as called for by Servaas Storm (2022), depends, not least, on how well governments manage the exit from the pandemic amidst a significant bout of inflation worldwide. If anything, that fight against a sudden post-crisis surge of inflation must go beyond traditional (demand-side) recipes for monetary tightening and/or fiscal austerity and focus on supply-side constraints like continued pandemic-related activity restrictions, global supply chain disruptions, climate-induced resource erosion (such as the slowdown of freight traffic on Europe's dying rivers), excess-profit-grab price hikes for improved margins in non-price-competitive settings, and widespread labor shortages.

Part of the supply-side focus needs to be on labor, promoting a variety of workplace and hiring arrangements for greater labor-market flexibility while also strengthening labor law protections as pertaining to union representation, collective bargaining rights, minimum pay, working conditions, and fringe benefits. We should provide extensive retraining facilities for workers rendered structurally unemployed by the zero-carbon transition and set up rapid-integration assistance programs for (im)migrants, of which there will be large waves across the globe for decades to come. Of crucial importance, and this is a point highlighted quite appropriately by Peter Skott and Paul Auerbach (2021) as vital in the long run, are large-scale investments in children: refundable child tax credits, child-care facilities, and first-rate education. Closely tied to this are sustained improvements in the socio-economic status of women, giving them control over their bodies and livelihoods. Not only will that boost our investments in children, but improved education and career opportunities for women will do wonders for lowering the birth rate and thus make for a more sustainable demographic balance, a highly desirable objective in the age of climate change.

The pandemic has revealed anew how unacceptably extreme today's income and wealth inequality has become, made worse by the enormous boost to capital income from the huge liquidity injections that central banks all over the world undertook during the pandemic. Key occupations, such as nursing and teaching, deserve upgrades in pay scales in light of their socially useful and strategic contributions to society's well-being and in light of chronic shortages. More generally, we need to think of what constitutes sustainable development far more broadly than in terms of just environmental conservation and climate change mitigation to address, among other things, issues of inequality and instability. We can see such a push for a broadly based policy orientation crystallize already among institutional investors calling for so-called "environmental, social, and governance" (ESG) benchmarks to guide corporate decision-making. The "Green New Deal" pushed by the US Democrats' left wing combines climate change mitigation with measures aimed at environmental justice, job creation, and economic inequality. And President Biden's initial three-pronged "Build Back Better" agenda included: an American Rescue Plan (passed as a 1.9 trillion dollars recovery plan in March 2021); an American Jobs Plan (passed as a bipartisan 1.2 trillion dollars infrastructure investment program in August 2021); and an American Family Plan (passed as the much-reduced Inflation Reduction Act, promoting emission-reducing investments, health care improvements, and corporate tax reform in August 2022).[21] Unfolding here is a paradigm shift towards a more encompassing social and environmentally grounded production mode, pushing sustainability as a matter of survivability.

This paradigm shift, surely anchored also in advances we shall make in both social and natural sciences for a better understanding of our world in transition, informs us as a species facing existential threats from pandemics to climate destabilization to weapons of mass destruction. But the policy responses to these threats will still have a largely regionally differentiated character, shaped by the relatively rapid re-configuration of the world's power hierarchy into a multi-polar constellation where three power centers vie for dominance: the United States, gripped by internal division over its future role and direction; a European Union propelled forward by crisis and tension to advance its historic experiment in supra-national governance; and a resurgent China as the counter-weight model adopting more state-permeated and/or communitarian solutions of a top-down nature. We shall have to acquaint ourselves quite deeply with the emerging variants of capitalism – the still largely neo-liberal American one in search of a new mission, the supra-national regulatory "social economy" European one, and the state-administered "developmentalist capitalism" models of China and others (India? Brazil? Each in their own way, yes!) – as they compete for setting the standards and making their influence felt.[22] Differences in approach will play out between those three power centers and, depending on the subject matter a panoply of other nation-states, on all the major issues: public health, education, migration, financial structure and regulations, the internet, digital money, competition policy, industrial policy, "friend-shoring" of supply chains, trade, climate policy, role of the military, agriculture, energy, labor protections, income maintenance, urbanization, and transportation. Getting global standards and coordination on vital issues of human survival (e.g., how to direct global migration flows in an orderly fashion in the face of climate change) in that setting will take a good deal of pressure from below, best

[21] Biden's initial American Families Plan (see White House, 2021) would have provided direct support to children and families (paid family and medical leave, a cap on child-care expenses), offered tax relief for child care, added four years of free education, made college more affordable, boosted the teaching profession, aimed for improved nutrition, reformed unemployment insurance, and closed tax loopholes for the wealthy.

[22] On the emerging multi-polar configuration of global capitalism, see Guttmann (2022). Malcolm Sawyer's (2022) vision of a "social" economy presents a progressive blueprint for updating the EU's long-standing "social market economy" model for the 21st century. The "variants of capitalism" approach (see Amable, 2003; Nölke et al., 2020) can use some further refinements to better capture the complex dynamic of this triangular field of tension between competition and cooperation among three power centers, each representing a distinct type of capitalism.

mobilized on a large scale in all power centers, including China, where the youth can leverage a lot of influence as that huge country inverts demographically in a hurry.

Mass mobilization is best achieved by a widespread consensus that capitalism needs to be reformed for its own good towards a more sustainable version of itself that is built around concretely achievable and verifiable policy objectives. Take, for this purpose, as an exercise in worldwide consensus building of priorities in pursuit of key global public goods around which to build a forward-looking policy agenda, the United Nations' (2015) 17 sustainable development goals (SDGs): no poverty; zero hunger; good health and well-being; quality education; gender equality; clean water and sanitation; affordable and clean energy; decent work and economic growth; industry, innovation and infrastructure; reduced inequalities; sustainable cities and communities; responsible consumption and production; climate action; life below water; life on land; peace, justice and strong institutions; partnerships for the goals. Each one of those goals comes with concrete steps of action, and progress can be evaluated collectively on a global scale. Ideally, in the process of pushing for ongoing progress regarding these SDGs, we collectively end up knowing enough about all of us, anywhere in the world, to assess local needs and necessities for directing globally mobilized and shared assistance to the right places at the right time.

6. Sustainable finance, digital money, global currency

Global mobilization for sustainable development, as the socio-political push transitioning us into eco-capitalism, will be helped greatly if there was indeed a "flows-consistent finance" as the Paris Agreement has suggested. We are seeing first efforts to create such a "climate" finance, focusing on: climate-related financial disclosures; modeling of unique (physical, legal, and transition) climate risks; new environmental, social, and governance (ESG) benchmarks for corporate performance and valuation; regulatory distinctions between "brown" assets and "green" assets (e.g., EU's Green Taxonomy); and sustainable accounting rules. Green bonds, already emerging as a global financing mechanism, will surely help direct lots of funds to the key emission-reduction projects we need for the zero-carbon transition to succeed. Central banks are also beginning to worry about many "brown" assets eventually ending up as "stranded" assets that will have to be written off as they become obsolete (e.g., oil reserves, coal-fired power plants), a major threat to financial stability that will require effective loss-socialization mechanisms. One can think of offering one-time compensation in exchange for retiring high-pollution assets for the greater public good. An unresolved challenge, as reflected in the hitherto perennially underfunded Green Climate Fund, is the inability and/or unwillingness of rich industrial nations, which have caused most of the greenhouse gas emissions warming the planet, to assist the poorer developing nations, many of which suffer the worst consequences of climate change while having themselves barely contributed to the problem. This redistribution challenge is an economic as well as a profoundly moral problem best resolved by global governance institutions able to confer and distribute spending power directly.

I suspect that "sustainable finance" will have to go quite a bit further in the direction of globally organized spending power to move us beyond the squabbling and overly status-quo-wedded power centers of the new triad blocking needed progress by inaction. There is growing urgency to act collectively, no matter what quarrels divide us! And yet we still have a wrongly biased financial system. The era of finance-led capitalism has left us with an oversized financial system favoring speculation in pursuit of capital gains, rent extraction by insider networks, shareholder value maximization as the main corporate objective, and short-termism. Zero-carbon transition projects require a financial system that takes the long view, applying a very low social rate of discount (rather than the habitual five to seven percent used by Wall Street) and giving due consideration to social benefits and costs that are usually excluded from purely for-profit calculations prevailing in the private sector. That is a finance with very different priorities and norms than the one we built at the center of finance-led capitalism. The ongoing ESG revolution is a good case study of how finance is changing already, moving us beyond the primacy of shareholder value maximization that has ruled corporate finance and governance for the last four decades. Thus, we need both a socially beneficial finance system and one capable of large-scale redistribution from rich to poor, in correspondence with the 17 SDGs that such a socially and environmentally embedded system of finance will have to support.

Given the long-standing dynamic of finance as a destabilizing vector of globalization, creating and distributing gains unevenly, it remains to be seen whether this system can be transformed into something better, reflecting social priorities and the public good. Such a shift in how financing gets done in eco-capitalism depends surely on the rebalancing of the private-public mix making up "finance" through new regulations, contractual arrangements (e.g., "green" bonds, weather futures) and joint-interest formations (e.g., credit unions, mutuals, cooperatives). That private-public mix underpinning finance, with the central bank serving as both the government's bank and the banks' bank, is already playing out quite differently in its respective American, European, and Chinese contexts. Those three power centers have distinctly different financial systems – the US more financial-markets oriented, the European bank-centered one moving from local banking to EU-wide banking, and the Chinese centered on regulated state banks and policy banks supporting a huge shadow-banking system that is moving finance beyond regulatory constraints. Sequentially numbered Basel Agreements (Basel 3 between 2010 and 2019, Basel 4 in 2023, etc.) have, at the same time, set up a global regulatory regime for trans-national banking. The Bank for International Settlements (BIS), which is responsible for those global banking regulations, will sooner or later also want to integrate the major "climate finance" provisions mentioned above for needed uniformity and clarity (possibly Basel 5?). On a national level, public development banks such as Brazil's BNDES, will play a strategic role in funding the zero-carbon transition. Finance is going to be one of those areas where "the rubber meets the road," where the reformability of capitalism will meet its test.[23] Our politics should reflect that, including an organized insistence on making the activities and institutions of finance subject to political debate and policy reform.

The question of finance in eco-capitalism will soon get reframed by the introduction, imminent in China and soon enough across the European Union, of "central bank digital currency" (CBDC) as the cornerstone of a new digital money regime powering the internet as a sphere of socio-economic activity. Putting that new e-money regime in place, with all its pertinent questions of privacy, security, data collection as a source of value creation, "smart" contracts, supra-national networks, and separation of money creation from bank lending, has to be seen as one of the central questions pertaining to the institutional make-up of eco-

[23] For first steps in the direction of rebalancing the private-public mix guiding "sustainable" finance, see the Glasgow Financial Alliance for Net Zero (GFANZ), the umbrella organization Network for the Greening of the Financial System (ngfs.net), the Financial Stability Board's Taskforce for Climate-Related Financial Disclosure (TCFD), and the creation of the International Sustainability Standards Board (ISSB).

capitalism.[24] Digital money, whether configured locally or even supra-nationally in connection with "smart" contracts to give it conditionality and connectability, will help us interact with each other in new ways on and between all the levels: the micro dimension of individual decision-making, the meso dimension of inter-connected networks and structures (e.g., the inter-sectoral matrix of a regionally defined economy), the macro dimension of national economies, and the meta dimension of the global public good. We will have to incentivize human behavior on all levels, with a flexibly integrative monetary regime helping us to do so. From financial inclusion to facilitation of collective project funding, the emerging digital money regime can be designed in the interest of money's public-good qualities and funding priorities tied to long-term debt affordability and social-benefit-based performance incentives (such as debt servicing relief after meeting verified emission-reduction targets).

It is entirely possible, perhaps even inevitable in the emerging geopolitical configuration of a triad-centered multi-polar capitalism, that the coming reign of digital money will carry the distinct mark of its respective state as well as the financial structure underpinning the variant of capitalism it represents. China could make its e-yuan the anchor of Xi's vision for a big-data surveillance state, assuring collective regulation in exchange for "common prosperity". And the European Union could push its digital euro as a vector of a supra-national financial integration, giving its hitherto fragmented banking systems and financial-market structures a pan-European boost for a stronger regional presence. Both the People's Bank of China (PBoC) and the European Central Bank (ECB) will want their CBDCs to help foster the accelerating internationalization of their respective currencies, a likely significant factor in transitioning from the dollar standard to a multi-currency system of global money.

But the story of digital money need not stop there. CBDCs will become the engine of a new monetary regime, hopefully one in support of sustainable finance and eco-capitalism. CBDCs will render increasingly obsolete the commercial banks' business model of taking deposits and making loans at the heart of finance-led capitalism. Whether and how digital coins get routed through commercial banks or, alternatively, spawn new payments systems beyond banks depends on the design chosen by the central bank, specifically the design of its blockchain underpinning those coins. Blockchains, by their very design as distributed ledgers, form decentralized networks that no longer depend on brokers and other intermediaries in control of asymmetric information. They depend instead on consensus mechanisms among network members for validating entries into a distributed data base and keeping it secure. The early head-start of cryptocurrencies, such as Bitcoin or Ethereum, has spawned blockchain verification mechanisms that carry distinct private-gain biases, notably the intensely energy-consuming competitive rewards-based mechanism known as "proof-of-work" (PoW) or the inherently unequal "proof-of-stake" (PoS), giving fees to those with the largest stakes pledged as collateral.[25] Once central banks enter the picture, they can design more democratic blockchain commons in the interest of an efficient, secure, and widely accessible payments system. Key here will be the public's participation in digital-coin circuits and innovative use of "smart" contracts for social organization of financing activities. We can already imagine all kinds of interesting new arrangements in support of community initiatives, many designed to

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[24] Good introductory discussions of the hugely consequential central bank digital currencies can be found in the Bank for International Settlements (2022) as well as Brunnermeier and Landau (2022).

[25] As Frankenfield (2022) points out, the PoW blockchains require computational work done by so-called "miners" solving increasingly difficult puzzles for verification and issue of new blocks, whereas the PoS blockchains use the computers of coin owners who pledge their coins as collateral in exchange for user fees.

advance sustainable development goals. The new CBDCs may, for example, encourage local-currency economic-activity networks based on labor service exchanges among cash-poor actors. Or they may help mobilize "sweat equity" schemes, such as giving slum-dwellers ownership rights to prefab housing as a reward for their community work to provide their neighborhoods with better services.

Digital coins can steer us towards a different kind of globalization, anchored in supra-national arrangements for the global public good, as crystallized in the aforementioned 17 SDGs. Notwithstanding variants of capitalism and multi-polar zones of influence, the issues we face are global as well as existential. Mobilizing the world community around concrete sustainable development goals will produce a collective fact-finding and information-gathering effort, helped by transdisciplinary knowledge production (e.g., environmental macro models bringing in the biosphere, further enhanced by sustainable value accounting), to yield a biospheric-social-economic-financing-living-conditions map covering the whole earth, not least to identify local needs in flux and direct help where needed. Assuming that the mobilization moves a "coalition of the willing" to launch global initiatives, the map of local conditions and needs might well get connected to a fund-transfer and financing mechanism capable of launching "social economy" and "zero-carbon transition" projects meant to advance our various SDGs. These projects, which will have a very low or even zero social rate of discount in recognition of their long-term nature and be subject to social-value accounting, can be validated as successful when they will have yielded tangibly measurable public-good benefits. Such validation should trigger rewards in the form of debt servicing reductions or convertible bonuses, incentives that can be built into the system of digital money that is earmarked for socially useful SDG-promotion projects by appropriate "smart" contracts. In essence, once we accept the idea of creating a new kind of digitalized credit-money for funding of socially useful sustainable-development projects with performance-based incentives (where the benefits arising from successful pursuit of such projects translate into tangible improvements of the economy and so should not be considered inflationary), we can set up separate funding pipelines for each of the 17 SDGs on a global scale.

Such an infrastructure of "sustainable" finance might be set up more easily if we can agree to a much-needed upgrade of the International Monetary Fund's so-called special drawing rights. The idea is to move the SDRs beyond their rather limited use today and instead have them evolve into an actively circulating liquidity and funding mechanism for earmarked activities.[26] We could, for example, set up SDR-denominated funds for each of the global SDG initiatives, such as "zero hunger" or "gender equality". And we could let these funds be managed by new or revamped international organizations representing stakeholder interests and ready to direct global efforts at providing specific public goods equitably (e.g., a revamped World Health Organization to fight pandemics, a new cybersecurity agency to fight cybercrimes). Since the SDRs are currency baskets comprising the world's five key currencies, which can be drawn on and may in turn be switched into from USD, EUR CNY, GBP or JPY positions via substitution accounts, we could set up a globally organized "sustainable" finance system denominated in SDRs that is parallel to the prevailing for-profit systems of finance that

[26] The SDRs, a currency basket comprising USD, EUR, CNY, GBP and JPY, are allocated by the IMF to its members according to their respective voting weights to serve as reserve assets or for official settlements between members. That asymmetric distribution formula ensures that the neediest low- and medium-income countries get far too small a share of newly allocated SDRs (as with the $650bn. allocation of SDRs in August 2021). There are now discussions to have rich countries transfer their excess SDR holdings to needier poor countries, as in Andrews and Plant (2021) or Cashman et al. (2022).

make up the USD currency area, the euro zone, and the Chinese yuan bloc. To the extent that the former outcompetes the latter, there will be a net flow from the triad US-EU-China into the IMF, allowing the latter to issue more SDRs and even think of expanding their role. The SDRs, for example, could anchor a target-zone system comprising the USD, EUR, and CNY, requiring a modicum of coordination of macro-stabilization policies among the three power centers. Eventually the SDRs could even become the supra-national currency at the center of a truly global international monetary system of the kind John Maynard Keynes (1980) imagined in the so-called Bancor Plan (1943) which he proposed in the run-up to the Bretton Woods conference in July 1944.

What needs to be understood clearly is that we are facing a rapidly intensifying environmental crisis which threatens to render many areas uninhabitable and forces large migrations across the planet. The urgency to act, and act radically, will only become more intense in the face of this pending disaster. When the crisis will have grown into one of the mode of production, putting capitalism itself at stake, attention may well shift into accelerating the expansion of a "social solidarity economy" (SSE) comprising cooperatives, non-governmental pressure groups, public-benefit companies, and commons of all sorts (e.g., urban commons run by neighborhoods, knowledge commons as internet platforms), which together move the conduct of economic activities beyond the capitalist profit-motive and market-routed coordination. Those SSE formations of the Third Way between "markets" and the "state" would also greatly benefit if they had dedicated funding facilities available for support. Worldwide mobilization in favor of global public goods, crystallized as the 17 SDGs, deserves a supra-national finance.

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