Chapter 20
Financial Instability, Climate Change and the "Digital Colonization" of Europe: Some Unconventional Proposals

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Abstract This chapter addresses the three main challenges by sketching three types of policy proposals. First, measures for repression of "finance alchemy" as precondition for a sustained recovery of the real economy and for a "renaissance" of the European Social Model; second, measures for fighting climate change and for promoting ("green") economic growth over a transition period; and third, measures for overcoming the "digital colonization" of Europe by US providers of operation systems, standard software and online platforms.

Key Challenges for Overcoming the Present Crisis

The transition from finance capitalism to real capitalism—the trough phase in the long cycle triggered by financial crises as in 1873, 1929 or 2008—usually takes many years since governance according to the old "navigation map" makes things only worse, but a new map has not yet been developed. Such a transition phase calls for fundamental changes in the direction of the course even without guidance by a new theory (like Roosevelt's New Deal).[1] The new direction of economic and social policy can be derived from a comparison of the framework conditions shaping the post-war prosperity phase on the one hand and the subsequent crisis phase on the other hand.

[1] It is no coincidence that the new EU Commission calls its ecological growth strategy "European Green Deal". Climate change is only the most evident example of the basic problem of systemic crises, typical for the trough phase of the long cycle: the paths followed so far led into a dead end (on the long cycle as sequence of real-capitalist and finance-capitalist regimes, see *Schulmeister*, Chap. 2 of this book).

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Until the 1970s, strict regulation of financial markets focused on striving for profits on activities in the real economy, production and income expanded over 20 years without major recessions. Social coherence was strengthened, in particular through building up the welfare state. At the same time, public debt declined relative to GDP. The guidelines of economic policy were derived from a simplified version of the theory of Keynes. Over the past decades, by contrast, neoliberal guidelines have been shaping the course of economic policy: financial markets were deregulated, the welfare state was weakened and climate change vastly ignored. The wide fluctuations of exchange rates, commodities prices, stock prices and interest rates had two types of effects. First, the emergence of "shocks" like the two "oil price shocks" of the 1970s (triggered by two preceding dollar depreciations), the 1982 debt crisis of Latin America or the great financial crisis of 2008. Second, the "structural" shifting of striving for profits from activities in the real economy to financial investment/speculation. Both effects caused unemployment, atypical employment and the public debt to rise. As a consequence, labour protection as well as the welfare state in general was weakened. Widening inequality and the growing number of people feeling "left behind" promoted the rise of nationalist-populist movements and politicians.

The dominance of neoliberal thinking in economics, in the media and in politics had not only specifically weakened the European Social Model but has also become the most important ideological reason for the failure to fight climate change—in spite of the growing evidence that global warming was caused by men. Even though standard economic theory acknowledges externalities as "market failures" (and climate change is the most threatening example), policy has remained unwilling to take serious collective actions. Those actions ran counter to the "Zeitgeist" which was (and still is) biased in favour of "market solutions".

The third "mega-trend" of last decades besides growing financial instability and continuing climate change has become digitalization in all its forms, from computer hardware and software, the internet, social media and the platform economy. In all these fields, innovative US corporations acquired global (quasi-)monopoly positions: Microsoft in operating systems and standard software, Apple in hardware and operating systems, Google in both fields as well as in search engines and online advertising, Facebook, Twitter and Instagram in social media, amazon in online commerce, Airbnb in arranging lodging and Uber in ride-hailing. The main reason for this success lies in the combination of "first-mover advantages", continuing globalization and—most important—"network externalities". The latter arise from the fact that all these activities are based on networks (including using the same standard software). For network economies, standard rules of market competition do not hold as the network gets the more attractive to "newcomers" the greater it has become ("the winner takes it all"). In this way, US corporations became "digital colonial masters" of the rest of the world (except—in part—for China), and the latter has to pay "tributes" in the form of money and data and remains technologically dependent. As market forces rather deepen than mitigate this relationship, overcoming the "digital colonization" of Europe constitutes a crucial challenge for European Union (EU) policy in the years to come.

This chapter addresses the three main challenges by sketching three types of policy proposals. First, measures for repression of "finance alchemy" as precondition for a sustained recovery of the real economy and for a "renaissance" of the European Social Model; second, measures for fighting climate change and for promoting ("green") economic growth over a transition period; and third, measures for overcoming the "digital colonization" of Europe by US providers of operation systems, standard software and online platforms. Even though the chapter deals only with these three challenges, one should be aware that a long-term economic, social and ecological renovation programme for Europe should also include the following components: first, the modernization and enlargement of the welfare state as probably the most important fundament of a new/renewed "European identity"; second, the implementation of infrastructure projects as part of development cooperation, in particular in Africa, but also in Latin America; and third, the development of new labour time models as prerequisite for combining low economic growth (once climate-neutrality and "true" full employment are achieved) with continuous implementation of technical progress (raising labour productivity) and sustained full employment. The following proposals are designed for the EU, but they could also be implemented in other countries and regions albeit with some modifications.

Promotion of Activities in the Real Economy Through Restricting "Finance Alchemy"

Fostering entrepreneurial activities in the real economy is the most important precondition for prosperity. It can only be achieved if "finance alchemy" is repressed and if exchange rates, commodities prices, interest rates and stock prices are stabilized. The reason is simple: Capital is a greedy, yet flexible, "animal", and it invests where profits are highest. If short-term speculation is unprofitable, then long-term investment in the real economy predominates—as over the 1950s and 1960s in industrial countries or since the reforms in China in the early 1980s.

Foundation of the European Monetary Fund

In a monetary union, interest rates on government bonds have to be stabilized at a common and sustainable level—otherwise speculators can play euro countries off against each other (as in the euro crisis). Hence, the European Stability Mechanism (ESM) should be transformed into the European Monetary Fund (EMF) as the common financing agency of all euro states. The EMF is financed by selling Eurobonds in capital markets as well as by deposits, which are open to any investor (not only banks) as a longer-term financial investment. Unlike Eurobonds, the EMF deposits would not be tradable and can therefore not be used to speculate on changes in interest rates (they are similar to the former German "Schatzbriefe", which allowed private individuals to finance the state directly). As EMF liabilities are guaranteed by

the ECB, they are even safer than German government bonds (a central bank cannot go bankrupt).

The (long-term) EMF interest rate is set at a level below the level of medium-term economic growth (in nominal terms). In addition, the EMF stabilizes the interest rate at the target level by intervening in the secondary market. Under these conditions, speculation on the bankruptcy of an EMU member state becomes useless. At the same time, guarantees for the liabilities of the EMF by euro member states are superfluous. Loans are granted to euro states under certain conditions ("conditionality" as with the IMF). They need not be restrictive and are differentiated according to project and country. The loans should in particular support economically weaker countries and focus generally on projects in the environmental and social sectors. In this way, one could also enforce fiscal discipline of euro countries: If the latter fail to meet the EMF conditions, they are no longer eligible for EMF loans and have to finance themselves through national government bonds.

Transition from Continuous Trading to Electronic Auctions

The overwhelming majority of financial transactions are triggered by computer-based speculation systems. They exploit the phenomenon of "runs" (i.e., "mini-trends") of exchange rates, stock and bond prices and commodity prices, and reinforce them at the same time (e.g., through the "clustered" trading signals of trend-following systems). The sequence of "runs" accumulates into bull or bear markets lasting several years (see Chap. 2). The most efficient means of breaking the feedback between technical speculation and the trending of the key prices in the global economy would consist in moving from continuous trading in microseconds to electronic auctions, for example, every 3 hours. The auctions shall be conducted on electronic trading platforms in the same manner as the opening price is determined already today: The computer calculates the equilibrium price based on all buy and sell orders, valid for the following 3 hours (to stick to the example).

Auction trading would radically reduce the "finance alchemy", stabilize prices and thus make activities in the real economy more attractive. For everybody who buys or sells stocks, bonds, foreign exchange or commodities futures for investing, trading or hedging purposes, it is sufficient when he/she can do so every 3 hours. At the same time, the technical trading systems cut off their "food", that is, high-frequency data. As a consequence, trends would occur less frequently and would be less pronounced so that speculation on the direction of imminent price *movements* on the basis of algorithm becomes less unprofitable. At the same time, focusing on market fundamentals would pay off more than is the case nowadays: In order to give buy/sell orders, traders are forced to form expectations about the *level* of the fundamental value of an asset. This is not the case in continuous trading: High-frequency trading is done automatically by computers and a technical trader will often buy (sell) an asset which he considers over(under)valued just because a short-term trend has taken off and his trading system produces buy (sell) signals.

Auction trading in asset markets would fundamentally change trading practices: "Automated trading systems" (including high-frequency trading) would no longer work as they are deprived of "fast" price data. For the same reason, traders no longer need to watch so many monitors. Instead, reflecting about the fundamental value of the respective asset and its determinants would become more profitable. Finally, one should keep in mind that electronic auction as means of approximating the equilibrium price is perfectly in line with mainstream economic theory. In fact, the founder of general equilibrium theory, Leon Walras, considered this method as the optimum possible.

General Financial Transactions Tax

Even though moving to electronic auctions would be most efficient in curbing short-term speculation, it is very improbable that such a move would take place in all countries with important financial markets. This will limit the stabilizing effect, for example, if only the "Post-Brexit-EU" makes this step. It would nevertheless be useful, if "finance alchemy" emigrates from this area. In order to prevent banks and corporations resident in the EU to engage in (very) short-term speculation elsewhere (e.g., in London), one should introduce a financial transactions tax based on the "residence principle" as proposed by the European Commission (see Chap. 6).

Towards a Supranational Monetary System

The double role of the dollar as the national currency of the US and as a (substitute) world currency is a major cause of fluctuations in dollar-denominated commodity prices (including "oil price shocks"), of the financial crises of dollar-indebted emerging market economies and of the excessive external debt of the US (see Chaps. 2 and 3). At the same time, the dollar is the most unstable of all major currencies because it is the "vehicle currency" in foreign exchange markets. Since the creation of the euro, there are only four major currencies in the global economy, the dollar, the euro, the renminbi and the yen. By setting target rates with small fluctuation margins (about 2%), the exchange rates between these currencies could be stabilized. Such an agreement would also be important as a prevention against "devaluation races", as this danger could sharply increase in the next financial crisis. At the same time, this agreement would be a first step towards the long-term goal of a genuine global currency ("globo"), which would act as a unit of payment and account for global economic "flows" (commodity trading) and "stocks" (transnational financial assets and liabilities) and consist of a bundle of the most important national currencies.

Improving the Environment as (Transitory) "Growth Engine"

Many (very) great investment programmes (in the spirit of the New Deal) would improve the environment over the long run, in particular by reducing CO_2 emissions, and would strengthen economic growth during the implementation phase at the same time ("green growth"). Examples of such projects are the thermic isolation of the whole stock of buildings in the EU, the construction of a (super-)high-speed railways net across Europe as alternative to air travel, and the transition from fossil energy to emission-free cars in individual mobility and to hydrogen technologies in industrial production. However, the potential of a (temporary) "green growth" can only be efficiently utilized if the price of CO_2 emissions and, hence, the price of crude oil, coal and natural gas as the most important polluters, rises steadily and faster than the general price level—simply because the profits from investments in energy efficiency consist of the saved energy costs ("opportunity profits").

Fixing the Long-Term Price Path of Crude Oil, Coal and Natural Gas in the EU

Recently, the renowned Harvard professor Jeffrey Frankel (2020) summed up the problem of how to motivate everybody to avoiding greenhouse gas emissions: "(….) the policy that will move us closest to achieving global environmental targets (….) is to raise the price of emitting carbon dioxide and other greenhouse gases. (….) it would be great if policymakers could commit to a century-long rising path for the carbon price. People could then plan far ahead. Firms would know with certainty the penalty for building long-lasting coal-fired power plants. (….) What is critical, though, is quickly to establish the expectation that the price of carbon will follow a generally rising path in the future". The crucial point is *fixing the expectations of all actors* that the price of CO_2-emission will *never again become cheaper*, but will permanently rise somewhat faster than the general price level. As long as there is uncertainty about the future price development of oil, coal and natural gas, even temporarily high prices will not sufficiently motivate households and companies to invest in emission-free technologies.

A concrete example: between 2004 and 2008 and between 2009 and 2012, the price of crude oil rose dramatically and with it the price of fuels, heating oil and natural gas (Fig. 20.2 shows the price of Brent crude oil and diesel in Germany in €—the latter rose to more than 1.50€). However, the oil bull market was followed by a bear market, and the diesel price fell again to only about 1€ in 2009 as well as in 2016. As a consequence, the demand for SUVs picked up again and investments in CO_2 reductions, which were profitable at an oil price of 70€ (and more), turned into "sunk investments". The following fact massively exacerbates the problem: Investments in energy efficiency or in renewable energy only pay for themselves after many years (energetic renovation of buildings, spread of e-cars including supply networks, etc.) or even decades (development of hydrogen technology in

industry and—possibly—also in (heavy) traffic, trans-European network of high-speed trains as a prerequisite for a radical restriction of air traffic, etc.). An ecological investment offensive therefore requires *maximum planning security*.

Even under the extremely restrictive conditions of (general) equilibrium theory, market prices cannot take into account the "external costs" caused through production and consumption. It is up to policymakers to "internalise" these costs (directly through environmental taxes, indirectly through emissions trading, in which the quantity of permits is gradually reduced). This market failure is exacerbated by a second market failure typical for all asset prices, including not only stock prices and exchange rates, but also the prices of fossil energy or of CO_2 permits: They fluctuate in a sequence of bull and bear markets, that is, they deviate widely from their "fundamentals". The development of the oil price (and thus indirectly also of the prices of natural gas and coal) is a particularly pronounced example of the "manic-depressive" dynamics of speculative prices (see Figs. 2.3, 2.5, 2.6, 2.7, 2.8, and 2.9 in Chap. 2).

By combining both types of market failure in those goods whose consumption is mainly responsible for global warming, this problem reached a life-threatening dimension. Climate researchers recognized the extent of the problem in recent decades, and most economists, however, did not as they disregarded the importance of the two types of market failures in times of neoliberal thinking. In particular, the idea that the "freest" markets, the financial markets, systematically create false prices (through "bulls" and "bears") is unthinkable within the paradigm of general equilibrium economics.

Economic policy has been focused on the two standard instruments for pricing CO_2 emissions, carbon taxes or emission trading schemes. Unfortunately, neither of them can achieve a path of continuously rising CO_2 prices. Let's begin with carbon taxes. In all EU countries, there has long been a tax on fuels. It is equivalent to a tax on CO_2 emissions caused by fuel consumption since there prevails a fixed relationship between the quantity of fuel consumed and the related CO_2 emissions. In Germany, for example, the tax on diesel is 47 cents per litre. Since the burning of 1 litre diesel produces 2.65 kg CO_2, the diesel tax burdens the emission of 1 ton of CO_2 by roughly 180€ (= 0.47/2.65 per kg). This is much more than in most planned or—like in Sweden or Switzerland—already implemented (general) carbon taxes. Due to the extent of fluctuations in the world market price of crude oil, phases of marked price reductions for petrol, diesel and heating oil are inevitable despite a CO_2 tax (even as high as 180€ per ton). This also applies if—as planned—the CO_2 tax is raised gradually. In the last 10 years alone, for example, the price of oil fell twice to such an extent that the price of diesel declined by about 50% (Fig. 20.2). As long as the oil price is determined on the derivative markets, where short-term speculative transactions dominate (the trading volume of "paper barrels" is many times greater than global oil production), CO_2 taxes cannot anchor the expectations of a steadily rising price of CO_2 emissions. Rather the opposite: the more the EU (and other countries) succeed in reducing the consumption of fossil energy, the more likely it is that world oil prices will fall, which in turn will counteract the increase in the price of fossil energy through CO_2 taxes.

Regardless of this "rebound effect", renewed drops in oil prices are likely because both supply and demand are not price elastic. Even small increases in global oil

supply (e.g., due to "undisciplined" OPEC countries or other oil producers such as Brazil, Guyana, Norway and Canada) or a slight weakening of demand (e.g., due to a further deterioration of the global economy or even a new financial crisis) triggers significant price declines. The basic structural problem is as follows: the global reserves of fossil energy are much larger than the global "CO_2 budget"—if a climate catastrophe is to be avoided, the reserves must not be exhausted. This over-supply will exert a permanent downward pressure on fossil energy prices.

The problem of setting an upward price path of CO_2 through emissions trading schemes can be illustrated using the EU trading scheme (EUETS) as example: It was introduced in 2005 and covers only the main CO_2 emitters from industry such as iron and steel, paper, chemicals, power generation and (EU internal) flights, which together account for about 45% of all CO_2 emissions. In theory, emission trading is the optimal control instrument: the amount of CO_2 is limited by the volume of permits and the cap is gradually reduced. A uniform price is formed on the permit exchanges, which ensures that the emissions occur where their benefit is greatest: A company that needs more certificates because of a good business situation buys them via the exchange from another company that has a surplus. These transactions constitute compliance transactions.

In order for emissions trading to create incentives to invest in the CO_2 reduction, the permit price would have to rise steadily. However, this is precisely what is not the case. In fact, the price for the emission of 1 tonne of CO_2 fluctuated between €32.3 and €3.1 (Fig. 20.1). Moreover, between 2011 and 2017, it was at such a low level that it did not create an incentive to invest in CO_2 avoidance.

This disaster has two main causes. First, the certificates for a longer period must be fixed in advance (almost 12,000 operating sites need planning security). This organizational necessity must lead to misallocations and thus "wrong" CO_2 prices due to the fundamental uncertainty about the medium-term economic development. For example, the financial crisis was—of course—not foreseen, resulting in an oversupply of emission permits so that their price fell to below €10 in 2009 and to below €5 by 2013 (Fig. 20.1). The fact that the EU had to introduce a "Market Stability Reserve" to reduce the (over)supply of allowances illustrates the issue. Second, financial actors on the CO_2 permit exchanges "interpose" themselves between companies with a surplus or deficit of permits and use the derivatives based on permit price as speculative vehicles. Thus, since 2010, 99% of all transactions have been based on derivatives and only 1% on genuine certificates (hedging can therefore only play a minor role). Already in 2012, the total CO_2 transaction volume (including derivatives) was more than 33 times higher than the companies' "compliance needs" (Berta et al. 2017). Moreover, the CO_2 price dynamics shows the pattern typical for speculative price in general: Short-term trends, which are exploited by algorithmic trading, accumulate into longer-term bull or bear markets (Figs. 20.1 and 20.2).[2]

[2]The properties common to speculative assets are: They can easily and almost permanently be traded, at least in derivatives markets (as in the case of commodities), the supply is fixed over the short run and might be shrinking over the long run (as with Bitcoins or CO_2 permits). In the respective markets, professional players trade with amateurs. In some cases, the latter buy or sell the respective asset for reasons of their business in the real economy (e.g., exporters/importers or tourists in the foreign exchange market or industrial or energy companies in the CO_2 emission market).

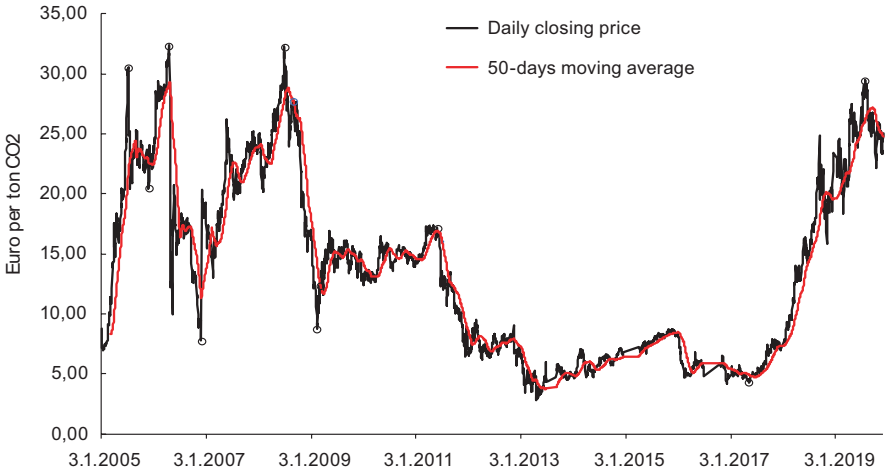

Fig. 20.1 Fluctuations of the price of EU CO_2 emission allowances

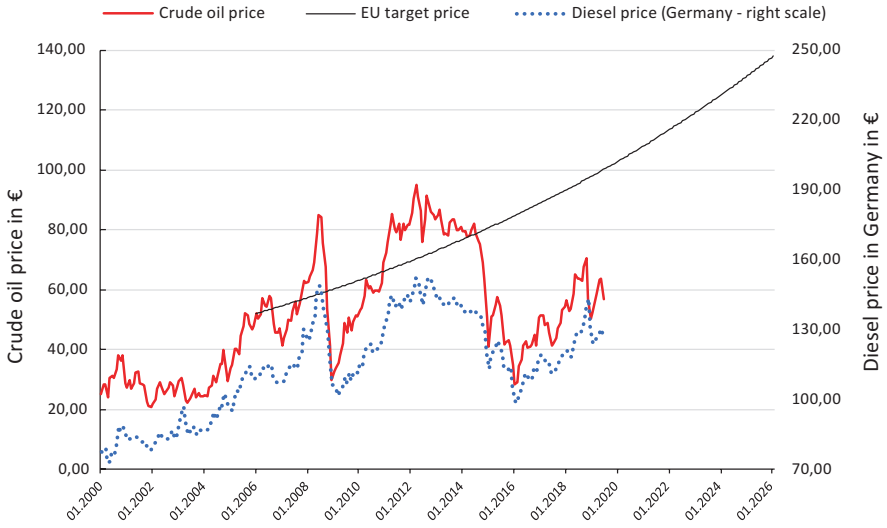

Fig. 20.2 Price incentives for CO_2-reduction—market or target prices

The participating industrial and energy companies, whose CO_2 emissions should be optimally allocated by the system, have to accept permit prices resulting from speculative derivative transactions of "financial investors" (traders). They of course also take into account "news" about the fundamentals, but mainly as a trigger for short-term price movements, which are exploited and reinforced at the same time by technical trading systems (Figs. 20.1 and 20.2 show a particularly simple system: buy or sell when the price intersects the line of the moving average of the last 50

prices from below or above—the "trading systems" used today are much more complex, but all of them aim at exploiting the "trending" of asset prices).

To summarize, the fluctuation of crude oil, coal and natural gas prices as well as of carbon emissions prices is almost systematically preventing ecologically necessary investments, since the profit of the latter lies in the avoided energy costs. Such investments will only be made to a sufficient extent if fossil energy becomes steadily and predictably more expensive. How could this be achieved? Instead of taxing the CO_2 content of oil, coal and natural gas, the EU should set a path with steadily rising prices for these energy sources (initially for about 20 years) and skim off the difference between the EU target price and the respective world market price by means of a monthly adjusted quantity tax—instead of the prices of fossil raw materials and the products made from them, the (implicit) quantity tax should fluctuate.

Here is a thought experiment using the example of crude oil to illustrate the working of such a price and tax regime. On 1 January 2006, the following regulation came into force in the EU: Starting from the (then) current oil price (Brent) of 52.0€, the price valid within the EU would rise along a predetermined path by 5% per year (just 3 percentage points higher than target inflation). This rate of change would be much smaller than the fluctuations realized since then, but it is always positive—and everybody knows it in advance. As a result of a second "bear market", the price of oil fell from €95.0 to €28.3 between March 2012 and January 2016, while the price of diesel in Germany fell from €1.52 to €0.99 (Fig. 20.2). However, the EU guideline price for oil would be €84.8 in January 2016. For February 2016, the EU oil tax would thus amount to 56.5€ (84.8 minus 28.3) per barrel, about twice the oil bill (the figures are for illustrative purposes only; if an EU price path had actually been introduced, the world market price of oil would have developed differently, most probably, it would have been further dampened).

If one considers that the EU had to pay a total of €414.5 billion in 2016 for energy imports—almost exclusively fossil—it becomes clear that the return on an EU tax on fossil energy would be well over €500 billion (even without the UK). In the long term, it would increase at an above-average rate: On the one hand, the EU target price is rising, while on the other hand, the EU's climate policy is curbing its energy imports and thus world market prices. This would also bring about a lasting change in the distribution of oil and natural gas income: These are mostly "rentier income" of the owners of the great oil and gas reservoirs. Whenever oil prices rose in the past, the producing countries, but also the oil companies, made extra ("windfall") profits. By constantly increasing the price *itself*, the EU is dampening world market prices and thus diverting part of the "rents" into the budgets of the Member States.

Technically, the implementation of such a flexible quantity tax would be very simple in the "digital age": Based on the difference between the EU target price and the world market price, the tax per unit of quantity of oil, coal and natural gas valid in the following month is determined at the end of each month by the EU Commission and paid in the Member States by producers and importers of fossil energy in the EU.

What would be the most important price and investment effects of EU target prices for fossil energies (because of the different "CO_2 intensity", the price path for

coal should be steeper and that for natural gas flatter than the oil price path)? All goods and services would become more expensive within the EU to the extent that fossil fuels are used in their production (from fuels including kerosene to plastic products). Products produced with renewable energy or less energy would become relatively cheaper. Goods imported into the EU would be subject to an analogous energy tax (border carbon adjustment tax). Since EU price paths "internalise" the environmental costs of fossil fuel consumption, such a levy would not contradict the rules of the World Trade Organization (WTO). As long as no comparable CO_2 taxes exist in the EU's trading partners, EU exports would have to be relieved from the EU tax paid (analogous to VAT).

The investment effects would be most significant: Since owners of single-family homes, housing cooperatives and so on *know* how much heating costs they could save by renovating buildings to make them more energy-efficient, they would expand their investments accordingly. The mandatory price paths would relieve the car companies of a large part of the risk of long-term and expensive investments in the development of electric vehicles. Of course, the "pace" of the price paths should be adapted to developments at greater intervals, but since a reduction in the price of fossil energy is ruled out, the following holds: the earlier an investment is made, the greater is its profit. Such a system of pricing fossil energy would therefore trigger a sustainable investment boom. This could be promoted by using part of the (enormous) returns from the energy tax for long-term large-scale projects (another part should offset the burden of energy price increases on low-income groups). These projects include the energetic restoration of the entire building stock in the EU, the creation of a trans-European network for high-speed trains, the switch to electric cars and to hydrogen technology, especially in the most energy-intensive industries (steel, paper, basic chemicals, building materials) and finally investment in public transport.

Such a Green New Deal would rise and—more important—stabilize economic growth in the EU while at the same time improving long-term environmental conditions. Such a (temporary) "green growth" would reduce unemployment and atypical employment, and with it the (fear of) poverty and declassing of more and more people. Technically, it would be far easier to implement just three flexible quantity taxes on oil, coal and natural gas than managing the complex and bureaucratic EU emissions trading scheme (not to speak about extending it to transport and housing) or taxing the CO_2 equivalent of all primary production inputs.

Thermic Renovation of the Stock of Buildings in the EU

The energy requirement of (residential) buildings for heating, air-conditioning and warming water can technically be reduced by almost 100% in most cases. Even if one would reach only the "low energy standard", one could save roughly 80% in energy and, hence, in CO_2 emissions. At the same time, however, the renovation rate per year is less than 1% in the EU. This situation calls for initiating and

implementing a mega-project in the spirit of the New Deal: The thermic renovation of the overall stock of existing—primarily residential—buildings in all EU countries over a period of 15–20 years. This project should be promoted at all levels—from the EU down to the communities—by linking together business, banking, public administration, house owner and residents in "concerted actions". The project needs to be promoted through campaigns in TV, print and social media, documentation of best practices (in particular with respect to the insulation material), engagement of local banks taking over the management of single projects ("one-stop-shop") in exchange for secure investment/credit opportunities in real capital, etc. The macroeconomic effects of this project would be very substantial for several reasons: It consists of millions of single projects and, hence, stimulates the economy on a large-area basis, that is, EU-wide. The production is labour-intensive and requires in particular not "too" highly qualified workers. For both reasons, the multiplier effects will be above average. Very rough estimates indicate that the annual GDP growth in the EU could be raised by up to 3 percentage points through such a "mega project" (Schulmeister 2018, p. 334).

Trans-European Network of High-Speed Railways

If the price of fossil energy would steadily increase in the EU, using airplanes as means of transport would become particularly more expensive. At the same time, air traffic accounts for a substantial part of CO_2 emissions. To steadily reduce them, one needs alternatives for transportation, in particular over distances below 1000 km, for example, a net of high-speed railways.

Nowadays, high-speed trains already reach more than 500 km/hour in tests. It is therefore not unrealistic that it might take roughly 3 hours to get by train from Berlin to Paris. If, at the same time, an air ticket for the same trip cost several hundred euros, more and more people would prefer the train (as is already the case today for the trip from Milan to Rome as the train takes less than 4 hours). Constructing such a railway network will take several decades, it would create a great number of jobs and it would "move" the countries at the EU periphery like Romania, Bulgaria, the Baltic states and also—in the future—the Western Balkans closer to the centre, not only as regards travel distance, but also the social–psychological and political distance.

Overcoming Europe's "Digital Colonization"

Wherever exchange, transportation and communication links are to be extended, uniform networks and standards offer the most efficient solutions. This holds for physical networks as "natural monopolies" (railways, power and water lines, etc.), for information networks as "quasi-natural monopolies" (Facebook, Twitter, etc.),

for search engines like Google, for operating systems (Windows of Microsoft, OS of Apple), for standard software like Microsoft Office as well as for internet platforms for services exchange (Airbnb, Uber, etc.). As efficient as such "universal solutions" are, they give private (US) corporations (quasi-) monopoly positions in the global economy. As a result, Facebook, Google, Apple, Microsoft, Airbnb, Uber or Amazon not only receives billions of euros as monopoly rents, but also an incredible amount of information about the lifestyles, values and preferences of every single user in the world. This information is linked and used for commercial and political advertising. Whoever has these data at his disposal can also manipulate democratic processes.

This situation poses a challenge for the EU in several respects. First, the EU has no chance to obtain any control or even substantial information on the use of the data collected by the giants of the Silicon Valley. Second, households and companies in the EU will have to pay monopoly rents to the USA which can be increased at will—for at least the next decades. Third, Europe remains technologically dependent on US companies in a field which is extremely important and vulnerable at the same time—in particular in times of crises (e.g., all government agencies in the EU use Microsoft Office).

The only viable way out of the dilemma: Europe must develop its own operation system, standard software, networks and search engines. Just as with the "natural" monopolies of rail, electricity or water supply networks, the "quasi-natural" IT monopolies should be operated by enterprises in the public interest. To this end, a European Software Consortium (ESC) should be created, in which the best IT companies, university departments and research institutes from the entire EU work together. After all, there are hundreds of thousands of highly qualified computer scientists and engineers, most of whom are highly motivated to work on such a European emancipation project.

The best historical example of such a strategy was the creation of Airbus in 1970, when Europe was lagging behind the US in the aircraft industry more than it is today in information technology. The formation of a trans-European consortium, massive subsidies and the political consensus on the importance of this project made it possible to catch up within 20 years. The realization of this Pan-European mega-project requires close cooperation between research policy and companies (at the EU level as well as within the member states) and massive financial support for the ESC. For example, the number of ESC employees could well reach the size of Airbus (about 60,000). An annual budget of 15 billion euros may seem gigantic at first glance, but it would still only be 0.1% of the EU GDP (without the UK). Finally, implementing this project also requires a sustained campaign to educate the public that Europe's information technology dependence will not only force tribute payments to the USA for decades, but will also threaten freedom of opinion, democracy and human rights. If all these conditions were fulfilled, Europe could overcome its "digital colonization" in 10–20 years.

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