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Keynes', Piketty's, and an extensive failure index: Introducing maldevelopment indices

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Introduction

In recent years there has been a proliferation of alternatives to move beyond GDP as an indicator of socio-economic wellbeing. This was most probably due to the growing distrust of GDP as an appropriate metric for measuring the degree of advancement of societies. Another probable reason for the growing GDP disbelief is the ecological crisis rapidly approaching catastrophic levels, and the international opinion and mass mobilization it has given rise to. Ecological disruption is not a subject about which GDP has much to say — although there have been attempts to adjust GDP to allow for the costs of environmental destruction.¹ GDP is not only a socially (distributionally) blind indicator but also an ecologically blind indicator.

The search for alternatives to GDP has even reached the highest bastion of economic orthodoxy, namely the International Monetary Fund (IMF). In a recent article in the IMF's house organ, Daniel Benjamin and others explain how to measure "the essence of the good life," and how to find a better gauge of prosperity than GDP (Benjamin *et al.* 2021, based on Benjamin *et al.* 2017). Their proposal is "beyond GDP," both in the sense of abandoning GDP's economistic approach and also in the sense of abandoning GDP's objective approach based on observable, measurable physical quantities. The approach is based on subjective, non-observable mental states, as reported by respondents of surveys designed to detect them. The approach is thus methodologically close to that of the World Happiness Report, which is mainly based on the results of the Gallup World Poll.²

The plethora of different attempts to find a better gauge of human progress, and to quantify "the good life" are positive and promising symptoms of an extensive collective search — a wide and intellectually multifaceted attempt to find a new economic and social paradigm. That is, it can be seen as a search for a way out of the present, in many senses flawed system.³

However, the "GDP mentality" is still strong and dominant, and it seems to prevail in the factual choices of most governments and international organizations. This mentality not only ignores or neglects the policy reorientation messages implicit in the proposed alternatives to GDP. It also refuses to recognize

¹ See for instance Fleurbaey and Blanchet (2013) for a survey of different alternatives "beyond GDP."

² See <https://worldhappiness.report>. The Nordic countries and Switzerland have ranked as happiest since the inception of the World Happiness Report rankings.

³ A shortlist of alternative indicators beyond GDP should at least include the following: UNDP Human Development Index, OECD Better Life Index, EU's Beyond GDP program, Genuine Progress Indicator, Social Progress Index, Happy Planet Index, Gallup-Sharecare Well-Being Index, Index of Sustainable Economic Welfare, Gross National Well-being, and Green National Product.

the flaws and ills of the present system, since long been denounced by numerous social thinkers and reformers.

One most prominent such thinker and reformer economist, John Maynard Keynes, introduced the concluding chapter, on the social philosophy underpinning his book — *The General Theory of Employment, Interest, and Money* — with the sentence:

The outstanding faults of the economic society in which we live are its failure to provide for full employment and its arbitrary and inequitable distribution of wealth and incomes.

It is relevant to remind economists, including Keynesian economists, of these final words. Keynes is here taking distance from, or negating, the supposed economic laws of distribution. The distribution of incomes is for Keynes *arbitrary*, that is, it does not follow any such law, as for instance the marginal productivity law. The same applies to the distribution of wealth, i.e. accumulated incomes/profits. This means that the distribution of wealth and incomes can for Keynes be modified without that impinging on some ineluctable economic law. What is more, for Keynes the rules according to which wealth and incomes are distributed *should* be changed, because they are inequitable.

We live now, 86 years after *The General Theory*, and after several decades of the dismantlement of the Welfare State, back in economic societies with levels of income and wealth inequality, and with employment problems, similar to those of Keynes' time. To that, we must now add the new and very ominous risks inherent in the impending climate catastrophe.

This should be seen as a real failure, and urgent measures should be taken to get rid of it. The first rational measure in such a situation should be to carefully scrutinize the state we are in. This is where the idea of failure indices comes in. While alternatives to GDP try to show what a better life should look like, and rank countries according to how far they have reached in that direction, a failure index should show what are the unsolved faults and flaws of present societies needing urgent attention, and how far they have come in solving them.

A Keynesian and an eco-Keynesian index

So we can now introduce our first failure index, a venerable Keynes index. The Keynes index simply tries to implement an empirical evaluation of the fundamental ailments of present societies as diagnosed by Keynes, namely unemployment, income inequality, and wealth inequality. Three flaws whose magnitude — that for simplicity we assume of the same weight and importance — is measured by particular indicators. This index will we call Keynes1.

We also define a Keynes2 index, an eco-Keynesian index. To our knowledge, Keynes did not refer to the environmental question in his writings. But he was a compelling and persuasive critic of the ostensible flaws of the societies of his time. Confined as they were within the stringent paradigm of free-market *laissez-faire*, those societies were not allowed to search, let alone to provide, any solution to their multiple faults. Flaws that the spontaneous general equilibrium of *laissez-faire* could not solve, would soon be “solved” by the mechanism of the spontaneous “extended general equilibrium” which includes markets, and also non-market mechanisms such as politics and conflict—including war and revolution.

The ecological crisis, and in particular the global warming crisis, are flaws with implications more grievous than that of the inequality and employment crises. These flaws also cannot be addressed and

solved by the spontaneous general equilibrium of markets. If not addressed and solved by the conscious agency of collective bodies such as governments and international initiatives and organizations, there is the very real risk that they will be “solved” by the “extended general equilibrium” mechanism that includes war, and also political and ecological collapse.

It is quite natural to assume that a Keynes of today would include global warming, or more precisely, the unsustainable emissions of greenhouse gases (GHG), among the outstanding faults of societies existing in our time. We may confidently also assume that Keynes would consider the ecological crisis, and particularly the global warming crisis, such an urgent and important problem as the income and wealth inequality, and unemployment crises. An eco-Keynesian failure index should then include an ecological GHG indicator, and with the same weight, a socio-economic flaw index comprising unemployment and income and wealth inequality, our previous Keynes1 index. This will be called the Keynes2 index.

A “Piketty” failure index

The *World Inequality Report 2022* (WIR22) is the collective work of dozens of researchers, coordinated by Lucas Chancel, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman (see Chancel *et al.* 2022). As they state on page 10 of the executive summary:

Economic growth numbers are published every year by governments across the globe, but they do not tell us about how growth is distributed across the population – about who gains and who loses from economic policies. Accessing such data is critical for democracy. Beyond income and wealth, it is also critical to improve our collective capability to measure and monitor other dimensions of socio-economic disparities, including gender and environmental inequalities.

The authors of the WIR22 are here implicitly criticizing the GDP indicator for not taking account of how income or well-being is distributed among persons — a criticism that by the way also applies to most proposed alternatives to GDP. The WIR22 report considers it of critical importance to be able to accurately assess the magnitude of income and wealth inequality, and also of gender and environmental disparities. They provide a wide up-to-date and consistent dataset covering these aspects for a representative list of 26 countries comprising a large majority of the world population.

WIR22 is a precious mine from where to extract data for our Keynes1 and Keynes2 indices. From WIR22 data can also a meaningful failure index be defined which includes what for its authors are the four critical flaws of income, wealth, gender inequality, and environmental damage (GHG emissions). For brevity we call this index Piketty1 — Piketty being a well-known name among economists and representative of the large group of researchers behind the Report. Piketty2 includes the four indices of Piketty1, plus a fifth indicator of transparency. The transparency indicator measures the level of availability and quality of economic inequality data, as assessed by WIR22 together with the United Nations Development Program (UNDP).

Estimating Keynes’ failure indices

Keynes’ first index defined above is Keynes1, which includes Keynes’ three defined flaws of unemployment, income inequality, and wealth inequality. Keynes1 is the simple average, for each country, of the corresponding unemployment and inequality indices. Indices vary between 0 and 1.

From raw data for flaw x_i (for instance, the rate of unemployment) in country i , index I_i for (the rate of unemployment in) country i is obtained by making:

$$I_i = \frac{x_i - x_{min}}{x_{max} - x_{min}} \quad (1)$$

where x_{max} and x_{min} are the highest and lowest country (unemployment) values respectively.

A composite index is composed of several indices. Composite index I_i^c (e.g. Keynes1) for country i , is the sum of the n different indices, divided by the number n of indices (three in the case of Keynes1). That is, I_i^c is the simple average of the n different I_i :

$$I_i^c = \sum_{p=1}^n \frac{I_{i,p}}{n} . \quad (2)$$

Composite index I_i^c will not, in general, vary between 0 and 1. For convenience, to obtain 0 to 1 values we re-index it, defining indexed $I_i^{c'}$:

$$I_i^{c'} = \frac{I_i^c - I_{min}^c}{I_{max}^c - I_{min}^c} . \quad (3)$$

This is how Keynes1 — and all indices in this paper — are constructed. The second index, Keynes2, assumed that a present-day Keynes would possess an ecological consciousness as strong as his economic and social consciousness. Keynes2 index gives then the ecologically harmful GHG emissions the same weight as Keynes' socio-economic flaw indicator Keynes1. That is, Keynes2 is the (re-indexed) arithmetic mean of Keynes1 and GHG emissions.

We now briefly comment on the definitions and sources of the indicators composing the Keynes' indices — a detailed description is given in the Appendix. (An Excel spreadsheet with the raw data on components and indices for the 26 countries can be requested from the authors.)

The carefully and laboriously constructed WIR22 dataset is the source of our Keynes1 and Keynes2 failure indices, except for the rate of unemployment, which is not included in WIR22. Employment-to-population data from the UN Human Development Report are used instead. According to the data, countries with the highest non-employment rates are countries such as Algeria, South Africa, and Morocco, where women's employment is low. Countries with the highest employment rates are China, Indonesia, and Israel.

WIR22 country-sheets provide information for the remaining two components of Keynes1 (income and wealth inequality), and the ecological component of Keynes2 (GHG emissions per capita).

In WIR22 income inequality is gauged by the ratio of the average income of the top 10 percent to the average income of the bottom 50 percent (income gap). The 10 to 50 percent income gap is one of many possible measures of income inequality and a plausible one. Of the 26 countries of the report, the highest income inequality is found in South Africa, and Latin America (Mexico, Chile, and Brazil). Countries with the lowest income inequality are Sweden, France, and Italy.

WIR22 country sheets do not provide measures of wealth inequality. They do provide data for computing our own wealth inequality index: the top 10 to bottom 50 percent ratio of the shares of total

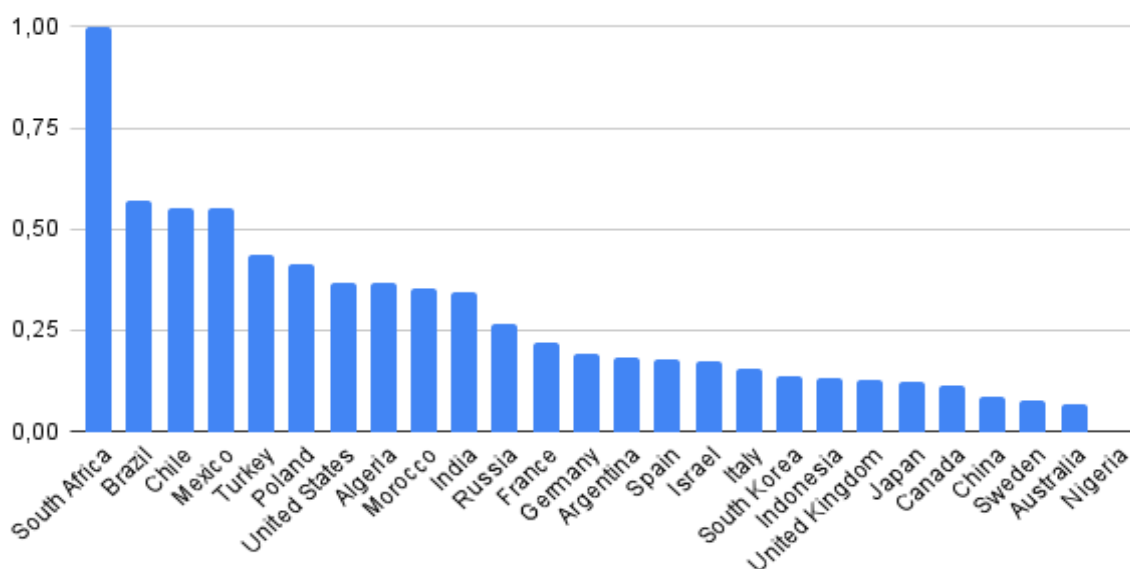
wealth owned by the respective group. Wealth inequality is in general much larger than income inequality. In countries in which income inequality is large, wealth inequality is huge: South Africa, Chile, Brazil, and Mexico. Wealth inequality is lowest in Italy, Spain, and Australia.

The above are the components of the Keynes1 index. To compose Keynes2, the eco-Keynesian failure index, we need data about greenhouse gas emissions. The WIR22 data of per capita GHG emissions include emissions from carbon dioxide (CO₂) as well as from other greenhouse gases such methane (CH₄) and nitrogen oxides (NO_x).⁴ They take account of (net) emissions in production, consumption, and foreign trade. Raw data on GHG emissions per capita are transformed in an index according to the formula above. The highest per capita emitters are the USA, Canada, and Australia. The lowest emitters are Nigeria, India, and Algeria.

Results for Keynes1, first Keynes' failure index

Keynes1 is the (re-indexed) simple average of the indices of unemployment, income inequality, and wealth inequality summarily described in the previous section. We present here the Keynes1 results for the 26 WIR22 countries in the visually more direct graphic form.

Keynes1 Index



South Africa ranks highest by far in the Keynes1 index, followed by Brazil, Chile, and Mexico. This is a direct consequence of the weight that income and wealth inequality — exceptionally high in these countries — have in Keynes' failure index.

A result that counters established prejudice is the place of Nigeria as the country least prone to Keynes' failure. Unfortunately, the result is perhaps not very reliable, because WIR22 places Nigeria as lowest in the transparency dimension. Australia, China, and Sweden follow among the countries less affected

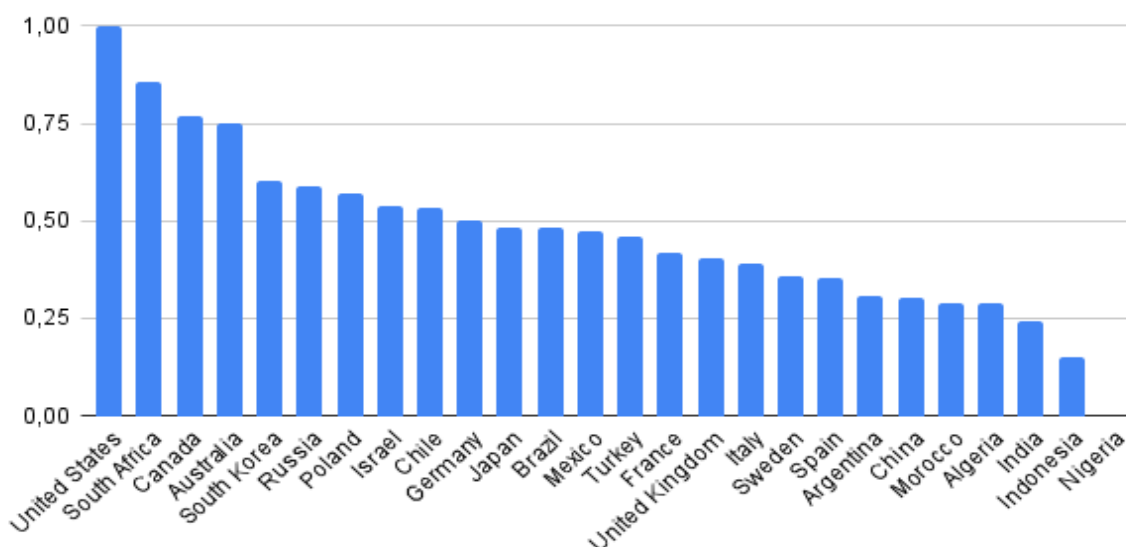
⁴ WIR22 provides also estimates of the distribution of per capita GHG emissions by different groups of emitters *within* countries. In countries like China, Mexico, and Chile, the average per capita GHG emissions by the top 1 percent of emitters are 40 to 50 times the average emissions of the bottom 50 percent. See also Chancel and Piketty (2015).

by the Keynes1 malady. This also is perhaps a not very expected result, which is not put into question by credibility problems — although China’s and Australia’s transparency ratings are not very high.

Results for Keynes2, an eco-Keynesian failure index

Our eco-Keynesian index Keynes2 includes, with equal weights, socio-economic and ecological components. The socio-economic dimension is provided by the previous Keynes1 index; the ecological dimension is furnished by WIR22’s GHG footprint, i.e. annual greenhouse gas emissions of the average individual. Keynes2 is the (re-indexed) unweighted arithmetic mean of Keynes1 and the GHG footprint index.

Keynes2 Index



The worst performers, with the highest eco-Keynesian failure values, are countries — except South Africa — that are rich and that socio-economically performed relatively well: USA, Canada, and Australia. Rich countries are in general high (per capita) emitters, and their high ecological damage rankings outweigh their favorable socio-economic ranking. In the case of South Africa, a relatively low GHG footprint (associated with low average income) was not enough to compensate for the inequality flaw. Other high inequality countries, such as most Latin American countries, succeed better in compensating high Keynes1 failure indices with low GHG footprint values, due to low average incomes.

The best performers, with the lowest Keynes2 index values, are without exception low-income countries with very low GHG per capita emissions. Very low emissions — and not too bad socio-economic rankings — by countries like Nigeria, Indonesia, Algeria, or Morocco, tend to dominate the resultant Keynes2 value.⁵

⁵ A short digression. The highest emitters, i.e. rich countries emitting (per capita) several times the sustainable world average, should compensate countries emitting below the (per capita) sustainable world average. Climate transfers to poor, low polluting countries are presented as “aid,” but they should be understood as compensations or indemnities for damages caused to their (share of the) atmosphere. A rational and equitable system of compensations should facilitate an organized transition path to sustainable emissions. Examples of rational transition schemes are for instance Barnes *et al.* (2008), Buzaglo (2007, 2009), and CSO (2021).

Results for Piketty1, first Piketty failure index

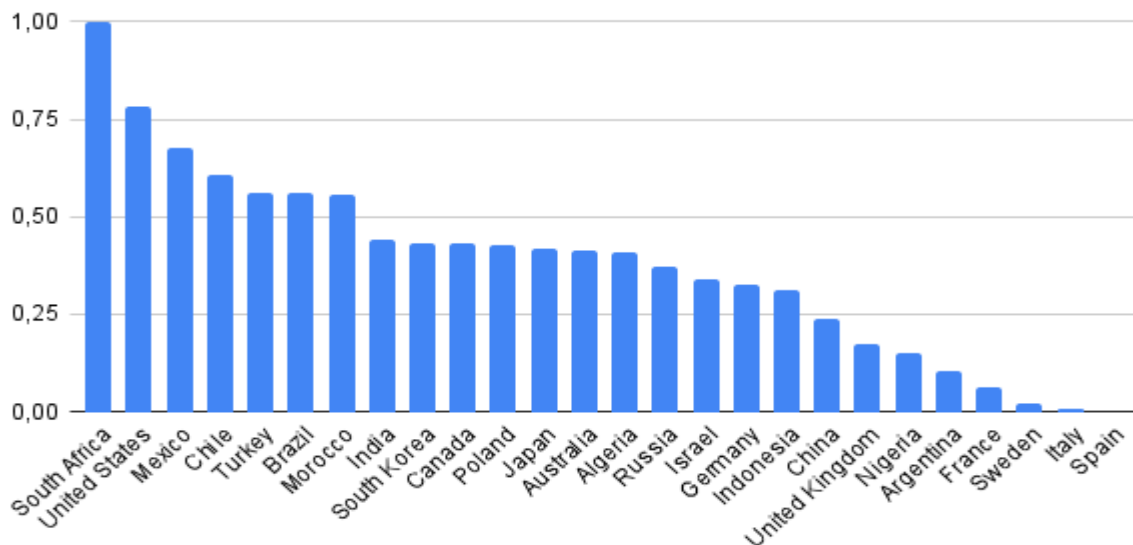
Piketty1, the first Piketty index, is composed of three indices of inequality — of incomes, of wealth, and gender inequality — and an ecological failure index of GHG per capita emissions. Except for the gender inequality index, these indices have already been introduced in previous sections, on the calculation of Keynes' indices.

WIR22's indicator of the degree of gender disparity or discrimination is the share of total labor income earned by women. The female labor income share partially reflects the extent to which women are integrated into the wider economic and social life of the community. A share of 50 percent indicates gender equality of total incomes; zero percent means no labor earnings by women.⁶

Ranking as the least gender unequal, Sweden, France, Poland, Russia, and Spain are close to zero in the index of gender failure. In these countries, the share of total labor income earned by women is around 40 percent. The gender failure index is highest in Algeria, Morocco, India, and Turkey.

The figure represents the ranking of countries according to Piketty's first failure index — the (re-indexed) simple average of four failure indices: of income, wealth, and gender inequality, and ecological damage (GHG per capita emissions).

Piketty1 Index



As in the previous Keynes1 index, the disheartening income and wealth distribution conditions of South Africa dominate also its position in the Piketty1 index. The US is second in the Piketty1 failure ranking, because of the world's highest GHG per capita emissions, added to relatively high income and wealth concentration values. For reasons similar, but milder than in the case of South Africa, Mexico follows in the Piketty1 ranking. Among the countries with the least Piketty1 indices, we find countries like Italy,

⁶ The (non-)employment to population ratio used in our specification of the unemployment component of Keynes' indices also indicates to some extent the discrimination of women. To that extent, our Keynes indices also contain a gender failure component.

Spain, Sweden, and France, with different proportions of relatively favorable conditions for women, distributional equality, and a modicum of ecological awareness.

Results for Piketty2, second Piketty failure index

The WIR22 study provides also information on the degree of accuracy or credibility of the inequality data reported by countries. An index of data transparency produced jointly with the UNDP, “measures the level of availability and quality of economic inequality data.” (p. 178 of the Report).

In principle, the reticence of administrations or authorities to transparency concerning data on economic inequalities may reflect two types of problems. One type of problem is related to the intended avoidance of the reputational loss that results from high inequality, which is universally considered a social and ethical fault. Countries might try to embellish their data on distribution by different nontransparent means, or by simply not collecting and reporting such data.

The second type of problem that data opacity may reflect is institutional corruption. The statistical services not taking data accuracy and transparency seriously may reflect the approach to integrity and trustworthiness prevalent in the institutional system in general.

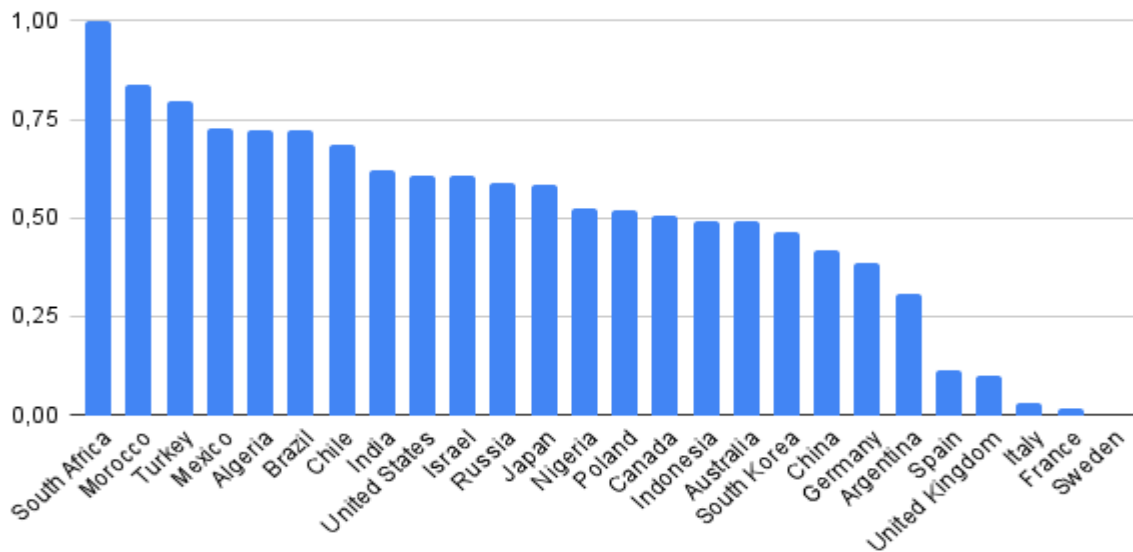
The Piketty2 index adds to the Piketty1 indices a data transparency index reflecting both types of problems. Countries with high opacity indices are either underestimating inequalities, suffer from a (higher than average) degree of institutional corruption, or both. An increase in the Piketty2 index in relation to Piketty1 due to low transparency, for instance, would indicate that inequalities are higher than reported, that corruption is particularly high, or both. The second Piketty index could be considered a kind of “truthfulness adjusted” failure index.

However, we have in the Introduction manifested our skepticism about subjective indicators. In the case of the transparency index the subjects manifesting their feelings or opinions are not respondents to surveys, but experts and researchers in contact with countries’ statistical agencies. Expert opinion may be well-founded, but there is still the possibility that they are not. An evaluation of the results must keep in mind this possibility.

The second Piketty index then adds a fifth component of transparency to the four Piketty1 failure indices (of income, wealth, gender inequality, and GHG emissions). Piketty2 is the (re-indexed) arithmetic mean of these five indices.

Compared with the Piketty1 index, the Piketty2 index ranking favors countries with high WIR22 transparency index values, such as the United States, the United Kingdom, or France. It worsens the positions of Nigeria, Algeria, Morocco, and others with low transparency values.

Piketty2 Index



The United States, for instance, with mediocre distribution values and the highest GHG per capita emissions, ranked second after South Africa in Piketty1 but is in the ninth position in Piketty2. Other countries with a large ranking change — in the opposite direction — are Algeria and Nigeria.

As stated above, these changes are based on subjective assessments; readers with an objectivist inclination may want to stay with the first Piketty failure index.

An extensive failure index

The index we introduce now tries to synthesize in one number a wide spectrum of economic, social, and political failure. This may seem overambitious or futile, but it is what GDP and its alternatives have been trying to do, although in the opposite direction of advancement, wellbeing, happiness, and so on. To ascertain the multiple sources of human failure may be a change of perspective with some prospective chance of usefulness. To focus on how to assess the extent of the multiple problems of a flawed present might be helpful in the search for remedies, and for paths towards a brighter future.

The present failure index covers a much wider spectrum of flaws and diseases of present-day societies than the previous Keynes' and Piketty's indices. For that aim, it counts on a very rich store of data covering hundreds, and perhaps thousands, of relevant social and economic indicators, at international institutions such as The World Bank, the World Health Organization (WHO), the International Labor Organization (ILO), IMF, UNDP, and others. Also, many universities and nongovernmental research organizations such as WIR assemble important data.

The selection of failure indicators must be based on these data, which means that even if they help to form an impressive fresco of the state of the world's economic and social failure, some parts of the picture may remain vague or silent, for lack of necessary information. This is the case, for instance, of the degree of monopoly in markets (the media *inter alia*), of the effects of internet over- or mal-use, of the macro rate of surplus-value (that is, consistent and accurate data on capital shares), and of the degree of work alienation.

The extensive failure index defines six dimensions of economic and social malaise: socio-economic dysfunction, ecological damage, exclusion, distress, militarism, and alienation. Each of these dimensions is composed of a number of indicators of particular flaws. The (re-indexed) average of the indicators makes the index of the dimension.⁷ The (re-indexed) average of the indices for the six dimensions mentioned makes the extensive failure index.⁸ Follows now a succinct description of dimensions and their corresponding indicators. Additional details on definitions and sources can be found in the Appendix.

Socio-economic dysfunction dimension

Our extensive list of “the outstanding faults of the economic society in which we live” includes the following components of socio-economic dysfunction.

- I. *Income inequality* and II) *Wealth inequality*: The same as in Keynes’ and Piketty’s indices, *income* and *wealth inequality* indices are included as indicators of socio-economic dysfunction. (Source: WIR22).
- III. *Direct taxation*: The share of direct taxation (taxes on income, profits, and capital gains) in total fiscal revenue reflects the *degree of redistributive ambition* on the income side of the public accounts (the failure indicator denotes the *lack of ambition*: 100 minus percent of direct taxation). (Source: World Bank).
- IV. *Corruption* diminishes the quality of life and undermines the general economic, social, and political climate. The chosen indicator estimates the *control of corruption*; corruption is the consequence of the *lack of control*. (Source: World Bank/ Worldwide Governance Indicators, WGI).
- V. *Financialization*: “When the capital development of a country becomes a by-product of a casino, the job is likely to be ill-done.” (Keynes in the *General Theory*). Financialization, that is, overgrown financial markets, increases the risks of debt deflation and recession, and misdirect investment away from production. Rises in the price of shares and real estate resulting from financialization increase inequality. *Private debt, loans, and debt securities as a percent of GDP* reflect the degree of financialization. (Source: IMF).
- VI. *Tax evasion*: Public revenue lost to *tax evasion*, in particular, evasion by transnational firms, reduces the capacities—in particular, redistributive capacities—of the public sector. The *degree of tax evasion is measured as a percent of tax revenue* (Source: Tax Justice Network).
- VII. *Tax havens* have a deleterious effect on the international economy, fomenting capital flight, tax avoidance, and illicit financial flows. (Source: Tax Justice Network/Corporate Tax Haven Index).
- VIII. *Offshore wealth*: Tax havens in VII. above are countries of destination of flight capital. Hidden capital or offshore wealth measures *capital hidden by rich individuals in tax havens* by country of origin as a percent of GDP. (Source: Alstadsæter *et al.* 2018).
- IX. *External indebtedness*: The degree of external indebtedness indicates the degree of vulnerability of the economy. A high *external debt to GDP ratio* increases the probability of speculative attacks and payments crises and reduces the economic policy space or policy autonomy. (Source: IMF).

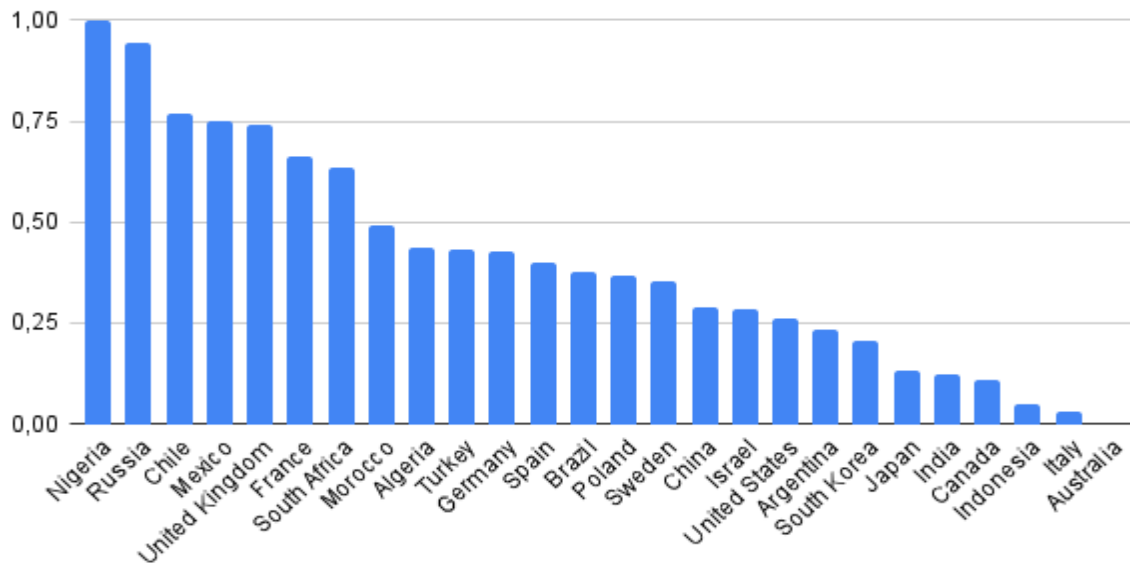
⁷ See formulas (2) and (3) above (p. 36).

⁸ Formally, extensive failure index I_i^e for country i is the simple average of the composite indices corresponding to the six named dimensions: $I_i^e = \sum_{p=1}^6 \frac{I_{ip}^e}{6}$. I_i^e is re-indexed according to formula (3) above (p. 36).

- X. *Extractivism*: Lack of diversification or dependency on the production and export of one or a few raw materials (oil, minerals, staples, etc.) denotes extractivism. It hinders economic development, increases the vulnerability of the economy, and may be ecologically detrimental. The Herfindahl-Hirschman index measures the *degree of product concentration in exports*. (Source: UNDP/HDR).

The figure shows the (re-indexed) average of the ten above-defined indices of socio-economic dysfunction for the 26 countries of the WIR22 sample. Different causes explain high socio-economic failure values for different countries. Nigeria has high values in tax evasion, corruption, and extractivism. Russia tops the lists on wealth held off-shore, non-direct taxation, and corruption. High wealth concentration, and financialization, are behind Chile's high socio-economic failure rating. Countries with the lowest dysfunction rankings have relatively low indices on those accounts.

Socioeconomic Dysfunction Index

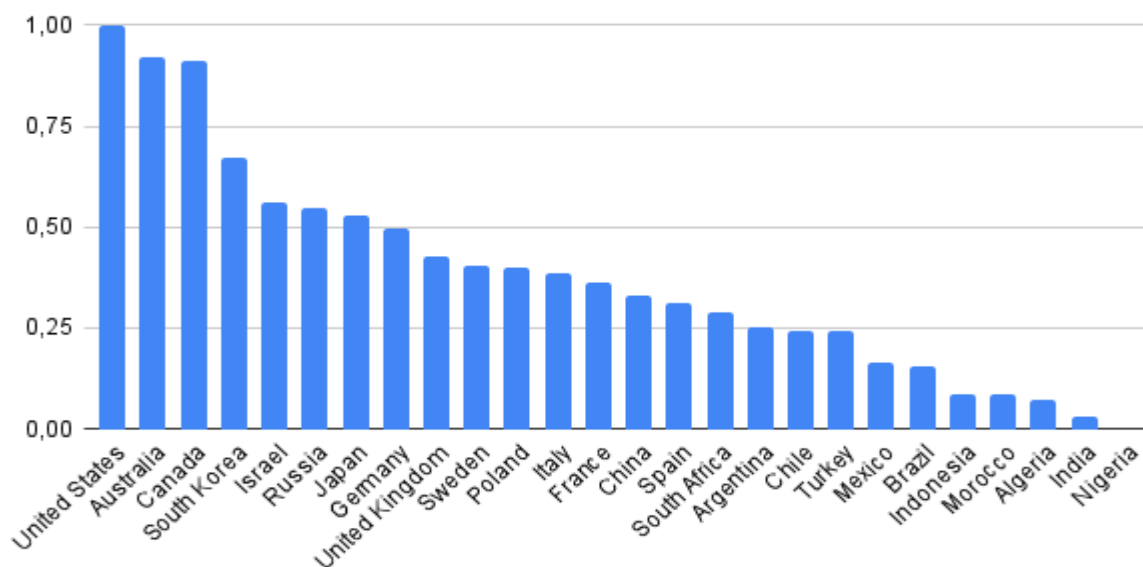


Ecological damage dimension

The ecological dimension of the extended failure index includes only one indicator. There are of course many other sources of ecological damage, but climate warming is by far the most dangerous and urgent.

- I. *GHG per capita emissions*: That is, the annual greenhouse gas emissions of the average individual in the country. The *personal GHG footprint* reflects the country's average individual damage to the atmosphere. (Source: WIR22).

Ecological damage



The United States, Australia, and Canada are in a special category of very high (per capita) GHG emitters. The lowest emitters are low-income countries.

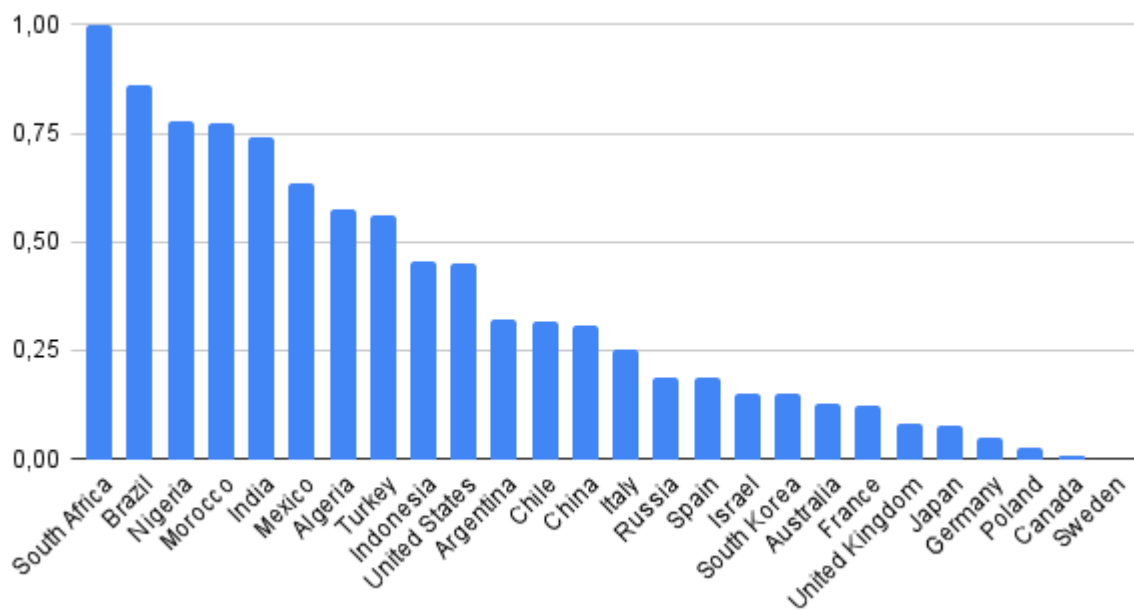
Exclusion dimension

The general notion of exclusion includes several types of obstacles to full participation in the economic, social, and political life of the community. This dimension comprises indicators of gender and racial discrimination, and of inequity in employment, education, and law enforcement.

- I. *Gender inequality*: We adopt WIR22's approximation to the degree of gender disparity or discrimination as the *share of total labor income earned by women*. The female labor income share reflects the extent to which women are integrated into the wider economic and social life of the community. (Source: WIR22).
- II. *Racial/ethnic discrimination I*: There is an inexcusable lack of international data on racial discrimination. Index Mundi, a private data collecting project, produces a Racial Discrimination Survey "whose purpose is to measure *how much racism exists in a given country as perceived by its residents*." This is a subjective index, which we try to supplement with the following objective approximation to a discrimination indicator. (Source: Index Mundi).
- III. *Racial/ethnic discrimination II*: Discriminated ethnic, racial, and other minorities occupy most often the lowest percentiles of the income distribution. The lower the share of total incomes perceived by say, the 10 or 20 percent of lowest income earners, the higher the probable level of discrimination and exclusion. We adopt the (inverse of the) *bottom 10 percent share as an objective proxy for the level of discrimination*. (Source: World Bank).
- IV. *Vulnerable employment*: The share of employed people engaged as contributing family workers or own-account workers is an approximation to a measure of the size of the "*precaria*", that is, those with insecure employment, or unpredictable means of subsistence. (Source: UNDP/ ILO).
- V. *Inequality in education*: High *inequality in the distribution of years of education* indicates discrimination of minorities and other excluded groups. (Source: UNDP/Human Development Report, HDR).

- VI. *Insecurity I*: Exclusion and insecurity are interrelated. Misguided attempts to reduce insecurity through repression/reclusion increase exclusion without reducing insecurity. A high *prison population to total population ratio* denotes a high level of exclusion—and insecurity. (Source: UNDP/HDR).
- VII. *Insecurity II*: The *number of victims of intentional homicide (per 100,000 people)* is one indicator of the Sustainable Development Goal 16. Goal 16 is to promote peaceful and inclusive societies for sustainable development. (Source: UN Office on Drugs and Crime).

Exclusion Index



High exclusion rankings for South Africa, Brazil, and Nigeria are explained by high rates of homicide. Morocco has high gender and education inequalities.

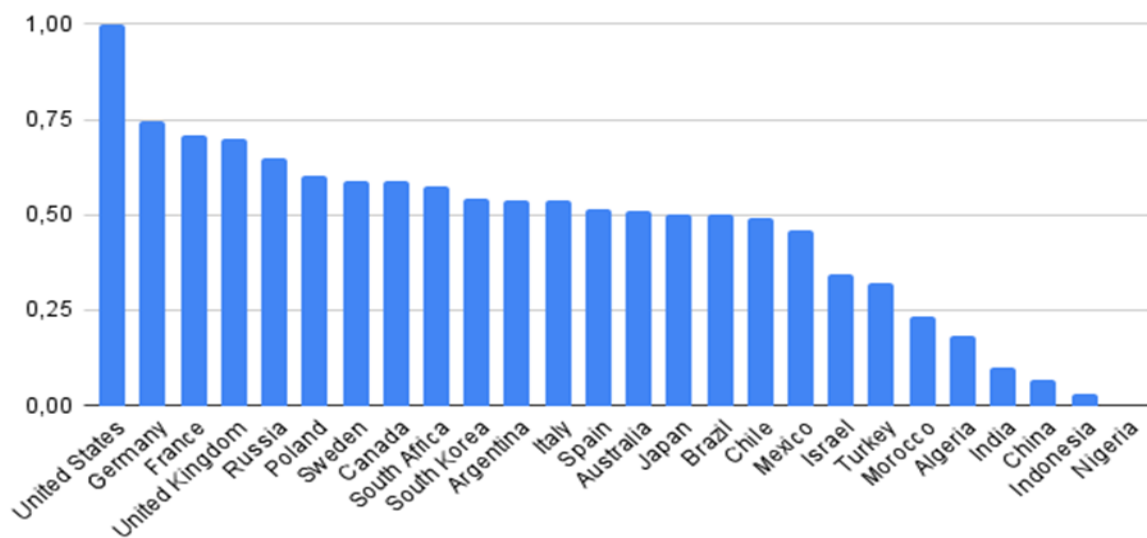
Distress dimension

Social and economic malaise directly affects communities' health outcomes and conditions. Health systems can contribute more or less effectively to better health outcomes.

- I. *Drug addiction*: Substance use disorders are often the result of social and economic distress. The extent of the problem is gauged by the *death rates from mental health and substance use disorders*. (Source: ourworldindata.org).
- II. *Suicide*: Distressed societies are more prone to depression and suicide, and less capable of preventing them. This results in higher *suicide mortality rates*. (Source: World Bank/ WHO).
- III. *Obesity*: Eating disorders also reflect social distress, and the difficulty, in both rich and poor countries, to counter the effects of (unhealthy eating) advertising on the *rate of deaths due to obesity*. (Source: ourworldindata.org).
- IV. *Covid mortality*: *Covid mortality rates* reflects the priority given by authorities to public health, and the capacity of the economic and social system—in particular, the health system—of containing the epidemic. (Source: Johns Hopkins University).

V. *Health systems' soundness*: Health systems mirror societies' overall life approach and conditions. Health systems' costs (in terms of real expenditure per capita) produce differing results (in terms of life expectancy) according to priorities and structures, including distributional structures. An extreme example is Turkey in comparison with the US, both with about the same life expectancy (78 and 79 years respectively), and a ratio of 1 to 9 in terms of real per capita health costs. Health systems' costs may rise exponentially without visibly increasing life expectancy, due to the adoption of increasingly expensive (and often painful) life-prolonging technologies. The *ratio of real health expenditure per capita to life expectancy* is a plausible measure of health systems' soundness. (Source: World Bank).

Distress Index



The US has the highest rankings in obesity and health system unsoundness and a high covid death rate. Germany's position is mainly due to high drug abuse rates. A relatively high covid death rate is the most important factor in the case of France.

Militarism dimension

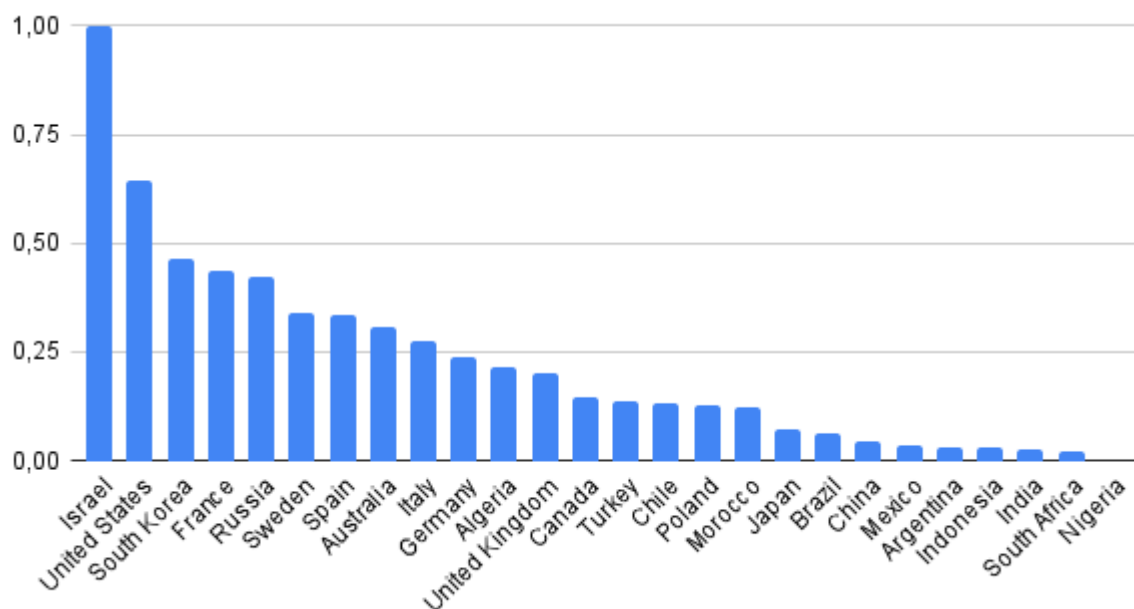
Let us introduce this dimension with the wise words of the venerable Adam Smith.

The whole, or almost the whole public revenue, is in most countries employed in maintaining unproductive hands. Such are the people who compose ... great fleets and armies, who in time of peace produce nothing, and in time of war acquire nothing which can compensate the expense of maintaining them, even while the war lasts. ... Those unproductive hands, who should be maintained by a part only of the spare revenue of the people, may consume so great a share of their whole revenue ... that all the frugality and good conduct of individuals may not be able to compensate the waste and degradation of produce occasioned by this violent and forced encroachment. *The Wealth of Nations*, Book II, Chapter III.

To the waste and degradation provoked by the direct costs of great fleets and armies mentioned by Adam Smith must be added many other deleterious consequences of the scourges of war and war preparation. The Militarism index is composed of the three following indices.

- I. *Military personnel*: The *ratio of armed forces personnel to the total population* is one measure of the degree of militarization. (Source: World Bank/Stockholm International Peace Research Institute, SIPRI).
- II. *Military expenditure*: *Per capita military expenditure* (in PPP-adjusted dollars) is another measure of the degree of militarization. (Source: World Bank/SIPRI).
- III. *Arms exports*: *Per capita arms exports* reflect the contribution of exporting countries to the propagation of militarism and war. (Source: World Bank/SIPRI).

Militarism Index



Israel is first in the militarism score, with the highest military personnel, expenditure, and exports in per capita terms. The US has the same per capita expenditure, but lower (per capita) military personnel and arms exports. South Korea has relatively high indices on the three accounts. It is perhaps rather unexpected to see China in the militarism score between Mexico and Brazil—and Russia between Sweden and France.

We close this section with some more wise words from a most venerable voice. “[Militarism,] this plague-spot of civilization, ought to be abolished with all possible speed.” Albert Einstein, in *The World As I See It*.

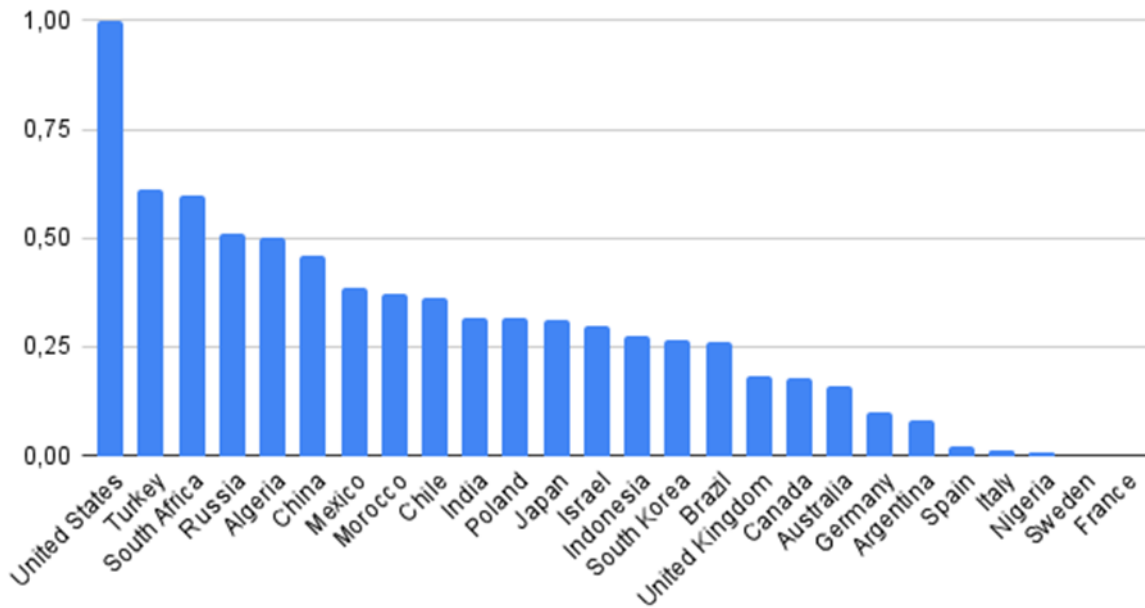
Alienation dimension

The idea of alienation remits to the very ancient search for meaning. In Genesis, alienation begins with the original loss of innocence and the unity of consciousness, and the resulting separation from the

Other and from Nature. Other traditions and ontologies have other accounts of the origins and nature of this false consciousness. In our times, alienation refers to the traits of the social and economic system that reflect and confirm or deepen the original fracture. Exploitation and oppression are expressions of alienation; that is, they are instances of the apparition of the Other as an alien — a potential instrument and object.

- I. *Human rights*: The establishment of a large set of fundamental human rights by the United Nations marks a formidable step in the direction of human disalienation. However, these rights are in many places not fully recognized and respected. The *rate of ratification of international human rights treaties* is a rather objective measure of a subject often used politically. Indicative of alienation is the rate of non-ratification. (Source: Office of the United Nations High Commissioner for Human Rights, OHCHR).
- II. *Workers' rights*: The basic fundament of present-day alienation is the capitalist mode of production, based on the objectification of the worker and the fetishizing of commodities. A series of charts by the International Labor Organization mark some advancement in the recognition of the rights of workers. A relatively objective measure of workers' alienation and lack of recognition of their rights is the *rate of non-ratification of ILO's charts*. (Source: ILO).
- III. *Collective bargaining*: Union membership should be the relevant measure of workers' organizing capabilities and relative power vis-à-vis capital. However, after several decades of setbacks, the international reality of workers' organizing is too fragmented and heterogeneous. The prevalence of collective bargaining is considered a better indicator of organizational strength. The *collective bargaining coverage rate* conveys the number of employees whose pay and/or conditions of employment are determined by collective agreements, in relation to the total number of employees. We are interested in the converse, i.e. the non-coverage rate. (Source: ILO).
- IV. *Unemployment*: A large "reserve army of labor" diminishes the relative power of workers, lowers their wages, and increases their alienation. An "unlimited supply of labor," as is almost the case in some countries, results in subsistence wages and the total subordination of the workforce. The rate of *(non-)participation in the labor force* in relation to the total population is a proxy of unemployment (and "disguised unemployment"). (Source: UNDP).
- V. *Political voice and accountability*: Freedom of expression, freedom of association, and political freedoms are necessary for the free organization of working people, and thereby, of the progressive disalienation of workers — and, in fact, of the whole society. The World Bank produces an indicator based on "perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as *freedom of expression, freedom of association, and a free media*." (Kaufmann *et al.* 2010). Our indicator denotes the *lack of voice and accountability*. (Source: World Bank/WGI).
- VI. *Plutocracy*: The former indicator is based on perceptions by several individuals and organizations, and as such, is prone to subjective biases of many kinds. We include therefore an objective proxy of the degree of political alienation. Formally or externally free and democratic societies may be governed in the interest of a rich minority, instead of the interest of the large majority. It can be said that the more of the *total wealth of a country is in the hands of the top one percent of capital owners*, the more is the country a plutocracy *de facto*. (Source: WIR22).
- VII. *Propaganda*: The hegemony of an alienating system is maintained through a whole complex of structures and practices. Of a particular impact on the socio-economic sphere is the promotion of commodity fetishism by the management of preferences and the engineering of desire through advertisement and other methods of marketing. A business intelligence firm's estimations of *total media ad spending per capita* for a number of countries allow for an approximation to the problem. (Source: eMarketer).

Alienation Index

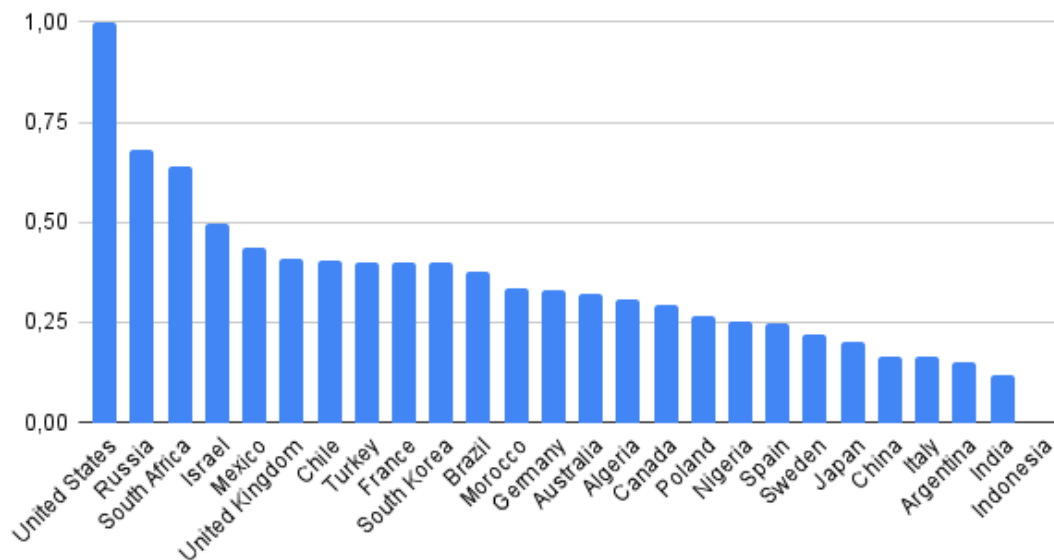


The US stands out for maximal non-ratification of human rights and labor conventions, and the highest total ad expenditure per capita. Collective bargaining is also almost non-existent in the US. Turkey's low performance in human rights, collective bargaining, and political freedoms explain its high alienation index. South Africa suffers from extreme wealth inequality (plutocracy), and low labor force negotiating power (low collective bargaining).

Results for the extensive failure index

The extensive failure index synthesizes the results for the six different proposed failure dimensions. The extensive index is the (re-indexed) average of the indices for socio-economic dysfunction, ecological damage, exclusion, distress, militarism, and alienation. The figure shows the results.

Extensive failure Index



Except for the socio-economic dysfunction dimension, the US shows high failure values in all dimensions; it attains the maximal value in ecological damage, distress, and alienation. Russia ranks high in socio-economic dysfunction and relatively high in social distress and ecological damage. An almost minimal level of militarism does not help South Africa in notably lowering its failure level, due to high rankings in exclusion and socio-economic dysfunction. Militarism is the main cause of Israel's failure ranking.

Final comments

In recent decades GDP growth has been the argument to justify policies that aggravated unemployment and the inequality of wealth and incomes, and increased environmental harm. GDP growth, of course, is blind to the fact that there is mass unemployment, that real wages decline or stagnate; or to the fact that atmospheric pollution by greenhouse gases approaches catastrophic levels. GDP is also blind to many other flaws of unregulated capitalism — the economic society in which we live.

Our study evaluated the extent of these flaws for a representative sample of countries. Keynes pointed to the failure to provide for full employment, and the inequitable distribution of wealth and incomes as “the outstanding faults of the economic society in which we live.” A first composite “Keynes index” combines indices for the three Keynes faults — unemployment, and wealth and income inequality. The second Keynes index is an “eco-Keynesian index,” composed of the previous Keynes index, and an ecological footprint index (per capita greenhouse gas (GHG) emissions).

The World Inequality Report 2022 allows for further empirical assessment of the flaws of present-day capitalism. WIR22 provides up-to-date data for the Keynes' indices, and for a "Piketty index" — Thomas Piketty is one of the coordinators of the study. "Piketty1" combines the indices of inequality of income, wealth and gender, and per capita GHG emissions. "Piketty2" adds the WIR22 transparency index, which somewhat qualifies the results.

The third type of index, the extensive failure index, tries to enlarge the picture, including a wider view of the flaws of unregulated capitalism. It synthesizes six dimensions: socio-economic dysfunction, ecological damage, exclusion, distress, militarism, and alienation. Each of these dimensions is composed of several indicators of particular flaws.

The results are interesting, and sometimes counter established perceptions. Several mental images of the hierarchy of fortune and misery, success and failure, are shaken. Failure indices may become a mirror in which societies can discover their less laudable traits, and hopefully inspire action to counter them. Societies may also find solace, unexpectedly finding their place amongst the least troubled on some accounts. They may try to deepen progress on those and other concerns.

A final comment, on failure indices and *degrowth*. A failure synthetic indicator may be the inclusive notion that could give a new, more widely appealing meaning to the idea of *degrowth*. *Degrowth* should then be the decrease of failure levels, not the decrease of any undefined kind of GDP output. The idea is that increases in some GDP components — and decreases in some others — should contribute to a diminution of maldevelopment.

Acknowledgements

We would like to thank Kajsa Buzaglo Olofsgård for her comments and help with the text. We are also thankful to Rodolfo Candia, Edward Fullbrook, and Stefan de Vylder for comments on the text, and to Gabriel Zucman for data on off-shore wealth.

Appendix: Sources

Most recent data for all indices. In a few cases of lack of data for a particular variable in a particular country, the country's composite index average includes only variables with existing data.

Keynes1 index

- 1) *Unemployment*: (100 minus) percentage of the population ages 15 years and older that is employed. <http://hdr.undp.org/en/indicators/148306>. Data for the year 2019. Accessed 20/12/21.
- 2) *Income inequality*: Income inequality levels refer to income measured before income taxes and after operations related to pension and unemployment insurance systems. <https://wir2022.wid.world/www-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.
- 3) *Wealth inequality*: Top 10 to bottom 50 percent ratio of the shares of total net household wealth owned by the respective group. Net household wealth is equal to the sum of financial assets (e.g. equity or bonds) and non-financial assets (e.g. housing or land) owned by individuals, net of their debts. Total household wealth adds up to the total wealth of the non-profit sector (e.g. foundations, universities) and total public wealth (the wealth owned by the government) to make total national wealth. Because of very high inequality values of a few outliers (South Africa, Chile, Brazil, and Mexico) in comparison with the rest, natural logarithms of inequality ratios are taken. In a few cases

of slightly negative wealth shares (i.e., net debt) for the bottom 50 percent, the value of 1 is adopted to avoid (meaningless) negative ratios.

<https://wir2022.wid.world/www-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.

Keynes2 index

Keynes2 = (Keynes1 + GHG emissions per capita.) ÷ 2.

GHG emissions per capita: Personal GHG footprint refers to the annual greenhouse gas emissions of the average individual. Footprints take into account all emissions, those stemming from direct energy use (e.g. fuel burnt by a car) as well as indirect energy use (CO2 emitted to produce the goods and services to sustain a lifestyle). Estimates also take into account imports and exports of carbon embedded in goods and services imported or exported to other countries. <https://wir2022.wid.world/www-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.

Piketty1 index

Excluding unemployment, Piketty1 contains in addition to the former indices a *gender inequality index*. The *female labor income share* refers to the share of total labor income earned by women. If earnings were distributed equally between males and females then the indicator would be 50 percent.

<https://wir2022.wid.world/www-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.

Piketty2 index

Piketty2 includes an additional variable: *Inequality data transparency*, produced by the World Inequality Lab in partnership with the United Nations Development Program. It measures the level of availability and quality of economic inequality data. <https://wir2022.wid.world/www-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.

Extensive failure index

Comprises six dimensions containing several indices each.

I. *Socio-economic dysfunction*

- 1) *Income inequality*: <https://wir2022.wid.world/www-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.
- 2) *Wealth inequality*: <https://wir2022.wid.world/www-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.
- 3) *Non-direct taxation*: 100 minus percent of direct taxation (taxes on income, profits and capital gains) in relation to total fiscal revenue.
<https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS?view=chart>; and
<https://data.worldbank.org/indicator/GC.TAX.YPKG.ZS?view=chart>.
- 4) *Corruption*: Estimated as 100 minus Control of corruption rate.
[http://info.worldbank.org/governance/wgi/Home/Reports 2020](http://info.worldbank.org/governance/wgi/Home/Reports%2020). Accessed 18/1/22.
- 5) *Financialization*: Private debt, loans and debt securities as percent of GDP.
<https://data.imf.org>. Data for year 2020. Accessed 15/1/22.
- 6) *Tax evasion*: Public revenue lost to tax evasion. <https://taxjustice.net/country-profiles>. Data for 2021. Accessed 18/1/22.
- 7) *Tax havens*: <https://taxjustice.net/country-profiles>. Data for 2021. Accessed 18/1/22.
- 8) *Offshore wealth*: Alstadsæter et al. (2018). (Data for 2017.)
- 9) *External indebtedness*: International liabilities to GDP ratio.
<https://data.imf.org/regular.aspx?key=62805745> ÷

<https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?view=chart>. Data for 2020.
Accessed 18/1/22.

- 10) *Extractivism*: Herfindahl-Hirschman degree of product concentration in exports.
<http://hdr.undp.org/en/indicators/170006>. Data for 2018. Accessed 18/1/22.

II. *Ecological damage*

GHG per capita emissions.

<https://wir2022.wid.world/www-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.

III. *Exclusion*

- 1) *Gender inequality*: <https://wir2022.wid.world/www-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.
- 2) *Racial/ethnic discrimination I*: <https://www.indexmundi.com/surveys/results/8>. Accessed 20/12/21.
- 3) *Racial/ethnic discrimination II*: The (inverse of the) income share held by lowest 10 percent. <https://data.worldbank.org/indicator/SI.DST.FRST.10?view=chart>. Most recent value. Accessed 20/12/22.
- 4) *Vulnerable employment*: <https://hdr.undp.org/en/indicators/43006>. Year 2019. Accessed 20/12/21.
- 5) *Inequality in education*: <http://hdr.undp.org/en/indicators/101606>. Year 2019. Accessed 20/12/21.
- 6) *Insecurity I*: Prison population to total population ratio.
<http://hdr.undp.org/en/indicators/128306>. Years 2013-2018. Accessed 20/12/21.
- 7) *Insecurity II*: Victims of intentional homicides (per 100,000 people). Year 2018. Accessed 15/2/2. <https://dataunodc.un.org/content/homicide-rate-option-2>.

IV. *Distress*

- 1) *Drug addiction*: <https://ourworldindata.org/grapher/death-rates-from-mental-health-and-substance-use-disorders>. Year 2017. Accessed 20/1/22.
- 2) *Suicide*: <https://data.worldbank.org/indicator/SH.STA.SUIC.P5?view=chart>. Accessed 20/1/22. Year 2019.
- 3) *Obesity*: <https://ourworldindata.org/obesity>. Year 2017. Accessed 20/1/22.
- 4) *Covid mortality*: <https://coronavirus.jhu.edu/data/mortality>. Accessed 20/1/22.
- 5) *Health system's soundness*: Real health expenditure to life expectancy ratio.
Current health expenditure, PPP \$ (purchasing power parity USD):
<https://data.worldbank.org/indicator/SH.XPD.CHEX.PP.CD?view=chart> ÷
Life expectancy at birth: <https://data.worldbank.org/indicator/SP.DYN.LE00.IN?view=chart>.
Most recent data. Accessed 20/1/22.

V. *Militarism*

- 1) *Military personnel*: Armed forces personnel to population ratio.
Military personnel: <https://data.worldbank.org/indicator/MS.MIL.TOTL.P1?view=chart> ÷

Population: <https://data.worldbank.org/indicator/SP.POP.TOTL>. Most recent value. Accessed 20/1/22.

- 2) *Per capita military expenditure (in Purchasing Power Parity USD)*:
<https://data.worldbank.org/indicator/MS.MIL.XPND.CD?view=chart> (Military expenditure in current USD) × Price level ratio of PPP conversion factor to the market exchange rate:
<https://data.worldbank.org/indicator/PA.NUS.PPPC.RF> ÷ Total population:
<https://data.worldbank.org/indicator/SP.POP.TOTL>. Most recent value. Accessed 20/1/22.
- 3) *Per capita arms exports*:
<https://data.worldbank.org/indicator/MS.MIL.XPRT.KD?view=chart> ÷
<https://data.worldbank.org/indicator/SP.POP.TOTL>. Most recent value. Accessed 20/1/22.

VI. *Alienation*

- 1) *Human rights*: Rate of non-ratification of international human rights treaties.
<https://indicators.ohchr.org/>. Accessed 25/1/22.
- 2) *Workers' rights*: Rate of non-ratification of ILO's charts.
https://www.ilo.org/dyn/normlex/en/f?p=1000:10011:34831575285806:::P10011_DISPLAY_BY:1. Accessed 25/1/22.
- 3) *Collective bargaining*: Collective bargaining non-coverage rate.
<https://ilostat.ilo.org/data/>?. Accessed 25/1/22.
- 4) *Unemployment*: Rate of non-participation in the labor force in relation to the total population. <http://hdr.undp.org/en/indicators/148306>. Most recent value. Accessed 20/1/22.
- 5) *Political voice and accountability*: Inverse of the Political voice and accountability index, Worldwide Governance Indicators (WGI) project.
<http://info.worldbank.org/governance/wgi/>. Accessed 18/1/22.
- 6) *Plutocracy*: Share of total wealth held by the top one percent of owners.
<https://wir2022.wid.world/ww-site/uploads/2021/12/CountrySheets>. Accessed 20/12/21.
- 7) *Propaganda*: Total media ad real spending per capita (in PPP adjusted USD).
<https://trends.e-strategyblog.com/2014/07/24/global-ad-spending-per-person-by-country-2012-2018/20371/> × Price level ratio of PPP conversion factor to the market exchange rate: <https://data.worldbank.org/indicator/PA.NUS.PPPC.RF>. Most recent values. Accessed 18/1/22. Original data source: eMarketer.com.

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Externalities, public goods, and infectious diseases

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Abstract

COVID-19 has been mutating so fast that existing political and economic systems may not be able to control it without (a) getting *many* more people vaccinated and complying with other public health measures like masks, *and* (b) more effective vaccines than currently available. This article discusses externalities and other economic phenomena associated with managing infectious diseases. The history of COVID-19 suggests that a better understanding of these issues might help economists make better contributions to improving the effectiveness of public health measures for this and other infectious diseases. It also suggests that urgent action can help save lives and improve the international economy. The economic question for public health is to design public policy to minimize the present value of the burden of disease in perpetuity at some reasonable discount rate. This has implications for (i) pricing of tests, treatments, vaccines and other risk-reduction protocols and (ii) public health monitoring, especially for infectious diseases like influenza and future novel diseases like COVID-19, which experts claim are becoming more frequent as humans increasingly interact with ecologies that have traditionally been more isolated. It also raises questions about whether it might be wise to separate new product development in these areas from testing and production. Also, to help communicate the need for compliance with public health measures, society might require everyone who travels to carry liability insurance to cover losses suffered by others directly or indirectly infected from them.¹

The urgency of faster spreading variants of COVID-19

Before discussing economic considerations of infectious diseases, we feel a need to first summarize the urgency that we perceive in the spread of COVID-19 as we are writing this: The speed with which faster spreading variants of COVID-19 have been appearing suggests that humanity may not be able to control this disease without moving *much* faster to (a) get an effective vaccine to anyone any place in the world willing to be vaccinated, and (b) convince more anti-vaxxers² and anti-maskers³ to do their part to protect others whom they will likely infect if they get this disease.

¹ Parts of this work are available in Wikiversity "Externalities, contagious diseases, and news" (https://en.wikiversity.org/wiki/Externalities,_contagious_diseases_and_news); accessed 30 August 2021.

² See the discussion of [vaccine hesitancy](#) below, esp. incl. "liability insurance for contagious diseases".

³ References on "[Mask refusal](#)" are discussed in the Wikipedia article with that title, accessed 19 September 2021.

Even that may not be enough without more effective countermeasures than what we have right now, according to data summarized in Figure 1, which plots the "Basic reproduction number,"⁴ R_0 , for the original Wuhan variant, along with the variant that took Europe by storm in early-to-mid 2020 and the Alpha and Delta variants, along with estimates of the uncertainties. As this is being written, the most virulent, deadly, and least understood variant is Delta.⁵ Its basic reproduction number has been estimated at between 5 and 8.⁶ If it's 8, that means that we will need 87.5 percent (= $1 - 1/8$) of humanity immune or otherwise protected from exposure to this disease to stop the number of new cases from growing. That's the "Herd Immunity Threshold" axis on the right hand side of Figure 1.⁷

It will *not* be enough to get 87.5 percent of humanity vaccinated with the current vaccines, because no vaccine is perfect. If 100 percent of humanity were newly vaccinated with a vaccine that is 90 percent effective, we would be just barely above that 87.5 percent figure. The Pfizer and Moderna vaccines were reportedly 90 percent effective a month after the second dose.⁸ More recent research "found that the efficacy of the Pfizer-BioNTech vaccine against hospitalization fell from 91 percent to 77 percent after a four-month period following the second shot. The Moderna vaccine showed no decline over the same period."⁹

But it's worse than that, because a new variant worse than Delta could already be circulating, but scientists have not yet collected enough data to identify it as such; this is indicated by the red question marks (?) near the upper right of Figure 1. The risk of worse variants is proportional to the total number of cases. That's why it's so urgent to get as many people as possible vaccinated and complying with other public health protocols like masking.

This is not a minority position. Two-thirds of the epidemiologists surveyed in March 2021 thought that we had "a year or less before the virus mutates to the extent that the majority of first-generation vaccines are rendered ineffective and new or modified vaccines are required."¹⁰ Harvey et al. (2021) are

⁴ The "[Basic reproduction number](#)" "is the expected number of cases directly generated by one case in a population where all individuals are susceptible", according to the Wikipedia article with that title, accessed 19 September 2021. This concept has been used routinely in epidemiology since 1952. It is, however, quite difficult to estimate, which explains the wide range of uncertainty in the estimates of R_0 for the variants of COVID-19 considered in Figure 1.

⁵ Since this was submitted for review but before it is being published, the Omicron variant has been identified as a major problem. However, we are unaware of any credible studies of its basic reproductive number. In addition, the primary concern in this analysis is the economics of infectious diseases. We are therefore not discussing Omicron extensively in this article.

⁶ Gallagher (2021). Liu and Rocklöv (2021) "identified five studies, which estimated the basic reproductive number for Delta [ranging] from 3.2 to 8, with a mean of 5.08." We could revise Figure 1 and Appendix 1 using this information. We will not do so here, because the changes would not alter the main point of this article, namely the importance of considering externalities, public goods, free riders and the commons in setting public policy for infectious diseases. For detailed planning regarding COVID-19, it might make sense to expand these analyses.

⁷ See Wikipedia on "[Herd immunity](#)" and references cited therein, accessed 19 September 2021.

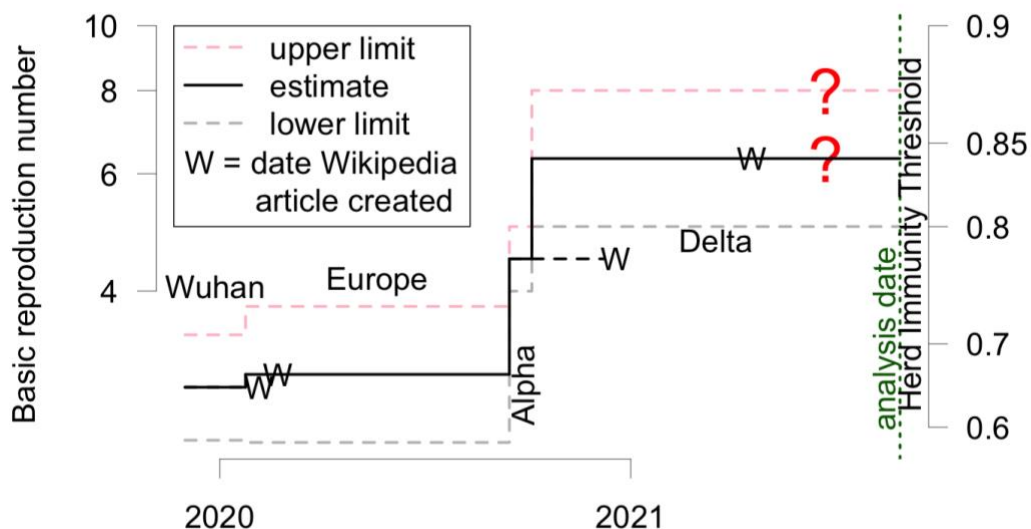
⁸ Wikipedia on "[COVID-19 vaccine](#)" cites multiple sources giving different numbers for the efficacies of the different vaccines. This article cited sources saying, "In Phase III trials, several COVID-19 vaccines have demonstrated efficacy as high as 95% in preventing symptomatic COVID-19 infections." However, "real-world vaccine effectiveness (RWE)" is lower. A 6 May 2021 Tweet from @sputnikvaccine claimed 80 percent efficacy from one shot (<https://twitter.com/sputnikvaccine/status/1390274722487746563>), accessed 30 August 2021. See also Thompson et al. (2021) and Wikipedia on "[vaccine efficacy](#)", accessed 19 September 2021.

⁹ Mandavilli (2021).

¹⁰ Ellyatt (2021).

concerned about "immune escape": As strains develop that are resistant to a vaccine, they will increasingly threaten people who have already been vaccinated.

Figure 1. Fastest spreading variants of COVID-19



Note: The axis on the left is the basic reproduction number, R_0 , which is the number of people in a susceptible population infected by each infected individual. The axis on the right is the associated Herd Immunity Threshold = $1 - 1/R_0$ = the proportion of the population that must be immune to control the disease. The dashed lines indicate the published limits for the Wuhan, Alpha and Delta variants. For the Wuhan variant, this is a 95 percent confidence interval derived from a meta-analysis of other published studies. Our source for the Alpha and Delta limits did not state a confidence level; we assumed 95 percent. We also assumed that the estimates of R_0 follow a lognormal distribution, which allows us to impute standard errors for the estimated values of $\log(R_0)$ as 0.093, 0.057 and 0.12 for Wuhan, Alpha, and Delta, respectively. We use the latter number to estimate the uncertainty in the estimated R_0 for the early phases of the pandemic in Europe. "W" indicates the date of creation of the Wikipedia article for each variant, which is a measure of when it became "notable". Each such Wikipedia article contains references suggesting dates when the first case of that variant seems to have appeared, which we used for the start of each horizontal line segment. The question marks "?" on the plot indicate that new variant(s) may already be spreading faster than Delta but have not yet been identified as such.¹¹

Harvey et al. (2021) claimed that between December 2019 and October 2020, the virus was "acquiring approximately two mutations per month in the global population."¹² That's grossly misleading, because the mutation rate is *not* a function of time: It's proportional to the number of patients infected and spreading a disease.¹³ COVID tends to linger longer and generate more mutations in patients whose

¹¹ The numbers for this plot and references for them are summarized in Appendix 1. This plot was initially prepared before the appearance of Omicron. It could be updated at any time that credible estimates of R_0 for it are available. That's not a serious priority for the purposes of this paper, because the issue here is the general theory of the economics of infectious diseases, not restricted to COVID.

¹² Harvey et al. (2021).

¹³ In living organisms, the error rates in copying DNA have been estimated at between 10^{-4} and 10^{-5} per base or "letter" in the DNA sequence. See Milo and Phillips (undated). However, many living organisms have mechanisms for finding and fixing errors. And many of the errors that don't get corrected cannot function. Of those that continue to function, only a few are more [transmissible](#) or more [virulent](#) (with either a higher risk of death or long-term disability).

natural defenses have been suppressed by drugs to fight cancer, manage autoimmune disorders like rheumatoid arthritis, or keep transplanted organs from being rejected, or who have untreated or poorly treated HIV.¹⁴ COVID reportedly underwent 32 genetic changes in 216 days (approximately seven months), in one HIV patient, averaging 6.75 days between mutations.¹⁵ Another HIV patient generated 5 COVID mutations in 15 days, averaging 3 days between mutations.¹⁶ Shah (2022) insists that accurate analyses of the evolution of diseases like COVID should consider exchanges both to and from non-human hosts.

If the number of new cases per unit time is cut in half or by a factor of 10 or a million, the number of new variants per unit time will also be cut by approximately the same factor. We estimate that there has been at least one new viable variant for each 600 cases, and it could be one for every 60 cases or less.¹⁷

Conversely, legal structures that encourage media organizations to disseminate content contradicted by the available evidence *increase* the risks associated with this disease and contribute to deaths of millions by COVID.¹⁸

To repeat the basic message of Figure 1, existing vaccines may not be adequate by themselves, even if 100 percent of humanity were vaccinated. On the other hand, testing that is sufficiently rapid and accurate combined with effective quarantine / isolation of people testing positive¹⁹ might be enough if adequately enforced, even without a vaccine. Generally available masks may not be enough unless combined with other measures like existing vaccines.²⁰

¹⁴ Tribune Content Agency (2021).

¹⁵ Keyser (2021).

¹⁶ Allday (2021).

¹⁷ The estimate of "at least one new viable variant for each 600 cases" is based on rounding up the ratio of 290 million cases by January 2021 to 512,000 unique SARS-COV-2 sequences reported by that time. The 512,000 number came from the Wikipedia article on "[Phylogenetic Assignment of Named Global Outbreak Lineages](#)", which claimed that more than 512,000 unique SARS-COV-2 sequences had been reported to open, international databases as of January 2021, all or nearly all of which could transmit the disease to another human. Unfortunately, no reference was given for that number. The actual number of unique sequences is almost certainly higher, because many parts of the world are not submitting sequences to the international database. The figure of almost 290 million cases by January 2021 came from the Wikipedia article on "[COVID-19 pandemic cases](#)", accessed 12 September 2021, which were extracted from the World Health Organization, "[Coronavirus disease \(COVID-19\) Weekly Epidemiological Update and Weekly Operational Update](#)" (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>). $290,000,000 / 512,000 = 566$. Round up to get one new variant for each 600 people with COVID-19.

¹⁸ Numerous publications document how Facebook, Twitter, Microsoft, Google, and other Internet companies make money from clicks: The veracity of the content is not a consideration. Worse, people are more likely to click on something outrageous if it's consistent with their preconceptions. This seems to have been a major driver, if not the primary driver, of the increase in political polarization seen in many countries around the world since Facebook was founded in 2004. See, for example, Vaidhyanathan (2018), Zuboff (2019, 2021), and McMaster (2020). McMaster, President Trump's second National Security Advisor, said Russia is using this to divide and weaken America and other countries, substantively degrading their national security. See also the Wikiversity article on "[International Conflict Observatory](#)" and other references cited therein (https://en.wikiversity.org/wiki/International_Conflict_Observatory), accessed 27 September 2021.

¹⁹ Krueger (2021).

²⁰ See Wikipedia "[Face masks during the COVID-19 pandemic](#)" and references cited therein. Wikipedia "[N95 respirator](#)" discusses the N95 US standard and comparable standards in other parts of the world. Wikipedia "[Face masks during the COVID-19 pandemic](#)" describes supply problems; all articles accessed 28 September 2021.

The COVID-19 pandemic is costing trillions of US dollars and millions of lives. How much of that could be saved by accelerating the international negotiations required to get a vaccine to every human on the planet willing to accept it? And how much of that might be appropriately described as a transaction cost?

For centuries, the Black Death removed the most susceptible people from the gene pool.²¹ That reduced the R_0 for the bubonic plague. We don't want to wait that long. As noted below, malaria has been dramatically reduced in many countries without a vaccine by adding insecticide-treated bed nets, insecticide spraying in homes, rapid diagnostic tests, free preventive treatment for people at risk of the disease, and more effective medicines for those who had fallen ill to the more traditional efforts to reduce mosquitos. Countries with high rates of malaria lack the political will to expand the use of these proven techniques, according to experts in the WHO.²² All these techniques carry substantial positive externalities for others.

Public Health: Overview

Laurie Garrett (2000, p. 11) wrote that public health is "a practical system ... rooted in two fundamental scientific tenets: the germ theory of disease and the understanding that preventing disease in the weakest elements of society ensured protection for the strongest (and richest)". She also reported that, "Vital statistics data from England, Wales, and Sweden show that in 1700 the average male lived just twenty-seven to thirty years. By 1971 male life expectancy reached seventy-five years. ... [In] the United States ... less than 4 percent of the total improvement in life expectancy since the 1700s can be attributed to twentieth century advances in medical care. It is a matter of considerable academic debate which factors were most responsible for the spectacular improvements in life expectancy and infant mortality seen in the United States and Western Europe between 1700 and 1900." Factors mentioned include improved sewers, clean water, education and government responses to epidemics.²³

Even when direct access to improved sewers, clean water, education and government responses to epidemics is not universal, people who do not have such access may still benefit when diseases circulate less and other goods and services become easier to obtain.²⁴

The better sewers, water, education, and government response to epidemics that contributed to this increase in life expectancy all carry positive externalities; an [externality](#) is a cost or benefit for a third party who did not agree to it. Pollution is a negative externality.²⁵ Goods with positive externalities that

²¹ Wikipedia on "[Bubonic plague](#)" says it has been killing humans for thousands of years including between 25 and 60 percent of the European population in the fourteenth century. "From 2010 to 2015 there were 3248 documented cases reported worldwide, including 584 deaths", according to "[Plague: Key facts](#)", World Health Organization, 31 October 2017 (<https://www.who.int/en/news-room/fact-sheets/detail/plague>). Sichone et al. (2020) estimated $R_0 = 1.75$ with a 95 percent confidence interval ranging from 1.51 to 1.98. Its R_0 was almost certainly much higher in the fourteenth century with the living conditions and existing genetic diversity in Europe at that time. Websites accessed 19 September 2021.

²² World Health Organization (2020) and Alonso (2021).

²³ Garrett (2000, p. 10).

²⁴ While not directly relevant to the present discussion, we note that most of the innovations that contributed to those improvements in life expectancy since 1700 "would have died in the cradle but for persuaders and activists who championed the innovation and policies", according to Pinker (2021) and Johnson (2021a, b).

²⁵ Wikipedia, "[Externality](#)", accessed 26 August 2021.

are consumed on a sufficiently large scale become part of the commons, defined as the cultural and natural resources accessible to all members of a society and held in common, not owned privately.²⁶ The commons are enjoyed by all, including people who never lifted a finger to obtain the improvements in quality of life they enjoy as a result.

The total economic value of externalities is huge, almost certainly several times the [gross world product](#). Constanza et al. (2014) estimated that ecoservices, only one class of externalities, "contribute more than twice as much to human well-being as" the gross world product.²⁷

The present article discusses negative and positive externalities associated with public health. Media and messages that *discourage* compliance with public health measures carry *negative* externalities, increasing the burden of disease shared by all and contributing negatively to the commons. Public health systems for testing, diagnosing, tracking / monitoring, treating, vaccinating for and limiting the transmission of infectious diseases carry huge *positive* externalities, as described herein. Anti-vax propaganda and effective public health efforts can both be considered part of the commons, contributing negatively or positively to the well-being of all.

Paying for an effective public health program encounters the classic free rider problem, like any other economic transaction with positive externalities. The smallpox eradication program provides an extreme example of the benefits of the eradication of a disease.

²⁶ Wikipedia "[Commons](#)" says, "The commons is the cultural and natural resources accessible to all members of a society, including natural materials such as air, water, and a habitable earth. These resources are held in common, not owned privately." The traditional literature on the "commons" discussed environmental resources, use of land and water. More recent literature extends the idea to include cultural, intellectual, digital, urban and knowledge commons, all of which are "accessible to all ..., not owned privately." Website accessed 19 September 2021.

²⁷ Costanza et al. (2014) estimated the value of the externalities associated with ecoservices. They noted that they had considered only a portion of known externalities. The real numbers could easily be twice as large. This could mean that if all the externalities were properly considered, the real economy could easily be five times as large as documented in the [gross world product](#). Similarly, Austin (2021) explained how this means that the world's economic and political leaders are being pushed to do things that are massively counterproductive, driving climate change into a major crisis because the world's leading economists are focusing on the wrong things, pretending externalities are negligible, when the global expert consensus is that these externalities will ultimately prove to be catastrophic. Austin suggests that we need [Pigovian taxes](#) to reverse the problems that the largest negative externalities are creating with the international economy and ecology. Properly internalizing these costs on an actuarial basis might make it easier to communicate to the public the economics of alternative public policies.

Free riding on smallpox eradication

One example of extremely positive externalities is the [smallpox eradication program of the 1960s and 1970s](#). In the mid-1960s the global disease burden of smallpox was estimated at between 10 and 15 million cases costing roughly \$1.35 billion (USD) annually in the losses from sickness and death plus the cost of vaccinating people. The eradication campaign spent on average \$23 million for each of the 13 years between 1967 and 1979 totaling \$300 million. International donors provided \$98 million, while \$200 million came from the endemic countries.²⁸

Documentation we've seen describing the smallpox eradication program does not mention any fee charged to those who were vaccinated, but it was very likely zero, especially in the latter stages of the campaign. If the price had been higher, fewer people would likely have been vaccinated when they did, which likely would have extended the duration and increased the total cost of the program. And they presumably did not *pay* people to get vaccinated, which could have generated an industry of poor people getting vaccinated repeatedly for the money.

One important aspect of this for the present discussion is that everyone alive today benefits from that \$300 million program that ended in 1979. This has been an incredibly valuable public good and part of the commons. We are not even asked to pay a penny today for the benefits (positive externalities) we derive now from that program, which ended over 40 years ago. Some of us would not even be here. Some of us born before 1979 would have died from smallpox without it. Others born more recently would not have been born, because one of their parents or grandparents would have died from smallpox before they were conceived. The rest of us would have a shorter life expectancy and higher cost of health care, because of the costs of vaccinating and otherwise managing smallpox that were eliminated, presumably in perpetuity, by that program. Every human alive today is free riding on that program paid in full almost two generations²⁹ ago. Everyone alive today benefits, and none pay anything anymore. Any competent actuary could quantify the benefits in increased life expectancy and reduced burden of disease from a program like this.

Similarly, any consortium of countries that experienced, e.g., 10 percent of that total annual cost of \$1.35 billion could have paid the entire \$300 million and gotten their money back every 2.22 years (= \$300 million divided by 10 percent of \$1.35 billion) in perpetuity. The United States, the largest contributor to the program, has reportedly recouped its investment every 26 days since then in money not spent on (a) vaccinations and (b) the costs of incidence. If the US had paid the entire \$300 million, they still would be getting an incredible return on that investment, ignoring the benefits to the rest of humanity. *The transaction costs of obtaining financing for similar programs for other contagious diseases are huge.*

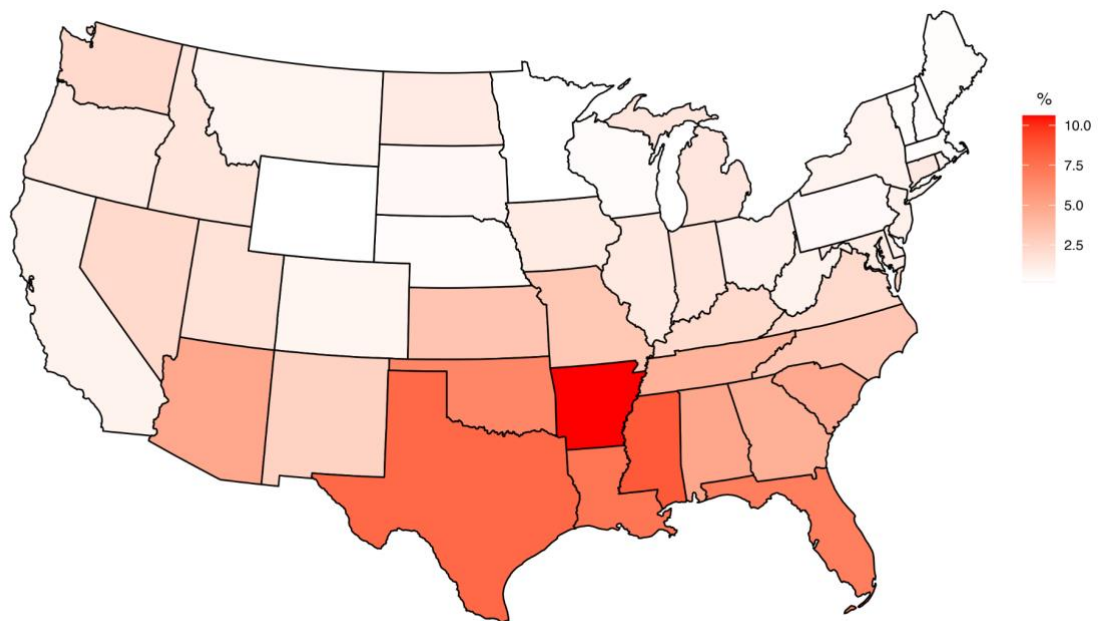
²⁸ Seymour (undated). A billion dollars divided by 10 million cases is only \$100 per case. That suggests that either that \$1.35 billion is conservative or the 10 to 15 million cases was a gross overestimate. See also Ochmann and Roser (2018).

²⁹ Wikipedia on "[Generation](#)" says it is, "generally considered to be about 20–30 years, during which children are born and [grow up](#), become adults, and begin to have children." Accessed 17 September 2021.

Malaria³⁰

Meade and Emch (2010, p. 119) said, "The experience of the United States illustrates some of the complex forms of cultural interaction with the biotic disease system. Originally malaria was an Old World disease. The British brought *P. vivax*³¹ to North America, and the slaves they imported brought *P. falciparum*³² from Africa. ... Malaria was *the* American disease of the late 19th century." The 1890 US Census reported 880 thousand deaths, of which 2.1 percent were attributed to "malarial fever". Numbers were reported for each of what are now the 48 contiguous states of the US plus the District of Columbia³³ with percentages ranging from 0.2 in Minnesota and Wyoming to 10.6 in Arkansas; see Figure 2.

Figure 2. Malaria as a percent of all deaths in the US³⁴ in 1890



³⁰ [Malaria](#) is a mosquito-borne infectious disease that affects humans and other animals. It is caused by single-celled protozoal parasites of the [Plasmodium](#) group. Five species of *Plasmodium* can infect and be spread by humans. See Wikipedia "[Malaria](#)" and references cited therein. Accessed 5 September 2021.

³¹ [Plasmodium vivax](#) is less virulent than [P. falciparum](#) but still leads to death in humans in some cases. See Wikipedia [P. vivax](#) and sources cited therein. Accessed 5 September 2021.

³² [Plasmodium falciparum](#) is the deadliest of the 5 species of *Plasmodium* that cause malaria in humans. See Wikipedia on [P. falciparum](#), accessed 10 September 2021.

³³ In the District of Columbia (DC), whose geographical area is too small to show on this map, 1.6 percent of all deaths in reported 1890 were attributed to malaria. DC is between Virginia and Maryland, where 2.2 and 1.2 percent of deaths, respectively, were reportedly due to malaria. Thus, DC is consistent with the image in Figure 2.

³⁴ Data from Billings (1894). Image modeled after Figure 4.4 in Meade and Emch (2010, p. 120); it is available on Wikimedia Commons, "[File:Malaria as a percent of Deaths in the US in 1890.svg](#)", accessed 10 September 2021. In 1890 what is now Oklahoma was split between "Oklahoma" (roughly the western half of the current state of Oklahoma) and "Indian territory". Those two were combined when Oklahoma was admitted as a state and were combined in preparing this Figure.

The incidence of malaria has since been dramatically reduced in the US without a vaccine primarily by methods that have nothing to do with how the disease is treated once diagnosed. The expansion of agriculture in the North often involved clearing forests and draining swamps, reducing the breeding area for the mosquitoes that communicate the disease from one host to another. Moreover, since most mosquito species feed at night, dawn or dusk,³⁵ improvements in the construction of houses reduced the ability of mosquitos to feed on humans, especially in the North. The opposite happened in parts of the South: The breeding area increased where rice was grown, and housing was less likely to have glass in windows and other barriers to entry for mosquitos.³⁶ By the 1930s, malaria had become concentrated in 13 southeastern states.³⁷

In 1940 the US Department of War asked the Public Health Service (PHS) to create a "Malaria Control in War Areas (MCWA)" program, which organized public health activities near military facilities, most of which were in the South. Early in 1942 the PHS obtained funds for an independent malaria control program for military installations and war industries in 15 southeastern states and the Caribbean. This program focused primarily on larvicide. They started with Paris green, which was soon replaced by diesel oil. Starting in 1942 diesel was replaced by DDT. In 1947 the MCWA was replaced by the "National Malaria Eradication Program (NMEP)".³⁸ This program did *not eradicate* malaria, but it did reduce the incidence to between 1300 and 1500 cases annually,³⁹ making it a minor rather than a leading cause of death in the US.⁴⁰

The primary purpose of discussing malaria here is that its incidence has been dramatically reduced in the developed world without a vaccine through action based in large part on an understanding of the etiology of the disease.⁴¹ This is crudely analogous to routine hand washing since the understanding of the germ theory of disease and masking and social distancing for COVID-19.

More recent efforts to eradicate malaria have added newer technologies to the more traditional efforts to reduce mosquitos. These include insecticide-treated bed nets, insecticide spraying in homes, rapid diagnostic tests, free preventive treatment for people at risk of the disease, and more effective medicines for those who had fallen ill. Countries with high rates of malaria lack the political will to

³⁵ Crans (1989).

³⁶ Meade and Emch (2010, p. 120).

³⁷ The Wikipedia article on, "[National Malaria Eradication Program](#)" says, "By the 1930s, malaria had become concentrated in 13" southeastern states. For this, they cite "[Map 4 - Areas of the continental United States believed to be malarious in 1934-35](#)" (<https://commons.wikimedia.org/wiki/File:MalariaMap.jpg#%7B%7Bint%3Afiledesc%7D%7D>) in Coates and Hoff, eds. (1963), accessed 18 September 2021. A visual inspection of that map identified the following states that might be considered southeastern: Texas, Oklahoma, Arkansas, Louisiana, Kentucky, Tennessee, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, and Virginia.

³⁸ Parascandola (1996).

³⁹ Taylor et al. (2012). See also Wikipedia, "[National Malaria Eradication Program](#)", accessed 10 September 2021.

⁴⁰ Malaria is spread exclusively through bites of infected [Anopheles](#) mosquitoes, according to [WHO fact sheet No. 94 on Malaria](#), updated March 2014 (<https://web.archive.org/web/20140903002027/http://www.who.int/mediacentre/factsheets/fs094/en/>). A few cases have been reported of people catching malaria without going near a location where malaria is endemic, e.g., in airports with flights from such locations (Sanders 2021). Also, mosquito control seems also to have reduced the incidence of other diseases like yellow fever, which tend to be spread by different mosquitoes. Website accessed 19 September 2021.

⁴¹ Cox (2010).

expand the use of these proven techniques, according to experts in the WHO.⁴² All these techniques carry substantial positive externalities for others.

Malaria is infectious but not contagious. It does not normally spread from one human to another where there are no [Anopheles mosquitoes](#) to spread it. Thus, people who live in places with no [Anopheles mosquitoes](#) will not directly share in the externalities from improved malaria control, not counting the positive contributions to productivity of the international economy from a reduction in the burden of disease. This makes it different from contagious diseases like smallpox and COVID-19, for which transmission is (primarily if not exclusively) person-to-person.

Other infectious diseases

Table 1. Examples of infectious diseases⁴³

Disease	Mode of transmission	Contagious?
COVID-19 , influenza , smallpox	Aerosols, respiratory droplets	yes
malaria	mosquitos	no
polio	anal-oral	yes
dracunculiasis	water	no
yaws	skin-to-skin contact	yes

A 2001 analysis of what the United States saves through standard childhood vaccinations estimated that, after the costs to deliver the vaccines and the health care costs for the rare side effects that vaccines cause, society saves nearly \$10 billion in direct medical costs, and \$43 billion in indirect costs like lost worker productivity and permanent disability from disease for a total of \$53 billion; this was the total life cycle cost for all the children born in 2001 discounted at 3 percent.⁴⁴ The US Gross Domestic Product in 2001 was \$10.6 trillion with a population of 285 million.⁴⁵ Thus, the dollar value of the positive externalities of childhood vaccinations is roughly 0.5 percent of GDP⁴⁶ and \$187 (almost \$200) per person,⁴⁷ not counting the increased costs to public health systems due to an epidemic or pandemic.

[Other eradication programs](#) currently in progress target [polio](#), [dracunculiasis](#) (Guinea worm), [yaws](#) (caused by a [spirochete](#) similar to [syphilis](#)) and [malaria](#). Obstacles to eradication include the need to (a) upgrade public health systems in poor countries to avoid diverting the few trained health workers

⁴² World Health Organization (2020) and Alonso (2021).

⁴³ See Wikipedia on "[Basic reproduction number](#)" and on the individual diseases. Accessed 19 September 2021.

⁴⁴ Zhou et al. (2005).

⁴⁵ Johnston and Williamson (2021).

⁴⁶ \$53 billion saved as a percent of the \$10.6 trillion = 0.5 percent.

⁴⁷ \$53 billion divided by 285 million people = \$187 per person.

from concerns that seem more pressing, and (b) guard against "reintroduction from areas where poverty, civil unrest, or lack of political will impede high vaccination coverage and sustain endemicity."⁴⁸

Western military activities and support for corrupt regimes in Muslim countries on top of the legacy of colonial domination have reportedly contributed to [boycotts of the polio vaccine and spikes in cases](#) in Afghanistan, Pakistan,⁴⁹ Nigeria,⁵⁰ Kenya,⁵¹ and elsewhere. An honest budget for the [War in Afghanistan \(2001–2021\)](#) should include the negative externalities from the increased burden of disease in the US and its allies. Their military operations in Afghanistan and elsewhere and other support for political corruption in Muslim countries are reflected in the resistance to vaccination efforts.

How to price goods to combat infectious diseases?

Public policy should minimize the present value of the disease burden in perpetuity at some reasonable discount rate. For most goods, [when prices are reduced, demand increases](#). For many goods useful for managing infectious diseases like vaccines, tests, masks, and treatment, the benefits to others (positive externalities) exceed the marginal cost of producing and distributing an additional unit, at least in geographic regions where the disease is endemic. In such cases, the price to the consumer should probably be zero.⁵²

This is more likely to be true for diseases that are contagious than those that are infectious but not contagious, as discussed with Table 1 above. The Delta variant of COVID-19 was first detected in India and is the rage worldwide as this is being written. Conversely, a person with malaria in a location without *Anopheles* mosquitoes is not likely to infect others. Similarly, someone ill with dracunculiasis is not likely to infect others in a location where sufficient care is taken to ensure the potability of the water that people drink.

More precisely, one possible pricing model might be the maximum of two numbers, as discussed in Appendix 2 below:

1. The marginal cost of producing an additional unit minus the average benefit to others. In some cases this could be negative, implying we should pay people to get vaccinated, tested or treated to minimize the spread of a contagious disease.
2. A minimum charge needed to limit waste: We may not wish to create an industry of people who get vaccinated or tested excessively. And for products like N95 masks, we may not want to subsidize uses in dusty environments that do not carry risks to others in the same way as we might subsidize uses that would more likely limit the spread of contagious diseases.

⁴⁸ Seymour (undated).

⁴⁹ Walsh (2007). In 2011 the [Central Intelligence Agency](#) of the US government (CIA) reportedly conducted a fake [hepatitis B](#) immunization campaign to collect blood samples from [Osama bin Laden's Abbottabad compound](#) to confirm the genetic identity of children living there before [staging the attack during which he, a wife, a son, and two guests were killed](#), according to references cited in the Wikipedia article on "[Killing of Osama bin Laden](#)". See also Larson (2012) and *BBC News Online* (2011).

⁵⁰ Ghinai (2013).

⁵¹ Njeru et al. (2016).

⁵² World Health Organization (2020) and Alonso (2021).

For many products, the vast majority of the price to consumers is substantially higher than the *marginal* cost of producing an additional unit. For products without large positive externalities, this higher price is routinely justified to encourage people to take the risks involved with operating any business, especially if it involves developing new products. However, the current practice of granting patents for technology developed at public expense, as with the Moderna vaccine and under the Bayh-Dole act of 1980 may *reduce* rather than *increase* the general welfare -- and may actually be a major *obstacle* to controlling a disease like COVID-19.⁵³

Humans susceptible to any disease would benefit from having their government pay those fixed costs whenever the positive externalities expected from the increased use of a good would reduce their risk of catching the disease enough to offset the tax subsidies. This would apply to vaccines, tests, masks, and treatments.

In many cases, this optimal price could be negative, suggesting we should pay people to get vaccinated, tested, or treated. For COVID-19 vaccinations, that has been done in some cases,⁵⁴ though Largent and Miller claim it "is morally suspect, likely unnecessary, and may be counterproductive."⁵⁵ However, when it is done, proof of identity is required to avoid creating an industry of people being vaccinated, tested, or treated unnecessarily multiple times.

For other goods with positive externalities, a positive price may be justified if they also have uses that do not carry the positive externalities associated with reducing the burden of disease, like [N95 respirators](#). The general rule is that you and I should be willing to subsidize consumption of goods by others to the extent that such consumption benefits us. With goods with multiple uses only some of which carry such substantive benefits to others, we would like to subsidize only uses with positive externalities and not other uses when it is economically feasible to discriminate between uses.

A mathematical framework for modeling both the benefits and the costs of producing and distributing such goods is outlined in Appendix 2. In this framework, any patent and copyright royalties should be combined with the fixed costs and should *not* be included in the price to the consumer: Otherwise, they discourage uses that would benefit others and make it harder to recoup the costs of developing the product and of improvements that drive down production costs.⁵⁶

⁵³ e.g., D. Baker (2016, esp. pp. 80-81); D. Baker et al. (2021).

⁵⁴ e.g., Oza (2021), Vavreck (2021), Morris (2021).

⁵⁵ Largent and Miller (2021).

⁵⁶ Patents and copyrights may have made good sense [prior to the US Civil War when US federal government spending averaged roughly 2 percent of national income \(Gross Domestic Product, GDP\)](#). However, [there is substantial literature today insisting that patents, in particular, do not "promote the Progress of Science and useful Arts"](#), as required in the US by the [Copyright Clause](#) in the Constitution, but rather do the opposite. D. Baker (2016, pp. 80-81) implied that the Bayh-Dole act of 1980 is on average an *obstacle* to the progress of science and the useful arts, because it allows universities, research institutions, private companies and individuals operating on government contracts to gain control of patents derived from work done on government contracts in ways that become obstacles to such progress without increasing research productivity enough to justify those grants. He notes further that the vast majority of the cost for vaccines, drugs, and diagnostic procedures in the US are for patent royalties, enforced the world over through the World Trade Organization. The marginal cost of producing an additional unit is almost negligible by comparison. We argue here that this patent enforcement threatens the health of people the world over, including in the US. See also D. Baker et al. (2021).

Another alternative is provided by the example of the COVID "Vaccine for the world", Corbevax,⁵⁷ whose developers have released the information on how to make it into the public domain, so it cannot be patented, and is currently being produced in India. These developers could not get funds from the government, which gave over a billion dollars to Moderna to help their vaccine development. Instead, they got \$6 or \$7 million raised from philanthropies.⁵⁸

Public health programs should be managed as public goods. When successful, the results become part of the commons, enjoyed by all. One of the most successful public health programs was the smallpox eradication program, discussed above. We next consider who should pay to subsidize the distribution of goods with positive externalities like vaccines.

Who benefits and who pays?

As mentioned above in discussing smallpox eradication, any group of countries representing 10 percent of the global burden of smallpox in the mid-1960s would have recouped their investment every 2.22 years since if they had paid the entire cost of the program, and the US has reportedly recouped its contribution every 26 days since.

As this is being written, there seem to be three major bottlenecks to vaccinating everyone worldwide: (1) Vaccine hesitancy. (2) Production capacity. (3) Disputes about who should pay and how much. We are not prepared to discuss vaccine hesitancy, apart from the brief comments we already made in the section on "Other contagious diseases" above. And the limits on production capacity seem primarily tied to the economic need of the commercial vaccine producers to retain their intellectual property. This includes trade secrets that are not disclosed in their patent filings.⁵⁹

The present situation calls to mind the evolution of fire-fighting services: when your house is burning down, it's a little late to start thinking about buying fire equipment or forming a fire department. That seems an apt analogy to the condition of the world today regarding COVID-19. After the 1666 Great Fire of London, fire insurance brigades were formed.⁶⁰ Each company had its own "fire mark", which was a durable plaque affixed to the outside of the building. Each fire brigade would only extinguish fires in buildings bearing their mark. In 1833 the political leaders in London decided they would all be safer if their ten independent fire brigades were merged.⁶¹ Fires spread until controlled, regardless of source.

Similarly, on 29 December 2020, Acharya and Reddy claimed, "It's Time to Use Eminent Domain on the Coronavirus Vaccines: Respecting drug companies' intellectual property rights during a pandemic

⁵⁷ Salam (2022).

⁵⁸ *Democracy Now* (2022). This development was led by [Dr. Peter Hotez](#), who's (2021) book advocates "vaccine diplomacy."

⁵⁹ The Wikipedia article on "[Deployment of COVID-19 vaccines](#)" cites multiple sources saying that vaccines like those available for COVID-19 are large, complex molecules, requiring considerable knowledge that is not disclosed in patent applications and not available in current generic manufacturing facilities. Website accessed 19 September 2021.

⁶⁰ Cote and Bugbee (1988). See also Wikipedia, "[Fire department](#)", accessed 19 September 2021.

⁶¹ London Fire Brigade, "[London's ten independent brigades all merged to form the London Fire Engine Establishment \(LFEE\)](#)" (<https://web.archive.org/web/20110903052849/http://www.london-fire.gov.uk/JamesBraidwoodAndTheLFEE.asp>), accessed 19 September 2021.

doesn't make medical, or economic, sense." They suggest separating (1) research and vaccine development from (2) clinical trials and (3) production and distribution.

They wrote, "The easiest way to make vaccines truly available to all is to freely license every effective vaccine formula so that generic producers can manufacture the vaccine anywhere." They also noted that the results of clinical trials managed by people who stand to gain economically from the outcome are never as *credible* as when those who manage the clinical trials have no vested interest in the outcome.⁶² Others argue that governments in the past have displayed insufficient interest in funding developments as risky as new vaccines and new drugs. Moreover, if governments expropriate the intellectual property rights in COVID vaccines, pharmaceutical firms may give up on saving lives and focus on inventing quality of life treatments like Pfizer's Viagra and Allergan's Botox, which are more profitable and less likely to be expropriated. In fact the vaccine sector had withered away to only a handful of companies by the turn of the 21st century and by 2021 had only recently begun to grow again.⁶³ However, it's not clear if that decline in the vaccine sector was a result of government action or that the major pharmaceutical companies recognized that *drugs that keep people alive without curing them tend to be much more profitable than either cures or vaccines*.

We cannot offer here any insights that will clearly support one option over the other. We do hope, however, that the information we provide will contribute to increasing the urgency of this discussion while hopefully providing some resources and perspectives that may not be as easily accessible elsewhere.

How much should countries spend on health? A 2003 discussion paper by William Savedoff for the [World Health Organization](#) notes that, "The range in per capita health spending across countries is larger than 100 to 1, and this translates into spending of anywhere between 1 percent to well over 10 percent of national income." Five percent of [Gross Domestic Product \(GDP\)](#) is mentioned as an unofficial target that has been used in some international comparisons and evaluations but was never officially approved. Savedoff mentioned a 1988 WHO resolution that does not mention 5 percent but does recommend taking action 'to reallocate existing resources more effectively, "reduce waste and increase efficient use of resources", etc.'⁶⁴

It may also be worth reviewing the most recent [Global Burden of Disease Study](#) published by the [World Health Organization \(WHO\)](#).⁶⁵ This methodology has been developed since 1990 to help guide public health investments in areas of greatest long-term need. In such studies, disease burden is often expressed in terms of [Disability-adjusted life years \(DALYs\)](#).⁶⁶ DALYs can be expressed in [US dollars](#) (at [Purchasing power parity, PPP](#)) or any other currency by multiplying DALY components by the average annual income ([Gross Domestic Product, GDP, per capita](#)). However, investments even by poor countries should not be limited to selecting from currently existing options but should also consider investing in research to find lower cost and / or more effective approaches to these problems. Might we

⁶² Acharya and Reddy (2020).

⁶³ Moore (2021).

⁶⁴ Savedoff (2003).

⁶⁵ [The Lancet: Latest global disease estimates reveal perfect storm of rising chronic diseases and public health failures fuelling COVID-19 pandemic](#), University of Washington Institute for Health Metrics and Evaluation, 15 October 2020 (<http://www.healthdata.org/news-release/lancet-latest-global-disease-estimates-reveal-perfect-storm-rising-chronic-diseases-and>), accessed 19 September 2021.

⁶⁶ The [World Health Organization \(WHO\)](#) used age weighting and time discounting at 3 percent in DALYs prior to 2010 but discontinued using them starting in 2010. See Mathers and Stevens (2013).

find other examples like the eradication of smallpox that could show massive returns on investments that are miniscule compared with the burden of disease?

Some research has documented net positive return to society from free health care provided pregnant women and from improved child care that reduced health problems later in life while reducing crime and increasing academic achievement that led to higher incomes and taxes paid as those children entered the workforce⁶⁷ and increased rates of economic growth that would not be achieved without those increases in academic achievement.⁶⁸

Vaccine cartel

Because of the urgency associated with the high mutation rate of COVID-19, any limits on the production of vaccines increase the risks to everyone, even those already vaccinated. In particular, when distribution is limited by demands for patent royalties, it threatens the health of all. It is "[penny wise and pound foolish](#)" and will almost certainly lead to more deaths among those already vaccinated. The disease burden among people in the developed world could cost *more* than if they had paid reasonable patent royalties for the entire world and otherwise worked to increase the speed of distribution of the vaccines.

The Health Global Access Project (Health GAP) has said, "Expanding Vaccine Manufacturing Capacity Solely Within the Pharma Cartel is a Recipe for Perpetual Vaccine Apartheid and Artificial Scarcity". In an "unusual pact between fierce rivals", J&J "will give Merck \$268.8 million in U.S. taxpayer funding to use its capacity to manufacture J&J's vaccine. ... Every country in the world is up in arms about inadequate supplies of COVID-19 vaccines. Rich countries had tried to ensure against delayed vaccinations by advance purchases For the rest of the world, including 130 countries that as of last week had received no vaccines, artificially limited supplies means waiting in line for years, more deaths, more social and economic disruption, and development of more contagious and vaccine-resistant variants. It is a recipe for a never-ending pandemic. The solution to the false supply scarcity should have been advance planning and early agreement to override patent protections Instead vaccine monopolists schemed to maintain rigid control over supply, price, and distribution, both to increase profits and prioritize their monopolies at the risk of public health."⁶⁹

The vast majority of the costs associated with many patented products is in the research; the unit costs of production are often a very small part of the cost [and can be made even smaller as the cumulative production increases](#).⁷⁰ This increases the importance of considering having taxpayers pay any patent royalties for goods with positive externalities and not requiring the end user to think about whether they should pay the higher cost.⁷¹

⁶⁷ Hendren and Sprung-Keyser (2020).

⁶⁸ e.g., Hanushek and Woessmann (2015).

⁶⁹ B. Baker (2021).

⁷⁰ Empirical research has documented "Experience curve effects" in producing a wide variety of goods, whereby each doubling of cumulative production tends to be accompanied by roughly a constant percentage reduction in the marginal cost of producing an additional unit. The Wikipedia article on "[Experience curve effects](#)" cites multiple sources documenting empirical support for this as well as limitation; accessed 19 September 2021.

⁷¹ D. Baker (2016) further suggests that this implies that the development of such products should be funded directly by taxpayers with the results placed in the public domain. See D. Baker et al. (2021).

Public health monitoring

Public health programs are public goods, benefitting even people who are unaware of them. Scientists have estimated that there may be 1.7 million mystery viruses in wildlife with the potential to transfer to humans. In September 2019 the US decided to end an innovative program begun in 2009 that had identified 160 potentially dangerous coronaviruses. Dozens of scientists and analysts working to identify potential pandemics in countries around the world, including China, returned to the US in the three months before the first reports of COVID-19 from Wuhan. The supporters of that program suggest that the current COVID pandemic might have been managed much better if that program had not been cut.⁷²

However, even without that program, in December 2019, before anyone outside of China had heard of COVID-19, Charity Dean reportedly saw a major problem from her monitoring of internet traffic for key words. Dean was the number 2 public health official in California but was unable to convince her manager that there was a problem. Instead, her manager excluded her from key meetings, apparently believing that Dean's claims were a waste of time. Eventually a couple of Silicon Valley executives got Dean's message through to Governor Newsom, who issued a stay-home order -- after COVID-19 was already a major problem in California.⁷³ In 28 September 2020 O'Leary and Storey described how they could predict "the number of people in the USA who will become infected and die from the coronavirus" using "the number of Google searches, Twitter tweets, and Wikipedia page views".⁷⁴ In fact this is a cheap way to monitor for all kinds of problems including [emerging and evolving conflicts](#), natural disasters, and public health crises.

Public health officials in the US announced⁷⁵ in August 2020 that they were creating a new tool called the "National Wastewater Surveillance System (NWSS)" that would "include a portal for state, tribal, local, and territorial health departments to share wastewater testing data, helping public health officials better understand community spread" of conditions like COVID-19. For that in particular, they are asking wastewater treatment facilities to test "sewage for RNA from SARS-CoV-2". With this they can model which strains are active where as well as the emergence of new strains.⁷⁶

Sadly, government agencies in the US and around the world have sometimes made pandemics worse by trying to suppress the dissemination of honest information. That was true in 1918, and it has been true with the current pandemic, contributing to increasing the global burden of disease. We would all be healthier if we improved monitoring and sharing of public health data while severely limiting the ability of government officials to censor or misrepresent what is being reported.⁷⁷

The development in recent decades of [electronic health records](#) provide the promise of computer-assisted health care monitoring, suggesting additional tests and alternative therapies. They could also

⁷² Milman (2020).

⁷³ Confessore (2021).

⁷⁴ O'Leary and Storey (2020).

⁷⁵ Danigelis (2020).

⁷⁶ [National Wastewater Surveillance System \(NWSS\)](#), Centers for Disease Control and Prevention (<https://www.cdc.gov/healthywater/surveillance/wastewater-surveillance/wastewater-surveillance.html>), accessed 19 September 2021.

⁷⁷ e.g., Blackburn and Parker (2021), Blackburn et al. (2020), Tomori (2020), Agogo et al. (2019).

be used for public health monitoring and research. Unfortunately, there is a sad record of use of such data by people in business and government to track and punish their perceived enemies. This has been countered in the past by an emphasis on privacy, protected in the US by the [Health Insurance Portability and Accountability Act \(HIPAA\)](#). However, Graves (2014) suggests it may be wiser to drastically curtail the ability of government and corporate bureaucrats to keep secrets about harms they may cause to individuals and groups. That can be difficult to achieve in the US, where business lobbyists often write legislation, even prohibiting the public from knowing the origins and quality records of the companies that supply pharmaceuticals.⁷⁸ Further discussion of those issues is beyond the scope of the present work.

Testing for contagious diseases

One of the major obstacles to managing COVID-19 has been the availability of tests, especially early in the pandemic. Before entering a retail outlet in the US in March 2021, a store employee measured a shopper's temperature with a forehead scanner. It was reported as 70 °F (21 °C). That's Stage 3 [hypothermia](#): That shopper would have been unconscious or dead, not trying to enter a retail outlet with that body temperature.

But a forehead fever thermometer in that context provides positive externalities, because it reduces the risk of people being exposed to a disease when shopping -- and it would be even better if it were reasonably accurate!⁷⁹

Diagnostic procedures with less error usually (a) make it easier to identify and manage contagious individuals and (b) increase the value of contact tracing. Both of these tend to reduce the spread of the condition. In addition, more accurate diagnostics make it easier to develop vaccines, treatment modalities, and other procedures for managing the spread of a disease. When a person with a contagious condition is diagnosed, steps are usually taken to reduce the number of others who would likely catch that disease.

Even if an outbreak occurs on the other side of the planet, more accurate diagnosis and better control limits the spread and with it the chances that you and I will catch that disease. Better control also on average reduces disruptions to the economy from people not producing as much when sick. If the disruptions are large enough, they can reduce the availability of seemingly unrelated products (like toilet paper in the US early in the COVID-19 pandemic)⁸⁰ and the cost of obtaining such. These positive externalities indicate that I would benefit from subsidizing the use of any such test procedure any place in the world if my subsidies increased the use of better diagnostic procedures enough to benefit me. That's also true with more effective treatment, as noted by the World Health Organization (2020) and Alonso (2021).

⁷⁸ "We know where our shirts are made, but not where our drugs are made, which is arguably more important," according to Ohio State Professor John Gray. To be precise, US law does not prohibit a private company from doing its own testing of pharmaceuticals and collecting data on the reliability of supplies. It does, however, largely prohibit the US Food and Drug Administration (F.D.A.) from sharing the information it has, according to Stockman (2021).

⁷⁹ The use of a malfunctioning forehead fever thermometer can carry positive externalities if its use convinces people who are not feeling well to avoid an enclosed space where they might infect someone else.

⁸⁰ Nguyen (2020).

Some contagious diseases could be eradicated if anyone who did not feel well had convenient access to a sufficiently accurate test. Such tests could help diagnose their condition and prescribe actions to maximize their rate of recovery while minimizing the chances of infecting others. This may not work if many people who are contagious are asymptomatic unless they are subjected to effective routine screening, e.g., when entering some public space like public transit, retail or office space.

There are in fact several research strains moving in this direction. Harvard Chemistry professor [Whitesides](#) predicts "Zero cost diagnostics" for almost any medical condition in the not-too-distant future.⁸¹ [These predictions are based on rates of improvement](#) comparable to [Moore's law](#), which has described the doubling of the number of [transistors](#) in a [microprocessor](#) almost every two years since 1970; it is named after [Gordon Moore](#), co-founder of [Fairchild Semiconductor](#) and [Intel](#), who first predicted something like this in 1965.

Moore's law is a special case of [experience curve effects](#), which is an empirical observation that each time the cumulative production of almost anything doubles, the unit cost drops by roughly a constant percentage, with the rate of improvement varying between products and industries. While it is not clear what determines this rate of improvement, it is clear that providing more money to fund research by competent experts tends to increase the rate of progress. Both the Salk and Sabin polio vaccines were funded by the [March of Dimes](#), founded in 1938 as the National Foundation for Infantile Paralysis by [Franklin D. Roosevelt](#), himself a polio victim and president of the US at that time. Twenty years later, two different vaccines were being administered worldwide and have since come close to eradicating polio.

Whitesides has proposed developing specially treated paper for low-cost diagnosis of health problems, analogous to [litmus paper](#), which has been used for roughly 700 years to test acidity. Others are developing ["lab-on-a-chip"](#) devices. Both types of products hold the promise of rapid, low cost diagnosis of almost anything, including [DNA sequencing](#) of previously unknown pathogens for pennies. In 2020 it cost \$600 to sequence the genome for a single human, [down from over \\$3 billion the first time it was done \(1990-2003\)](#). A \$100 genome is anticipated "soon"; a \$10 genome is reportedly not far away. Harvard geneticist George Church predicated "one day sensors might 'sip the air' so that a genomic app on our phones can tell us if there's a pathogen lurking in a room." The human genome has 3 billion letters but SARS-CoV-2 has only about 30,000 letters. This makes it much easier and cheaper to sequence something like a SARS-CoV-2 sample than the genome from an individual human. The widespread availability of relatively inexpensive sequencing has allowed researchers to monitor the evolution of SARS-CoV-2 essentially in real time.⁸²

[Joseph DeRisi](#) has developed a system called "IDseq" for ["metagenomics"](#), whose goal is to inventory all the viruses and living organisms in a sample of almost anything, e.g., bodily fluids or sewage. It does this by matching overlapping fragments of nucleotide sequences in the sample. The assembled genomes are then compared against a database of all the known sequences maintained by the [National Center for Biotechnology Information \(NCBI\)](#), part of the US government, to identify all known and previously unknown viruses and living organisms in the sample. This system has made major contributions to understanding many different diseases all over the world, including COVID.⁸³

⁸¹ Whitesides (2009). See also Diamandis and Kotler (2012) and the Wikiversity article on ["Freedom and abundance"](#) (https://en.wikiversity.org/wiki/Freedom_and_abundance), accessed 28 September 2021.

⁸² Gertner (2021).

⁸³ Kahn (2021).

The global burden from [influenza](#) might be dramatically reduced through low cost testing of domestic pigs and fowl. Aquatic birds are reportedly the primary reservoir of the influenza A virus, which is responsible for most cases of severe illness, epidemics and pandemics in humans. Influenza also circulates among mammals, especially pigs, which have often facilitated the transmission to humans.⁸⁴

Aaron Carroll, the chief health officer for Indiana University, said that a free COVID test should be mailed to each American each week until the pandemic is under control. Doing so would cost billions and save trillions. Germany is already doing this.⁸⁵ The present analysis says that decisions on how many free tests to produce and mail to whom should consider only the marginal costs of producing and distributing an additional unit. Those marginal costs are almost certainly a tiny fraction of the current sale price in the US. If we invoke eminent domain, as suggested by Acharya and Reddy (2020), cited above, we could pay the developers of such tests more than they could possibly make from patent royalties, place the testing technology in the public domain to create competition in producing such tests, and scale production to the need internationally. If we did, the unit costs of producing and distributing additional tests would almost certainly decline further. The major obstacle is US patent law, which in this case is clearly an obstacle to progress of science and the useful arts, in blatant violation of its purpose under the Copyright clause of the US Constitution.

Major obstacles to progress are sufficiently widespread understanding of (a) the benefits of research and (b) effective and efficient ways of managing research to benefit all.

A goal simpler than universal diagnosis might be reasonable diagnostics for known [sexually transmitted infection \(STI\)](#). Some organizations are already offering free testing for HIV and Hepatitis C at libraries, bars and other community locations.⁸⁶ Compliance might improve if tests for STIs could be as cheap and simple as testing [blood oxygen level](#) or using saliva or some other body fluid, e.g., a drop of blood like a [glucose test](#). If anyone could do it discreetly in the presence of a potential partner, that could become standard practice worldwide: When one partner tested positive, they might still engage in intimate behaviour that was not high risk.⁸⁷ If use of such tests became sufficiently widespread, it could be combined with a program using 100 percent contact tracing to eradicate STIs. Chen (2021) described difficulties finding a homeless pregnant woman, so she could be treated for syphilis, for which she had tested positive, before passing that disease to her baby at birth. This search could be eliminated with a test that could produce a diagnosis before the pregnant woman left the clinic where she was tested.

Roughly 16 percent of the [world population](#) of 7.4 billion had a [sexually transmitted infection](#) other than HIV/AIDS in 2015.⁸⁸ It may be worse in the US. A 2008 study by the [US Centers for Disease Control and Prevention \(CDC\)](#) reported that a quarter of US teenage girls have at least one of four infections monitored in the study.⁸⁹

⁸⁴ Li et al. (2019) and Joseph et al. (2016).

⁸⁵ Aaron E. Carroll (2021).

⁸⁶ Merchant (2021).

⁸⁷ Krueger (2021) reported how rapid testing is being used to test for COVID before admitting people to a party.

⁸⁸ The figure of 16 percent was computed by dividing 1.146 billion people with sexually transmitted infections excluding HIV by 7.38 billion to get 0.155, approximately 16 percent. The 1.146 billion is from GBD 2015 Disease and Injury Incidence and Prevalence Collaborators, et al. (2016),.

⁸⁹ The four sexually transmitted infections monitored in the study were [human papillomavirus \(HPV\)](#), [chlamydia](#), [genital herpes](#) and [trichomoniasis](#). Almost half of the African Americans in the study were infected. Altman (2008).

Even people who are 100 percent monogamous would benefit from widely used and accurate test(s) for common STIs. Some partners are clandestinely unfaithful, and not all children are as sexually naive as their parents want them to be. Moreover, widespread use of such testing would reduce the likelihood that rape spreads STIs. In sum, such testing carries positive externalities, and a program to improve such tests and their use would be a public good.

Face masks and other interventions to limit contagious diseases

Face masks provide an interesting example of a product that can limit the spread of contagious diseases. How should they be priced? The general rule for pricing mentioned above is the minimum of (a) the marginal cost of production minus the benefit to society and (b) a minimum charge required to limit waste. In this case, "waste" could include otherwise legitimate use in applications like painting or working in a dusty environment, which do not carry the positive externalities associated with limiting the spread of a contagious disease. The public should not be expected to pay fixed costs like patent royalties for uses that do not produce such positive externalities. For an outline of mathematical modeling for such applications, see Appendix 2 below.

Treating infectious diseases

Much of the above discussion of tests and face masks also applies to treatment of infectious diseases: The human population might on average be healthier if everyone who had symptoms that might be due to an infectious disease were *required* to seek medical assistance *at public expense*. The World Health Organization (2020) and Alonso (2021) suggested that measures like this have already reduced the incidence of malaria, because people with the disease are less likely to feed mosquitos that would then infect other people.⁹⁰

⁹⁰ The externalities associated with treating contagious diseases might tend to be greater than from treating diseases that are infectious but not contagious, as indicated above.

Vaccine hesitancy⁹¹ and liability insurance for contagious diseases

Ropeik (2013) said:

"A 2008 study in Michigan found that areas with 'exemption clusters' where [more parents chose not to have their kids vaccinated](#) were three times more likely to have outbreaks of pertussis than where vaccination rates matched the state average. ... A 2008 measles outbreak in San Diego triggered by an unvaccinated boy infected during a visit to Switzerland exposed 893 people... . Controlling the outbreak ... cost the community close to \$900,000.⁹² A similar case that year in Tucson, Arizona, infected 14 people ... with measles. The outbreak cost two hospitals nearly \$800,000, and tens of thousands more were spent by the state and local health departments to track down the cases, quarantine and treat the sick cases, and notify the thousands of people who might have been exposed."⁹³

Ropeik concluded, "society has the right and responsibility to establish laws, regulations, and choice frameworks that discourage vaccine refusal. ... [V]accine refusal costs society billions of dollars, both in direct health care costs and indirectly in lost productivity and public health spending to curtail disease outbreaks. ... [I]n many communities, vaccination rates, particularly for children, have dropped below thresholds necessary to maintain [herd immunity](#). ... A study in the United States found that in places where it is harder to opt out, fewer people do."⁹⁴ On 4 May 2020 the US Senate Republican Policy Committee published a report on "Legal precedents for epidemic response", noting that states in the US, though perhaps not the federal government, have the authority to enforce measures such as quarantine and vaccinations "as long as those measures are reasonably tailored to fit the situation." They date in US history to the presidency of George Washington, following English common law from the sixteenth century.⁹⁵

Becchetti and Salustri modeled disease progression in Italy with partial vaccination and concluded that herd immunity, a public good, could not be reached with the prevailing rates of noncompliance with vaccines without vaccinating people under 16 years of age, though the stress on the existing hospital system would be substantially reduced.⁹⁶

A relatively simple solution to the problem of people refusing to get vaccinated might be to require the following:

⁹¹ The Wikipedia article on "[Vaccine hesitancy](#)" discusses "anti-vaxxers" including many of the reasons they give, while documenting the paucity of evidence to support those claims. The Wikipedia article on "[Misinformation related to vaccination](#)" cites multiple sources documenting unfounded reports circulating on social media. For more on that see the discussion below of legal structures that encourage media organizations to disseminate information contradicted by available evidence. (Wikipedia articles accessed 19 September 2021.)

⁹² See also Sugerman et al. (2010).

⁹³ Chen et al. (2011).

⁹⁴ See also Wikipedia "[Vaccine hesitancy](#)", accessed 19 September 2021.

⁹⁵ Blunt (2020). On 23 November 2021 Fentem and Grumke (2021) reported that a judge in Cole County, Missouri, said that the Missouri state government did not have the authority to delegate decisions regarding mask mandates to state or local health departments, though elected officials could issue such mandates directly. St. Louis County government attorneys insist that this ruling does NOT apply to a masking order previously issued in the previous July by St. Louis County Executive Sam Page, because St. Louis County was not a party to the lawsuit.

⁹⁶ Becchetti and Salustri (2021).

1. Everyone should be required to purchase liability insurance for spreading contagious diseases to cover the losses from anyone who catches a contagious disease directly or indirectly from them.
 - 1.1 A simple formula might be to reduce the premium by a factor of (1-effectiveness) of a vaccine for those who are vaccinated. For example, the premium for a vaccine that is 95 percent effective might be 5 percent of the premium for someone who is not vaccinated. Similarly, the premium for a vaccine that is only 50 percent effective might be half that of the premium for someone who is not vaccinated. The premiums for both vaccinated and unvaccinated might be set to cover the cost of the burden of diseases and administering the insurance program.
 - 1.2 The insurance premium may also consider each individual's behavior patterns. For example, people may not have to buy the insurance unless they will be traveling to a place where the covered contagious disease may be more prevalent than it is where they currently reside and otherwise travel.
 - 1.3 For a disease that might plausibly be eradicated, some of the insurance premiums might be used to pay for increased contact tracing and [ring vaccination](#) as well as (a) research to facilitate understanding vaccine hesitancy, (b) [appropriate action to challenge the official behaviors that contributed to vaccination hesitancy](#) like the fake [hepatitis B](#) immunization campaign that the US [CIA](#) reportedly used to confirm [the residence of Osama bin Laden](#) prior to [killing him](#),⁹⁷ and (c) public health campaign to make it easier to overcome vaccine hesitancy. After an eradication program has been declared successful, the insurance premium for that disease should drop to zero.
 - 1.4 This is similar to the liability insurance required to drive a car in many if not all countries in the world today. That insurance rate is higher for people in higher risk groups, consistent with what is proposed here.
- 2 Anyone with symptoms that could be due to a contagious disease should be legally required to consult a health care professional and enter quarantine if told to do so. The cost of the medical consultation, therapy and quarantine should be paid from the liability insurance for contagious diseases. This would include paying people for actual loss of income in quarantine by some formula that would be capped at some modest multiple of a prevailing minimum wage.

Requiring anyone with symptoms of a potentially contagious condition to seek medical attention and act according to the medical advice should reduce the transmission of disease by itself, thereby reducing the vaccination rate required to achieve herd immunity. It could also facilitate any eradication program.

Insurance payments for such a system could be based on actuarial calculations considering the evidence from research into how each disease spreads. Contact tracing could identify several individuals as most likely for the outbreak and could estimate the proportion of the total burden of the outbreak that was most likely due to each individual using [Bayesian inference](#). If more than one insurance carrier was involved, these estimated proportions could be used to allocate the total burden to the different insurance companies with no need to declare any one person as most likely responsible

⁹⁷ Larson (2012). *BBC News Online* (2011).

for the outbreak.⁹⁸ If you are fully vaccinated, you may get the insurance for free, paid by increasing the rates on others who are not vaccinated.

An insurance mandate of this nature could be introduced using a "fee and dividend" system that is revenue neutral or slightly beneficial for the poor and middle class, similar to [carbon fee and dividend systems](#) designed to increase the market prices for fossil fuels in a way that does not generate massive protests as happened in [the UK](#), [Mexico](#), [France](#), [Zimbabwe](#), [Haiti](#), and elsewhere.⁹⁹

The main purpose of requiring liability insurance for contagious diseases is *not* to pay for the outbreaks but to help the public understand the following:

- Everyone benefits from others being vaccinated (and from others using other goods with positive externalities that can help control contagious diseases).
- You personally could become infected, be asymptomatic, and still be responsible for close family and associates getting sick and dying.
- Vaccines are never perfect.

This is similar to the malfunctioning forehead fever thermometer mentioned earlier: Part of the value (and in that case the only value) is to help people understand the potential impact of their actions on others.

Summary of policy implications

The following summarizes some of the most important implications of the discussion in this article:

1. To the extent that the international pharmaceutical industry operates a vaccine cartel as suggested above,¹⁰⁰ it should be broken. This could be abrupt using [antitrust law](#). Or it could be more gradual using tax law or subsidies for (a) research whose results would explicitly be published in the public domain and (b) vaccine production facilities to make vaccines whose formulae are in the public domain.
2. Everyone should be required to purchase liability insurance for spreading contagious diseases with the rates adjusted based on their vaccination history, general health, location, and travel.
3. Everyone except the international pharmaceutical cartel would benefit from better preparations for future pandemics, including improved public health monitoring and improving systems for rapidly developing and deploying relatively inexpensive and more accurate tests for new problems along with new treatment modalities and vaccines.

⁹⁸ Laws making people liable for infectious diseases they might spread and mandating insurance for same could be structured so awards of liabilities and beneficiaries of the insurance would be entirely on an actuarial basis, thereby eliminating the transaction costs associated with bringing cases in a court of law.

⁹⁹ See Wikipedia on "[Fuel protests in the United Kingdom](#)", "[2017 Mexican protests](#)", "[Yellow vests protests](#)", "[Zimbabwe fuel protests](#)", "[2018–2021 Haitian protests](#)", and "[Occupy Nigeria](#)", accessed 19 September 2021.

¹⁰⁰ B. Baker (2021).

Changes like these will be difficult, because they will likely require challenging some powerful interests who benefit from political corruption built into the current political and economic systems that manage public health issues.¹⁰¹ We hope that this discussion will contribute to developing a clearer vision of what needs to be done to improve the quality of public health policies available to the entirety of humanity, even to those whose social status might be threatened by the changes.

Appendix 1. Numbers and references behind Figure 1

Gallagher (2021) reported estimates of the basic reproduction number, R_0 , for four different variants of COVID-19: the original Wuhan variant, Europe's first wave, and the Alpha and Delta variants. He gave a single number for Europe's first wave and ranges for the other three. Table 2 gives lower and upper limits and a point estimate for each of these variants plus the name of a Wikipedia article discussing that strain, the estimated date of a first case with, and the date that Wikipedia article was created. For computational convenience and to save space, these dates are expressed in ISO 8601 format: YYYY-MM-DD.

The numbers for the original Wuhan variant came from Billah, Miah, and Khan (2020). They reviewed 42 studies discussing the reproductive number of this ancestral coronavirus variant. They included 29 of those studies in a meta-analysis, which produced an estimate of 2.87 with a 95% confidence interval of 2.39–3.44. That estimate is the geometric mean of the limits they gave. That suggests that they essentially assumed a log-normal distribution for the estimate. We used that assumption to estimate the standard error of the logarithm of their estimate. We did not find confidence levels stated with the limits given for the Alpha and Delta variants. For convenience, we assumed they were also 95 percent confidence limits and used that to compute standard errors for the logarithms of their estimates. The largest of the standard errors computed was used as the standard error for Europe's first wave, which we used to compute limits for that.

The concept of [herd immunity](#) describes the aspect of a successful vaccination program as a public good.¹⁰² If everyone with whom I interact is vaccinated, I'm not likely to get a disease, even if I have *not* been vaccinated. Other public health measures like diagnostic testing and masks carry similar positive externalities and may be public goods if adopted by a critical mass of the public. The Herd Immunity Threshold on the right margin of Figure 1 is the percent of the population that must be immune to establish endemic steady state,¹⁰³ i.e., where the number of new cases each day or month is neither growing nor declining. At that point the effective reproduction number,¹⁰⁴ being the average number of people in a partially immune population infected by an infected person, is 1.

¹⁰¹ As outlined, e.g., in D. Baker (2016) and Stockman (2021).

¹⁰² See Wikipedia, "[Herd immunity](#)" and references cited therein, accessed 15 September 2021.

¹⁰³ See the section on "[Endemic steady state](#)" in the Wikipedia article on "[Mathematical modelling of infectious disease](#)", accessed 19 September 2021.

¹⁰⁴ See the section on "[Effective reproduction number](#)" in the Wikipedia article on "[Basic reproduction number](#)", accessed 19 September 2021.

Table 2. Numbers for Figure 1

Variant	Lower limit	Estimate	Upper limit	Standard error of log (est.)	Est. date of first case	Creation date for Wikipedia	Wikipedia article
Wuhan ¹⁰⁵	2.39	2.87	3.44	.093	2019-12-01	2020-02-05	"Investigations into the origin of COVID-19" and "COVID-19"
Europe's first wave ¹⁰⁶	2.37	3	3.79	.12	2020-01-24	2020-02-22	COVID-19 pandemic in Europe
Alpha ¹⁰⁷	4	4.47	5	.057	2020-09-15	2020-11-15	SARS-CoV-2 Alpha variant
Delta ¹⁰⁸	5	6.32	8	.12	2020-10-05	2021-04-19	SARS-CoV-2 Delta variant
Omicron ¹⁰⁹	?	?	?	?	2021-11-24	2021-11-25	SARS-CoV-2 Omicron variant

The "basic reproduction number" concept tends to work on a societal level but not necessarily in a small group with high levels of contact like a household. If one member of such a group gets an airborne disease¹¹⁰ like COVID-19, there is an elevated chance that all the other members of that group will also get that disease, though it may take longer for people who are vaccinated than for those who are not.

¹⁰⁵ The limits and estimates are from Billah, Miah, and Khan (2020). The date of the first case was inferred from the specified Wikipedia article, which said, "A phylogenetic analysis of [samples implied] that the first human infection occurred in November or December 2019." For specificity, we interpreted that as 2019-12-01. For "Creation date for Wikipedia", we used 2020-02-05, the creation date for the Wikipedia article on ["COVID-19"](#). See also Wikipedia ["Investigations into the origin of COVID-19"](#). Websites accessed 29 August 2021.

¹⁰⁶ The R_0 for Europe's first wave was taken from Gallagher (2021), as indicated in the introduction to this appendix. For the dates, we used the specified Wikipedia article which began, "The first case in Europe was confirmed in Bordeaux, France, on 24 January 2020." See Wikipedia, ["COVID-19 pandemic in Europe"](#), accessed 29 August 2021.

¹⁰⁷ The range for R_0 came from Gallagher (2021). For the dates, we used the specified Wikipedia article which said, "It was first detected in November 2020 from a sample taken in September". For convenience, we interpreted that as 2020-09-15. See Wikipedia, ["SARS-CoV-2 Alpha variant"](#), accessed 29 August 2021.

¹⁰⁸ As for Alpha, the range for R_0 came from Gallagher (2021). For the dates, we used the specified Wikipedia article, which said, "It was first detected in India in late 2020." That cited two sources, the second of which was Peacock (2021), who said, "The first B.1.617 genome in the global database (GISAID) dates back to 5 Oct 2020." We used that for the estimated date of the first case. See also Wikipedia, ["SARS-CoV-2 Delta variant"](#), accessed 29 August 2021.

¹⁰⁹ See Wikipedia, ["SARS-CoV-2 Omicron variant"](#), accessed 23 January 2022.

¹¹⁰ Wikipedia, ["Airborne transmission"](#), accessed 19 September 2021.

Each person's susceptibility to an infectious disease is a random variable, whose distribution is impacted by their genetic makeup, personal history of exposure and vaccination, and their personal habits including but not limited to what masks they wear when, and ventilation in the shared living space.¹¹¹

Appendix 2. How to price goods with positive externalities?

We consider the following in pricing:

1. P = Price to the consumer.
2. $V = V(P)$ = Volume of consumption at unit price P . V could be zero for sufficiently large P and could be unbounded for sufficiently negative P , i.e., when people are paid to consume the good. We expect V to be monotonically non-increasing in P .
3. $B = B(V) = B(V(P))$ = The total (gross) benefits that others derive from consumption of one additional unit at consumption volume V . This could be zero when V is 0. We expect $B(V)$ to increase to a maximum then decline as additional consumption is diverted to applications that do not carry positive externalities, e.g., with N95 face masks used to protect a person from breathing particles that are not contagious. If there is a maximum, it should be unique with the function non-decreasing prior to that maximum and non-increasing after the maximum.
4. F = Fixed costs required to develop the product and associated production processes. This in theory could increase with V as people spend more money to develop more efficient production processes justified by large volumes of demand, but we will suppress those effects in this notation to simplify the discussion.
5. $M = M(V) =$ [The marginal cost of producing and distributing an additional unit](#) at volume V . This should be non-increasing, on average declining with total production, as described in the literature on [experience curve effects](#).
6. $T = F + \sum_{v=1}^{V(P)} [M(v) - B(v)]$ = total cost to society at production volume V and price P .

We want to select P to minimize T . Equivalently, this would maximize the *net* benefits to others after subtracting fixed and total variable costs.

In many practical applications, it will be clear without a major empirical modelling effort that the benefits to society from someone consuming one additional unit, B , substantially exceeds the marginal cost of producing and distributing that unit, M . In such cases, the optimal price to the consumer, P , will be 0. This will not be true for goods like [N95 respirators](#), which have uses that do not carry such positive externalities. For such products, it may be desirable to invest in more careful efforts to model B and M .

¹¹¹ The Wikipedia article on "[Compartmental models in epidemiology](#)" says that susceptibility (S) combined with exposure (E) sometimes leads to infection (I) and either death or recovery (R). Some people who recovered may be susceptible to a recurrence. However, their susceptibility after recovery or vaccination is usually less than without that experience. Wikipedia on "[Airborne transmission](#)" says, "Airborne transmission is complex, and hard to demonstrate unequivocally but the Wells-Riley model can be used to make simple estimates of infection probability." The Wells-Riley model essentially assumes exponential decay in the probability of remaining healthy as the number of disease particles inhaled increases. See also Wikipedia on the "[Wells-Riley model](#)". These Wikipedia articles were accessed 1 September 2021.

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An Essential Journey Back to the Seeds of Prosperity in a Time of Pandemics: Notes for a Renewed Agenda in Development Studies

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Abstract

Will COVID-19 only widen the social and climate injustices in the rules governing world trade and economy? The answers to this question will depend on whether it is possible to reformulate the current development agenda to address the structural causes of such injustices, or whether it remains focused on poverty alleviation and climate change mitigation. In this article, we explain that the official development agenda (and the theories underpinning it) simultaneously reduces both the capacity of developing countries to be self-sufficient in transforming production structures and moving to higher technology activities (and, as a result, increase real wages and the wellbeing of the population), and the capacity to save nature from being destroyed. The challenge is to overcome the current “superficial” view through a broadly conceived agenda that provides the theoretical and political foundations for restructuring globalisation. To this aim, it is necessary to go back to the “seed” of development studies in order to understand how rich countries became rich, in the first place, and why poor countries stay poor, despite their continuous efforts (Alternative Theories of Economic Development). This is whilst all the while rethinking the ethical, ontological and epistemological axioms that underlie common economic concepts such as production, wealth, growth, innovation, crisis or development (Alternatives Theories to Economic Development or “transition discourses”).

Keywords

Developmentalism, German tradition of development economics, Degrowth, ethics

Introduction

How is it possible that, seventy years after the start of international development cooperation and with sufficient technical capacity, deaths from preventable causes are not being eradicated? Why is it that, despite the fact that only a few decades ago the end of history was predicted, we are witnessing a considerable increase in inequalities, the emergence of new forms of poverty, and an acceleration in the destruction of nature? Our thesis is the following: the ideas, prescriptions and international strategies of official development discourse are inadequate and render the root causes of the abovementioned problems invisible. When we speak of the official development agenda, we refer to the focus on the palliative (poverty alleviation) method that gave rise to the Millennium Development Goals and continues to be central to the Post-2015 Development Agenda and the Sustainable Development Goals (SDGs). During the last decade, Experimental Development Economics and its Randomized Control Trials (RCT approaches) approaches have endorsed this strategic change in the development agenda at the scientific level, as have international organizations such as the World Bank

(WB), the International Monetary Fund (IMF), the World Trade Organization (WTO), and the Organisation for Economic Co-operation and Development (OECD).¹

We believe that the outbreak of COVID-19 (officially named SARS-CoV-2) and the subsequent public policies implemented by governments of all ideological spectrums in the fight against the pandemic have created a climate conducive to rethinking Development Studies and proposing a political agenda that addresses the aforementioned issues. To this end, in this brief contribution we will explore two bodies of evidence brought to the table by both the history of economic development and coronavirus disease alike. The first draws on literature related to the limits of mitigation-based action when dealing with crises, whilst the second explores the short fallings of dominant, capitalist approaches to development.

1. Palliative care is not enough: Alternative Theories of Economic Development

States are responding to the crisis generated by the COVID-19 with actions of a different political nature. From exceptional spending allocations for health care, companies, workers, and vulnerable sectors, to productive reorganization programs, or media propaganda to demand that citizens pay close attention to personal hygiene.² In any case, all countries without exception have implemented public policies that affect fundamental civil liberties, such as freedom of movement or freedom of assembly. To carry out this last type of actions (i.e. home confinement, movement restrictions) it has been necessary for States to implement exceptional legislative frameworks. For instance, China has enforced a “round the clock closed management” system, Italy has declared a “red zone” alert, Spain has imposed a “state of emergency”, France a “nationwide ban on gatherings,” and the USA has created “containment areas” (see Wamsley, 2020). The most successful experiences in the fight against COVID-19 show how simply having possessed abundant material resources, without adequate and radical government policies and drastic measures such as those outlined above, would have increased the spread of the virus and caused many more deaths (Lai et al., 2020; World Health Organization, 2020).

These lessons are useful in ending other pandemics even more damaging than COVID-19: poverty and hunger. Putting an end to both phenomena is not only a question of better RCTs, experience, or palliative interventions but also of implementing a coordinated strategy that allows for maximizing real wages in developing countries (Reinert, 2007). The empirical evidence shows that policy recommendations stemming from the official discourse on development are not in line with the policies implemented by developed countries, or by certain countries that have undergone successful development experiences (i.e. the United States, Germany, France, the United Kingdom, Switzerland, the Netherlands, the ‘Asian miracle’- China, Brazil, etc.). These countries promoted dynamic imperfect competition through protectionist policies, such as industrial and trade regulations and taxation associated with import and export (Chang, 2002; Khan and Christiansen, 2010). The present world economic order is characterized by developed countries (the European Union and the USA) being allowed to subsidize and protect their agriculture and using a range of direct government policies to

¹ The success of this ‘new’ approach to development has been demonstrated by the awarding of the last Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel to the experimentalists Esther Dufló, Abhijit Banerjee and Michael Kremer (DBK). Last March World Development published a monograph on the influence of DBK’s work in Development Studies (see editorial, van der Meulen Rodgers et al., 2020).

² With variations, this type of action has been implemented by most of the countries concerned. Adherence to them entails compliance with certain requirements on the part of potential beneficiaries: invoicing below certain levels, cessation of activity or income thresholds. In the case of Spain, all the details are available at Reales Decretos-ley 8/2020, RD-ley 7/2020, RD-Ley 11/2020.

promote development and to subsidize private enterprise (Mazzucato, 2011), while, under the rules of WB, IMF, WTO, OECD or the Washington Consensus, there is no countervailing right for poor countries to protect their manufacturing interests. The COVID crisis shows tendencies towards a new type of protectionism, first in medical equipment and medicines, but also in agriculture. One example here is Sweden, which closed down much of its agriculture in the past decades, except in the Southern part of the country and, on observing the lack of solidarity from the European Union, is now contemplating a higher degree of self-sufficiency (Veum, 2020). To understand this type of policy development (“developmental nationalism”) it is necessary to journey back to the origin, or ‘seed’, of Alternative Theories of Economic Development.³ That is to say, to go back to the history of Cameralism and the German tradition of development economics (Reinert, 2019; Reinert and Reinert, 2018).

2. Capitalism is not enough: Alternatives Theories to Economics Development.

Constructing the capitalist world-economy was only made possible through the use of racism and sexism as tools for the hierarchization and categorization of the population (Mbembe, 2000; Wallerstein, 2000). The history of capitalism is also the history of the open veins of the South and massive exploitation of natural resources (Galeano, 1972; Herrero, 2013). Its logic of accumulation entails irreconcilable contradictions and growing inequalities between centers and peripheries (Prebisch, 1949). In the field of Development Economics, the structural adjustment policies promoted by the Washington Consensus are a contemporary example (López Castellano, 2009), as are the Troika impositions which, in 2011, led to severe social cuts in countries like Spain or Greece (López Castellano and García-Quero, 2019). The dilemma of how best to balance public health, care for nature, and economic growth has been highlighted again as a result of the COVID-19. The suspension of work has led to a drastic reduction in environmental pollution, while putting the most vulnerable groups at greater risk. It has also shown how, despite their precariousness and low social recognition, various jobs linked to care and jobs with little monetary value are fundamental to sustaining and reproducing life. The challenge, therefore, is how to build a system with a production model that is compatible with human life and care for nature.

Theoretical currents such as Alternatives Theories to Economic Development or ‘transition discourses’ (Escobar, 2015; Gudynas 2011) contend that any political strategy that emancipates human beings and respects nature has to overcome the patriarchal-heterosexual-western-white-bourgeois-modern-colonial capitalism world system (Pérez Orozco, 2015).⁴ Some of the proposals linked to these trends, in particular to degrowth theories, are (FaDA, 2020; Hickel, 2019; Kallis et al., 2020): food sovereignty based on local agroecology; North-South solidarity; debt cancellation and the rejection of austerity and structural adjustment measures; democratization of key institutions of global economic governance; the introduction of policies to prevent mass unemployment (i.e. a job guarantee, work-sharing, basic care income); universal public services; global redistribution taxes, etc.⁵

³ Despite the common English usage of the nouns ‘source’ or ‘origin’ in this context, throughout the article we have opted to maintain a reference to the ‘seed’. This is to retain a more literal allusion to the short story ‘Journey to the Seed’, written by the Cuban author Alejo Carpentier in his book ‘The War of Time’.

⁴ In these currents, several perspectives coexist: *Buen Vivir* (loosely translated as ‘living well’), the ecological perspective, eco-feminist theories, degrowth contributions, de-colonial epistemologies and post-extractivisms, amongst others (see García-Quero and Ahumada, 2017).

⁵ From critical positions, they explain that these currents force everyone to live miserable lives, and that the coronavirus crisis reveals “the misery of degrowth” (McAleenan, 2020). However, degrowth is the opposite to a

These economic policy instruments also focus on the country's productive structure, but go beyond the Alternative Theories of Economic Development, challenging the concept of development itself, and beginning to place a change to the current paradigm on the global agenda. While Alternative Theories of Economic Development understand development as real wage increase produced through the expansion of activities with increasing returns to scale (Reinert, Ghosh, and Kattel, 2016), the Alternatives Theories to Economics Development move the analytical focus from the processes which increase the capital value to ones that make life sustainable.. It is not enough to break the vicious circle of diminishing returns. Rather, this must be done in a way that does not negatively impact countries of the South, vulnerable populations, and nature. These theories advocate for the de-colonization of Eurocentric powers and knowledge, to allow alternative modes of social existence (Quijano, 2011, Rivera-Cusicanqui, 1984) and innovation (Jimenez et al., 2022). From these perspectives, the very idea of infinite wealth production is harmful since it fails to recognize the physical limits of the planet and the economic relevance of care, a sphere associated with femininity (Pérez Orozco, 2014; Herrero, 2013). These questions imply a new 'journey to the seed' in Development Studies, in this case towards that of knowledge: the ontological and epistemological discussion.

3. Conclusions: Linking Alternative Theories to go beyond the capitalist world economy

Overconfidence in the magical thinking of technification, economic growth, the free market, and neoliberal globalization has led many to forget that the state is the main policy architect and actor when facing a crisis. Successful responses to Covid-19 have shown, once again, the central role of states in organizing political measures that foster and maintain the welfare of their populations, through actions to guarantee quarantine, social distancing, mobility restrictions, as well as extraordinary support to manage losses related to the economic downturn.

The role adopted by the states and politics in countries' performances when tackling COVID-19 is very different from the perspectives that dominate the current agenda of development. SDGs and RCTs, while containing some valid points, abound in efficiency criteria and reduce the fight against poverty and climate change to mere products of the rational or irrational choice of individuals. These discourses divert attention from thoroughly addressing these challenges, and obscure the fact that the key to avoiding poverty is transforming productive structures and achieving an endogenous technological capacity to improve real wages. Nor do they allude to the impossibility of combining current rates of economic growth with care for the environment and biodiversity (Otero et al., 2020).

The current challenge for the agenda and the theory of Development is to accept and incorporate these lessons, and to try to make two 'journeys to the seed' compatible to reduce the injustices in the rules governing the world. To recapitulate, the journeys are the following: 1). Towards a developmental vision focused on promoting industry and structural change; 2). Towards the epistemological and ontological foundations of Development Studies, the redefinition of its aim and its indicators, an expansion of its borders and a drive for methodological openness. Both journeys are only compatible from a systemic view that focuses on making visible the inherent exploitations of the capitalist world-economy in terms of gender, ethnicity or nature.

Solving pressing problems of contemporary society during and after COVID-19 is ultimately a matter of political and ethical discussion that implies prioritising some interests and freedoms versus others. In

new version of austerity, because austerity calls for scarcity in order to generate more growth, while degrowth calls for abundance in order to render growth unnecessary (Hickel, 2019; Kallis et al., 2020).

the fight against COVID-19, for example, public health has been given priority over the freedom to travel abroad. Why, in today's world, does the right to accumulate wealth, property, or to pollute the environment take precedence over the right to life of millions of people? The answer has much to do with one's power to achieve what one desires, whether referring to the European Union, USA, Donald Trump or Bill Gates. However, this is not mentioned in the official development agenda either. Just as governments have implemented stage-based plans (or similar measures) to de-escalate from the COVID-19 lockdown whilst prioritizing citizen freedom, the new development agendas have to reveal an ambitious exit strategy to gradually transition from global emergencies towards local interventions developed and spread with attention to community and the environment. Such strategies must commit, unwaveringly, to ethical criteria which hold the sustainability of life at their core.

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How Resource-Cheaply could we Live Well?

Ted Trainer

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Abstract

There is now a very strong case that global sustainability cannot be achieved unless there is large scale degrowth in rich-world economies, but there is little understanding of the magnitude of the reductions required. Reasons are given supporting the claim that rich world per capita resource consumption levels would need to be cut to a small fraction of present levels. This cannot be achieved by attempting to “decouple” GDP growth from resource and environmental impacts. It can only be done by transition to far simpler lifestyles and systems, and therefore to radically different economies. The general alternative social forms required are sketched. The main purpose of the article is to show that quite large reductions in per capita consumption are feasible without jeopardizing the quality of life. This is done by detailing aspects of the way of life on a selected homestead site proceeding according to Simpler Way principles. It is explained that a general transition to these kinds of lifestyles and systems would not jeopardise the maintenance of socially-useful modern technology. The conclusion is that the large scale degrowth required for sustainable, just and satisfactory lifestyles and systems is achievable but only if there is transition to some kind of Simpler Way.

Introduction

Most of the discussion of the global sustainability predicament focuses on the search for ways of enabling continuation of present rich world lifestyles and systems, but doing so with reduced resource demands and environmental impact. Relatively little attention is given to sustainability strategies focused on shifting to lifestyles and systems which do not involve high resource and ecological costs. There is now a very strong case that technical advance and effort to improve efficiency and productivity are not going to enable growth in GDP while resource and ecological impacts are brought down to sustainable levels. Extensive reviews involving hundreds of studies show that such a goal is not being achieved and is not likely to be. (See below.)

This means that solutions to the global sustainability and equity/justice predicament must be sought in terms of shifting to lifestyles and systems which dramatically reduce resource demands and environmental impacts. The first section of the following discussion indicates the reasons for believing that the reductions must be much larger than is commonly imagined, actually in the region of 90%. If this is so, radical challenges are set for conventional and indeed for most alternative economic thinking, including within the Eco-socialist camp. (Trainer, 2020.)

These considerations set the context for the main issue to be discussed in this study, which is how resource-cheaply it might be possible to live in these new simpler ways while enabling a good quality of life. Reference will be made to Lockyer’s study (2017) of a Missouri ecovillage, and the theoretical study of a Sydney suburb (Trainer 2019) which find that reductions in per capita consumption rates of the required order can be made without reducing the quality of life. However the focus in this article is to report numerical evidence on the ways practiced in a particular homestead within an illustrative

sustainability education venture which seeks to proceed according Simpler Way principles and functions.

However it is first necessary to make clear the context for this discussion.

The magnitude of the required reductions

It is not commonly understood how large the reductions would have to be to enable a society that is globally sustainable and just. The World Wildlife Foundation's Footprint measure (2018) estimates the average Australian per capita use of productive land at 6–8 ha. Thus, if the 9–10 billion people expected to be on earth by 2050 were to live as Australians do now, up to 80 billion ha of productive land would be needed. But there are only about 12 billion ha of productive land on the planet. If one third of it is set aside for nature then each Australian would be living in a way that would require about 10 times as much productive land as all people could ever have. Some other measures taking into account factors such as materials consumption (Wiedmann et al., 2015) indicate higher multiples.

To this must be added the implications of growth. If the Australian GDP rises by 3% pa and by 2050 all 9–10 billion people rise to the “living standards” Australians would then have, each year the global economy would be producing and consuming about 18 times as much as it does now. Yet the present amounts are unsustainable; the WWF estimates that the global footprint is now 70% higher than the planet could sustain. This indicates that the 2050 global resource and ecological impact would be in the region of 30 times a sustainable level. (For a detailed derivation of these multiples see Trainer 2021a.)

The common assumption that technical advance can solve the resource and ecological problems without impacting on affluent living standards and economic growth has now been contradicted by a large amount of evidence. Many studies show that despite constant effort to improve productivity and efficiency the growth of GDP continues to be accompanied by growth in resource use. See for instance recent extensive refutations of the “decoupling” thesis by Hickel and Kallis, (2019), [Parrique et al., \(2019\)](#), and Haberl et al. (2021) reporting on several hundred papers. This evidence would seem to decisively contradict the faith of the “tech-fix”, “Green Growth” and Ecomodernist believers.

The above multiples have profound implications for thinking about sustainability and desirable social forms. The Simpler Way perspective is that solutions to the global predicament cannot be found on the supply side but must be sought in terms of lifestyles and systems involving far less demand. Needs must be met via far less production and consumption in radically different systems, as distinct from in terms of improved efficiency and technical advance. In other words, the focal issue should be what alternatives to conventional goals and means must be adopted to achieve sustainability with a high quality of life? It is now necessary to indicate the kind of lifestyles and systems that could enable this.

What social form might enable such large per capita reductions?

The Simpler Way perspective (TSW, 2017) is that the foregoing context determines that a sustainable and just world cannot be achieved unless the basic form of social organisation has the following characteristics:

- Most people live in small, highly self-sufficient and self-governing local communities in control of their zero growth local economies.

- Strong cooperative and collectivist values and arrangements (e.g., commons, committees and working bees), ensuring for example that there is no unemployment and all have a valued livelihood.
- A minimal role for market forces. A needs-driven economy rather than a profit-driven economy; i.e., basic production, distribution and development decisions made by town assemblies focussed on maximising the welfare of all.
- Community self-government via thoroughly participatory processes such as town meetings and referenda.
- Above all, a culture of willing sufficiency, collectivism and especially frugality, in which life satisfactions derived from non-material pursuits.

These ways do not imply that there could be no cities, professional services and training, universities, high tech research or modern health care, or mass production of basic necessities etc. (For the detail see TSW 2017, and TSW.2021b.)

The dramatic reduction in resource and other costs is enabled by the smallness of scale, the integration and proximity within small settlements and the spontaneous action of familiar citizens. There can easily be intensive recycling, overlapping functions (e.g., “wastes” become garden fertilizer), reductions in overheads (such as offices, packaging, transport), and synergism. These effects are illustrated by a study of egg supply discussed below. (Trainer, Malik and Lenzen, 2019.) This and the Remaking Settlements study (Trainer 2019) show how the agribusiness system for providing food can be replaced by localised systems based on home gardens, collectives, commons, “edible landscapes” and small farms. (Smaje explains how Britain could feed 80 million with 15% of the workforce on small farms: 2020.) Similarly the egg supply example shows how most sewer and garbage disposal systems could be eliminated and replaced by closed nutrient loops whereby all animal, garden and human “wastes” are recycled to nearby soils, also eliminating the need for artificial fertilizers.

Attention needs to be drawn to the synergistic, “knock-on” or feedback effects within integrated systems. In conventional economies adding one new product adds dollar, resource and ecological costs of many kinds. More trucks need to be used to distribute it, meaning more road wear and accidents, more emergency wards and insurance offices and legal costs etc. However as the egg supply example illustrates, shifting to local supply paths can not only reduce or eliminate costs in many areas, such as less road accidents, but also generate benefits such as providing fertilizer. This reflects the Permaculture principle of designing systems to maximise the number of automatic and overlapping functions each element performs.

These brief indications of the Simpler Way approach set the context for the following case study of how extremely low per capita resource costs might be in viable and attractive communities. It is not being assumed that all people would need to live as is described; some people would need more elaborate and resource-expensive provisions, some would specialize in professions and some would live in cities. The intent is to show that in general remarkably large reductions are possible.

Evidence from Pigface Point homestead.

Since the mid 1980s Pigface Point has been developed as a non-profit educational site in the Sydney region introducing visitors to Simpler Way ideas and practices. It is an isolated homestead plus caretaker's cottage within 100 ha of bushland, rather than a community although at times around ten people have lived in the two households. It is not connected to normal power, water, sewage, garbage or postal services. The following per capita evidence refers to the practices and consumption levels of the main long term residents. In a few instances costs are estimated assuming circumstances that do not exist at the site but which could do so if the surrounding locality took the form being advocated, e.g., if neighbourhood workshops and community orchards were close by. In these cases reference is made to findings from the Remaking Settlements study (Trainer, 2019) which explores how an outer Sydney suburb might be restructured to maximise self-sufficiency and minimize per capita dollar and resource costs for individual households.

The findings describe what at first sight most would probably regard as unrealistically austere lifestyles. However no deprivation or hardship is involved. It is a matter of finding alternative ways of providing what is needed for a quite satisfying life via practices, pastimes and values that do not involve conventional resource-intensive activities or supply paths. Obviously the extent to which most people in consumer society could be persuaded to adopt these ways and to find them satisfying is problematic since they involve levels of consumption, travel and possessions that would be regarded as unacceptable in present consumer societies. The prospects for transition towards these ways depends on whether a very significant cultural change reversing the present obsession with growth and affluence can be achieved. But that is not the concern in the following discussion. (It is addressed in Trainer 2020b.) The intent here is to show the potential for achieving very low material resource consumption rates through action on the demand side.

Food

Although vegetable gardens, orchards and poultry meet some of the site's food demand these sources have not been maximized due to time that has to go into conducting the educational tours. They have been developed as indicators of what is possible, just as the site has several small examples of earth building to point to alternatives in this domain. It is therefore more meaningful to discuss the food sector in terms of the potential which the Remaking Settlements study derived, with some reference to practices at this site.

The study found that if the nearby outer Sydney suburb was designed on Simpler Way principles almost all food could conceivably come from within its boundaries, via home gardens, community gardens, neighbourhood commons. Edmondson, (2020) found that there is sufficient land within the city of Sheffield to meet its fruit and vegetable needs. However suburbs and towns should be surrounded by nearby small farms as Smaje details in Small Farm Future. (2020.) The book shows how a UK population of 80 million could be fed by only 15% of the workforce on small farms. Small farms have the highest yields and the most efficient performance, and many social and ecological benefits not captured by conventional economic measures. Some would be community-owned cooperatives. Little food would need to be exported from most regions or imported into them.

Following are some of the ways whereby resource and dollar costs of localized agriculture would be far lower than those associated with the agribusiness-supermarket path. Several of these are practiced at the Pigface Point site.

All household "wastes", including from kitchens, gardens, flush or composting toilets and animal pens would be recycled to gardens via fish ponds, compost heaps and methane digesters producing useful gas. This could completely eliminate the need for artificial fertilizers. Fish would be produced in small cement tanks and local ponds, linked to aquaculture, hydroponics and gardens taking the nutrient-rich waste water. Poultry can free-range clearing and fertilizing orchards and gardens.

Within settlements there can be many community owned and run "commons", e.g., orchards, nut groves, olives, herb patches, bamboo clumps, woodlots and forests, ponds, dams and tanks. Many of these would be developed where roads had been dug up, given the greatly reduced need for transport. (See below.) Committees could organise the maintenance of the commons, and working bees would do the "work". These public spaces could contain many forest gardens and "edible landscapes", providing free mulch, fuel wood, timber, honey, nuts and fruits.

The commons would also produce various materials as inputs to local small firms and hobby and craft production, including timber, reeds, leaf oils (e.g., lavender, eucalyptus) and other plant-based chemicals, vines and rushes for baskets, creosote from wood fires, and clay and earth for pottery and building. They would also provide grazing areas within orchards. The community would build and operate cooperative fish tanks, ponds, processing and storage sheds, and greenhouses to enable some production of bananas, winter tomatoes etc.

Produce would go to kitchens with almost no packaging, preserving, marketing, fertilizer, transport, energy or waste removal and treatment costs and with no advertising or marketing cost. Almost all transport could be via hand baskets, bicycles, and horse and cart. There would be little need for energy intensive storage such as refrigeration, because fresh food would mostly go directly from the gardens to the kitchen when needed. Neighbourhood freezers might be used, meaning that not every house would need a refrigerator.

A significant amount of grain and dairy products might have to be imported, ideally from farms within only a few kilometres. Permaculture principles, such as intensive use of permanent and tree crops, would almost eliminate the need for ploughing, possibly enabling horses and donkeys to do most of the cultivating and carting needed (given the short distances), as well as being leisure resources.

Ideally far less meat would be eaten, greatly reducing the land areas, infrastructure and resource costs. Meat could mostly come from small animals such as rabbits, fish and poultry, living within settlements and benefiting from free-range conditions.

These practices would mean that there might be very little need for energy inputs into the food producing sector of the economy. For the home garden, commons and edible landscape sectors there would hardly be any dollar and energy costs. The small farm sector would be where items such as shared tractors would involve relatively low costs.

In the conventional US food supply system energy costs per person are high, around 26 GJ/person p.a. (not including the 20% of food production exported.) (The Choose Energy Team, 2019.) Half this energy cost is incurred beyond the farm gate. If the energy costs embodied in trucks, silos, ports, fertilizer and chemical factories etc. were added the figure would be increased significantly. In addition there are large ecological costs associated with the agribusiness path whereas the local alternative improves soils while yielding co-products such as methane, fertilizers and pest control along with social benefits such as community cooperation, interaction and cohesion.

The Remaking Settlements study estimated that the total running energy cost plus embodied energy cost for a localised agriculture might be 192 MJ/person/y, in the region of 0.5% of the agribusiness path, and again the percentage would be lower if embodied energy costs were included in the estimates for the conventional path.

The study of egg supply by Trainer, Malik and Lenzen, (2019) makes clear magnitude of the resource and dollar cost reduction potential and the reasons for these. It was found that both these costs per egg were in the region of 1-2% of those for agribusiness-supermarket path. The supermarket egg has a vast and complex global input supply chain involving fishing fleets, agribusiness, steel mills, coal mining, power stations, shipping and trucking transport, silos, warehousing, chemicals, infrastructures, supermarkets, storage, packaging, marketing, the finance, advertising and insurance industries, waste removal and dumping, computers, a commuting workforce, and highly trained managers and technicians. It also involves the damage to ecosystems and soils associated with agribusiness, including non-return of nutrients to soils, acidification and toxicity from use of artificial fertilizers and pesticides, and carbon emissions.

However eggs supplied via backyards and community cooperatives can avoid almost all of these costs, while enabling immediate use of all “wastes”. Recycling of kitchen scraps along with free ranging can meet total poultry nutrient needs. Poultry and other animal manures, including human, can be directly fed into compost heaps, methane digesters, algae and fish ponds, thereby eliminating the need for inputs to village food production from the fertilizer industry. No transport, packaging, chemicals, feed mills, marketing or expert personnel or waste removal need be involved. Management, care and maintenance of systems can be largely informal, via spontaneous discussion and action. No dollar costs for labour need be involved. In addition cooperative care of animals adds to amenity and leisure resources and facilitates community bonding.

These effects are enabled by the smallness of scale, the proximity of functions (e.g., gardens close to animal pens), design for overlapping functions (free ranging fertilizes orchards and reduces fruit fly lava), and cooperative social organization. These concepts can apply to many other domains, including other food items, dwelling construction, clothing supply, many services, and especially to provisions for leisure, entertainment and education.

Water

Within-house use of potable water at Pigface Point is around 8 litres/pp/d, from rainwater tanks, and another 65 litres/pp/d is used for toilet flushing and irrigation pumped from a wetland. The potable figure is around 4% of the US and Australian household averages. (Water Footprint Calculator, 2020, National Poly, 2018, Indoor Water Use at Home, (2020.)

By far the most important issue regarding water is not household use but the demand generated by the conventional agribusiness system. Australian farm water use (ABS, 2021a) corresponds to 820 litres per person per day, even when exported food is excluded. This is around 16 times the Pigface Point figure, although the latter does not include all food consumed at the site.

In a localized food supply system water demand would be greatly reduced by use of many permanent crops, especially trees, mulching, recycling of water from households to gardens, and much reduced meat consumption. (Blazey, 2020) estimates that it can take 2,000 times as much water to produce a kilo of meat as it does to produce a kilo of vegetables. There would therefore be large reduction in need

for big dams, mains, large pumping stations, and the bureaucracies to run them. Windmills and small electric pumps would do most of the pumping of fresh and waste water.

Settlements would be landscaped to retain rainfall through use of earthen bunds, swales and ponds, eliminating the need for concrete sewer and storm water drains and pipes. Storm runoff would be channeled above ground to ponds and soak-in areas where fruit trees were planted. Few if any underground pipes, mains or concrete works would be needed. Above ground systems are easily monitored and repaired, unlike underground systems.

All water used on the Pigface Point site is collected there, so no water rates are paid.

Garbage and Wastes

Apart from packaging from purchased food items almost no non-biodegradable garbage is generated at the site. All kitchen and garden "wastes" go to compost heaps etc. Almost all clothing and footwear is old and patched/repared, and eventually becomes cleaning rags and is then composted. Worn out devices are dismantled and components placed in the workshop storage racks. In a sensibly designed settlement household and animal pen "sewage" would be piped to productive ponds and methane digesters for recycling of all nutrients. Thus, there would be very little need to transport garbage to dumps or to deal with solid waste, and none for dealing with sewage. No water, sewage or garbage rates are paid this site although occasionally a small amount of material is taken to the local tip.

Clothing

All "work" at the site, both physical and at a desk, involves no travel so tough old and threadbare clothing items are suitable and therefore expenditure on clothing and footwear is negligible. A pair of trousers might be worn every day for a month or more. Approximately one pair of sandals per person is purchased each year. Slippers and sandals are homemade and repairing, darning and patching are winter fire-side hobbies. Total clothing and footwear costs are in the vicinity of 30 c/pp/d. The national average is \$2.5/pp/day. (A.B.S. 2017) and the national average purchase of new clothing has been estimated at a remarkable 27 kg p.a. (Pepper, 2017.)

Housing and buildings

The main house built in 1946 is a modified army storage igloo, now of fairly normal house appearance. The conventional "fibro" caretaker's cottage was home built in around 1970. The site uses small animal shelters to illustrate forms of low cost alternative earth building.

Dwellings, storage sheds, community buildings and small business premises can be built from local earth, stone, wood, or straw bales, at very low dollar and resource cost, and with lifetimes of hundreds of years. Floors can be made from rammed earth surfaced, e.g., with turpentine and beeswax. Some roofing can be earth (sod) over a waterproof membrane on timber supports, or domes and vaults from mud bricks requiring no reinforcement or scaffolding. These are widespread in the Middle east. (For illustrative images and techniques see Rodriguez, 2014.) Weather proofing can be provided by a thin layer of cement over chicken wire reinforcing. Most roofing might eventually be ceramic tiles made from local clay and wood-fueled kilns. Research would go into the production of durable sealers and paints

from local plant, earth and animal sources. For example earth walls can be sealed with the traditional whitewash made from lime and milk.

In the alternative local economies envisaged people would have much more time for home-making, and therefore for cooking on wood stoves equipped with hot water jackets and tanks. A more vegetable based diet would reduce the amount of cooking needed. Rugs mostly made from wool could replace most carpets, eliminating the need for vacuum cleaning. Matting, seating and screens as well as baskets and hats can be woven from local reeds, rushes and willows.

Following are costings for a quite small dwelling constructed according to these kinds of principles and practices, illustrated by a model at Pigface Point. This is a fairly conventional house with rammed earth walls and floors and corrugated iron roofing, with a floor area of approximately 65 square metres. Walls and the ground floor would be made from rammed earth taken from what would become an underground cement-lined water tank with a volume of 23 m³. Corrugated iron roofing is assumed but might be replaced eventually by tiles from a local wood-fired pottery. To be built today paying retail prices for new materials the construction cost would be around \$7,000, or 9.6 cents/pp/d assuming a 100 year life time and two occupants. This does not include labour as building could be carried out by the owners with the assistance of friends and an expert builder who could be paid by working on his other projects.

This construction cost compares with \$155,000 for the low end of the range for Australian houses, and \$450,000 for the high end, (Home Guide, 2021.) The average conventional house area is 186 m², 2.9 times as large as this model, with a cost of construction per square metre of \$1,393 (Delahunty, 2020), compared with \$108 for the alternative, a ratio of around 13/1. (The average new Australian dwelling being built is around 245 m².)

It is important to recognize the effect of bank loans and tax. If building a medium sized conventional house costing \$250,000 involves a loan of \$160,000 then \$240,000 or more might have to eventually be paid back to cover interest. To be able to do this might require \$320,000 to be earned because about 30% of income will have to be paid in tax. The total to be earned to pay for the house, including the \$90,000 from savings, the tax on income, the bank loan plus interest, and the tax on that amount of income would therefore be around \$440,000. The foregoing cost of the alternative house is so low that a loan is unlikely to be necessary, and for very low income earners negligible tax would be levied on income. Thus the amount needing to be earned to obtain an average conventional dwelling could be around 63 times that for the alternative. For houses of equal area the ratio would be 23/1.

Ten years ago Milne (2013) estimated the embodied energy cost of materials for the average conventional house at 1000 GJ, (i.e., not including the energy cost of construction) so it is likely to be significantly higher now. The above alternative described above has an estimated energy cost of 40 GJ, or about 11% of the cost per square metre of a conventional house. Two thirds of this cost is due to the corrugated iron roofing. This could be completely avoided by use of domes and vaults made from mud bricks. These dwellings and community buildings can be large and apart from doors, windows and the fitting out of interiors, and if home built would involve almost no dollar or energy cost. (Rodriguez, 2014.)

Premises for most local firms, shops and community facilities such as libraries and community stores, workshops and meeting centres, could be built following these sorts of principles; mostly quite small, simple, built from mud, straw bale or rammed earth etc. plus locally grown and milled timber. Many such structures are still in use in Europe, especially the UK, although constructed several hundred years ago. These houses can be beautiful, decorated in a wide variety of styles, making the landscape unique and

interesting. For many people, designing and building their own home at a relaxed pace would be one of life's most satisfying adventures.

In present affluent-consumer societies many would not opt for the kind of alternative housing described above but it should be considered in relation to the context of severely limited planetary resources, and the enormous unmet need for housing in rich and poor countries. What kind of house might the planet be able to provide for 10 billion people? Even in Australia in 2019 there were 148,500 families on the waiting lists for public housing. (Institute of Health and Welfare, 2020), large numbers who will never be able to afford a conventional house, and 120,000 homeless on any given night, including about 18,000 children under 10 years of age (Sheltered by Grace, 2021.) Yet as noted above, the average new house being built in the country has the biggest floor area in the world, around 245 square metres. (ABS, 2021b.)

Tools, appliances, hardware and materials

The site's workshop has a 12 volt bench drill, grinder and lathe, all homemade and solar powered, but no other power tools. Most work is by hand tools, many of them around 80 years old. The gas stove is about the same vintage. The fridge and the gas water heater are the only other appliances, apart from the home-made open fire and washing machine.

Because most new buildings could be made from earth, straw bales, stone, bamboo and wood there would be little use of energy-intensive metals and plastics. There would be research into plant sources for chemicals, adhesives, medicines, paints, lubricants, fibres and fabrics. Most of the questionable synthetic chemicals in use today would not be necessary. Design would focus on minimizing problematic materials. For instance, furniture and sheds can be made without metal fasteners, by use of wedge and dowel-peg joints. (Mikey77, Undated).

Some materials would be produced in bulk in large regional or national factories, such as fabrics, light steel, irrigation pipe and chemicals, and distributed to many small factories, hardware stores and workshops. Demand for paper would be greatly reduced and might be met from local forests and recycling. Eventually roofing iron could be slowly replaced by ceramic tiles made from local clay.

Transport and travel

These very significant energy and dollar items could be greatly reduced in the alternative lifestyles and systems envisaged. There would be little need for transport to move people to work places because much less work in offices and factories would need to be done, and most work places would be localised and accessible by bicycle or on foot. The few large factories would be close to towns and railway stations. Fewer goods would need transporting and distances would be shorter. Neighbourhoods and their surrounding regions would be leisure-rich, reducing long distance travel for holidays and tourism. (See below.) The vehicles in most use would be bicycles, with some but relatively little use of buses and trains. Horses could be used for some transport, especially carting food from farms to towns and returning nutrients to the farms. Horses consume no oil, can refuel themselves, reproduce themselves and do not need spare parts or expensive roads. Most urban roads and freeways would be dug up and the space used for gardens and other commons.

The typical Pigface Point travel distances are 1-3 km to local shops by foot, bicycle, car or train each week plus an infrequent 20 km train trip to the city. For households within bicycling distance of towns

in the new settlements there might be almost no transport energy or dollar costs. The Australian per capita expenditure on transport by members of the average household has been estimated at about \$14 /pp/d by the ABS (2017) and \$19 by Beck and Newman (2016), which corresponds to approximately \$6,020/pp/y.

IT

The way of life being described has little need for information technology, although at this site about half of each day is spent at a desk writing, emailing, browsing and maintaining a minimal website. No use is made of electronic media for leisure purposes. According to McCrindle Research (2018) Australians average ten hours and nineteen minutes each day at work and in leisure time attending to electronic media. Jacobo (2019) reports that Australian teens spend more than 7 hours a day watching screens, not including school work. This means that in the Remaking Settlements suburb over 40,000 person-hours a week are being devoted to watching soap operas and playing electronic games when they could be being put into community activities.

IT would have an important role in running small firms and farms and keeping community records, and at the wider level of larger regional factories, hospitals, railways, universities and research establishments etc. Electronic media would be important information sources, especially locally run radio. But ideally the currently vast amount of time, talent and resources going into providing and consuming trivial electronic entertainment would be dramatically reduced, because most people would have more important and rewarding things to do. There would be hobbies, arts, crafts, community issues to discuss, working bees and committee meetings, activities in the community workshop to engage in or watch, mini-cafes and common rooms nearby, many friends within a few metres, the drama and poetry etc. groups, and the many sources and activities organized by the leisure committee.

Leisure

Leisure and entertainment are major cost items in consumer society, and major sources of savings in the alternative. The field has been partly dealt with above, in terms of developing leisure-rich communities and the need for far less time to be given to paid work, enabling much more time to pursue leisure interests. At present leisure time is mostly spent in the passive consumption of fleeting entertainment produced by corporations or professionals, especially via TV and IT, in travel and in purchasing and consuming goods and services. The quality of most electronic entertainment material is “spiritually” miniscule if not negative, evident in TV content, game shows and especially the violent and destructive nature of computer “games”. In addition much leisure time and expenditure at present goes into purchasing; shopping is a major form of entertainment. These phenomena are due in large part to the existence of dormitory suburbs which are “leisure deserts”, also lacking arrangements such as committees and working bees that would provide leisure opportunities.

Simpler Way lifestyles, settlements and nearby regions would be leisure-rich. The community itself would be a spontaneous leisure resource. A walk around a typical eco-village involves one in conversation, observations of activities in familiar firms and farms, and the enjoyment of an enthusiastically gardened landscape. In the new towns the leisure committee would organize events such as public facilities, festivals, celebrations, concerts, dances, visits, field days and local holiday options. Locally focused and operated media, especially radio, could further enhance leisure resources. The many local artists and crafts people would be keen to display and teach their skills. Thus the leisure

and cultural committee would be one of the most important in the town or suburb. For these reasons it is likely that there would be far less desire than there is now to purchase leisure and entertainment, or to travel for leisure, let alone to travel overseas.

At present any town or suburb includes many talented musicians, singers, storytellers, actors, comedians and playwrights, unable to do much performing because the globalised entertainment industry only needs a few super-stars. These people would have several days a week to practice their skills and would be appreciated for their (largely unpaid) contributions to the many local gatherings, concerts and festivals. Much of the time spent in productive activities such as gardening, making things and arts and crafts will be enjoyable, as would involvement in working bees.

This is the context in which the leisure and holiday situation at Pigface Point is to be understood. The main resident does not leave the homestead for holidays or watch TV and hardly ever goes to a restaurant or theatre. He has not boarded an aircraft in several decades, and has never done so for leisure. There is no distinction between work and leisure on the site; all repairs and construction are enjoyable creative activities. The site is isolated without any connections to surrounding settlements, so if it was linked to a local community with an energetic leisure committee then leisure options would be even more abundant. Consequently there is almost no expenditure on leisure, although the above occasional travel to the city might be regarded as partly leisure activity. In 2016 the average person in Australia spent \$63 each week on "recreation". (ABS, 2017.) About 6.3 million Australians travelled abroad in 2019 for leisure purposes, at an average expenditure of \$4,750 per person. (Budget Direct, 2020.)

It should be stressed that these large scale reductions in expenditure do not involve any sense of burden, deprivation or sacrifice in order to save the planet. They are consequences of ways that are chosen for their quality of life benefits. Further, costs and quality of life benefits could be significantly improved if the site was close to a thriving local economy.

Energy

In Simpler Way communities energy demand would be greatly reduced, primarily because far less would be being produced and consumed, proximity reduces travel and because systems would be much simpler.

Most of the wood cutting, pumping, washing, grinding, electric welding and freezer boosting would be carried out when the sun or wind was high. The many small local dams might enable most of the (much reduced) electricity storage required. Hydrogen and biomass might meet the small need for fuels for transport and storage. However some dependence on national renewable energy sources coming into the town via the old grid is likely to continue.

A more vegetable based diet would reduce the need for cooking and enable use of efficient wood stoves. These could be fitted with water jackets to contribute to space and water heating. All biological wastes would go to methane digesters providing energy. Communal earth ovens would be used for regular community baking parties. Earth buildings are well insulated and therefore cut space heating demand. Fridges and freezers are energy-costly, accounting for 15% of Australian household demand, but a diet based more on vegetables fresh from gardens would cut the need for them. Community fridges might be located nearby enabling many households to function without their own fridge.

At Pigface Point use of electricity is about 0.065 kWh/pp/day, delivered by solar panels. No energy goes into ironing, vacuuming or floor polishing, TV, air conditioning, fans, dish washers, clothes dryers or

other appliances. The small electric fridge uses about 0.43 kWh/pp/d. Washing is via a 70 W car fan motor driving a homemade device. Australian household per capita average electricity consumption is around 7.6 kWh per day, 117 times as high as for the homestead. (Ryan and Parvia, 2016, ABS, 2019, 2021, Living Energy, 2018, ABS 2019,2020.) Note that the national figure does not include the major energy use at the homestead which is water pumping, making up 43% of electricity used. The Australian household expenditure on electricity is around \$2500/y. The Pigface Point expenditure assuming PV panels, batteries etc. and associated lifetimes and replacements, is in the region of \$160/y, that is, around 6% of the national figure.

Fuel for the home-made open fire burning wood collected on the property accounts for around 0.5 kWh/pp/day (burnt in winter but here averaged over the year). Cooking and shower heating account for about 1kWh/pp/d of gas. No heating is used for dish and clothes washing. There would be almost no net carbon emissions, given that if left in the woodland the space-heating firewood would decompose and release as much carbon as the fire releases, to be taken up by subsequent biomass growth. Total household energy use per person equates to 0.994 kWh/pp/d. The Australian total household energy consumption equates to 11 kWh/pp/d, a ratio of 11/1.

Beyond the household: the local economy

Many of the above low per capita resource consumption rates could be achieved only if unconventional arrangements were in place beyond the household level. For instance very low leisure and holiday expenditures are made possible by development of leisure rich communities, travel to work is reduced by localizing production of goods and services, the need to build and run sewer systems is eliminated by recycling nutrients to nearby soils, which also reduces the national need to produce fertilizers. International trade and internal national transport would be dramatically reduced. Thus the most significant considerations for sustainable development are to do with the design of settlements and regional and economic systems, as distinct from reduced personal lifestyle consumption. These implications are discussed at length in [The Simpler Way](#) (Alexander and Rutherford, 2019.) Following are some other central themes.

As noted above, settlements must mostly be small in scale, highly self-sufficient and self-governing, basically cooperative and collectivist and geared to achieving a high quality of life for all despite frugal resource use. Most goods and services must come from within the town or the nearby region. The local economy must have undergone significant degrowth to be steady-state and to be needs-driven, not profit-driven, although a role for the market and private enterprise could remain. (The elimination of all private means of production, as advocated by socialists, is not necessary; see TSW: [The New Economy](#).) Control of economic and social affairs must be largely in the hands of the community, not centralized state agencies, although there would be a role for these in national coordinating and facilitating etc., focused on enabling thriving local communities. Thus there would be relatively little international trade, industrialization, centralization, urbanization, travel and transport or need for mass production or for the finance industry.

The primary role of the small remnant "state" organisations would be to facilitate and serve the local communities and regions, for instance ensuring that all towns have small industries enabling export into the national economy of some of the items towns cannot provide for themselves. States would provide national systems such as railways, communications and legal systems, but would have little power as all final decisions would be taken at the level of the town assembly. (The Simper Way exemplifies anarchist goals and means. See Trainer 2020c.)

These system simplifications would add to the powerful negative multiplier effects on resource and ecological impacts. As noted, at present each new cosmetic put on the market adds to road wear, road accidents, the need for hospital emergency wards, rubbish disposal etc. Thus reducing consumption via simpler lifestyles and systems has a negative multiplier effect eliminating many hidden costs. At the same time the alternative system arrangements bring many benefits, such as eliminating fertilizer, sewage and garbage treatment costs, along with many social benefits such as increased familiarity, cohesion and support.

These kinds of systems constitute no threat to the provision of socially-necessary high tech, modern health care, universities or R and D etc. When the present vast quantity of wasteful, luxurious, unnecessary production is phased out (\$550 billion spent p.a. on advertising alone), it will be possible to greatly increase research into improving technologies and systems that enhance welfare. Because far fewer goods and services will need to be produced far less time and talent will need to go into preparing technocrats and managers, enabling schools and universities to switch from mere training to Educating. (Needless to say many current systems work well and might require little or no change.)

Although not central to this discussion reference might be made to some other savings that could be made by radical change to the economy. At present the resource and dollar costs of almost all goods and services are increased by the profits that flow out to “shareholders”. If most production was via small local family farms, firms and co-ops within stable economies these sectors would involve few if any costs of that kind. Such operations would be seen as providing comfortable secure incomes, not as devices enabling accumulation of investable surpluses. There can be no interest paid in a zero growth economy (if more is to be paid back at the end of the year than was borrowed at the start, then in that year the economy must grow), and this would eliminate most of the bloated and parasitic finance industry. It would make sense for most if not all large and complex firms such as steel works, pharmaceuticals and railways to be publicly owned since in a steady state economy they could not accumulate surpluses, and society not investors should be making the decisions. However, it is possible that many large operations could be run by private co-operatives, as in Mondragon, provided that they function according to strict guidelines and monitoring in the interests of the public good.

Thus shifting to radically simpler lifestyles and systems need not raise any significant impediments to the provision of sophisticated and technically complex goods and services.

From the perspective of The Simpler Way, the required structures and functions show that a satisfactory and sustainable society could not be a capitalist society.

A note should be added on another issue not central to the present discussion; i.e., the plausibility of transition to the ways outlined. For instance, how could this decentralized, localised “rural” vision be realized in a world where most people now live in gigantic cities, where luxurious affluent ways are idolized, and where capitalism is deeply entrenched in minds as well as systems. Above all, does not Degrowth mean very large numbers must cease working for wages producing things? This “conundrum” does not even seem to be recognized within the Degrowth community. Trainer (2020c) argues at some length that our society is not capable of solving its biophysical or social problems and that we are accelerating towards a major global breakdown which might be terminal. However, this is opening the way for the emergence of the alternative envisioned above. The crucial point to be emphasized here is that the increasing failure of existing systems to provide will force people towards recognizing that they must try to build local communities based on principles of self-sufficiency, self-government, cooperation and frugality.

Conclusion

The per capita dollar and resource cost reductions indicated above are remarkably large. Compared with national averages they are in the range of, for food expenditure in general potentially 1/30+, household water use volume 1/25, clothing 1/8, housing 1/23 and household energy use 1/11. Travel expenditure is reduced from \$17/pp/d to almost zero, and for IT and leisure expenses the reduction is similar.

It is not being assumed that the frugal ways evident at Pigface Point would be regarded as acceptable in the near future. They might be more “austere” than will become necessary. The point of the foregoing analysis has been to show firstly that very significant reductions on the demand side are necessary for sustainability to be achieved, and secondly that these can be achieved without hardship or abandonment of high tech, by shifting towards the kind of lifestyles and systems evident at Pigface Point and to settlements designed according to Simpler Way principles. It hardly needs to be pointed out that these ways could not be adopted without extreme cultural change from currently predominant world views and values. However it is likely that the increasing difficulties affluent-consumer-capitalist society is running into will be powerfully conducive to such a shift. Hopefully the foregoing discussion has shown that it could be less problematic than might at first be imagined.

It can be argued that the conditions for a high quality of life require little in the way of material consumption. Consider, having adequate food, shelter and clothing, having good health, good family and friends and a pleasant environment, being secure from poverty and violence, living in a supportive community, being free from oppression, struggle and stress, having worthwhile and valued work, having meaning, interests and purpose, being appreciated and respected, having a sense of place or home, and some degree of peace of mind. With the possible exception of health none of these requires more than quite low levels of incomes or material wealth. Many in tribal and peasant societies and in intentional communities live well on very low levels of consumption.

This discussion strengthens the case for seeking solutions to the global predicament in terms of less resource intensive ways, rather than in terms of technical fixes for the damaging consequences of pursuing increasing levels of affluence and economic output. In other words, given the goal of sustainable and just societies, the most likely way to achieve these goals involves recognizing that they must be redefined in terms of simpler lifestyles and systems. Hopefully the foregoing discussion strengthens the case that this path is more feasible than might have been assumed.

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The role of the IMF in a changing global landscape: Testimony to US House of Representatives Committee on Financial Services, Sub-Committee on National Security, International Development, and Monetary Policy, Virtual Hearing on February 17, 2022.

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The context

The Covid-19 pandemic has increased the inequalities between rich countries and the rest of the world (other than China). Most developing countries face a significantly worse external environment, and their resources are now even more constrained than before. This has already led to declining employment, significant increases in poverty and hunger, and worsening economic prospects in the near future. This process reduces the expansion of global effective demand, which in turn limits the potential for global economic recovery.

One major reason for the K-shaped global recovery is the huge variation in fiscal responses between rich countries and the rest.¹ Although the COVID-19 pandemic caused government revenues to decline in all countries, the advanced economies increased their public spending and tax benefits in 2020 by around 18 per cent of GDP. The United States provided significantly more, as much as 25 per cent. By contrast, emerging-market economies provided less than 6 per cent and low-income countries only 2.5 per cent of their 2020 GDP.² Because their income bases were already lower, developing countries as a group spent only a tiny fraction in per capita terms of what was spent in the advanced economies.

In 2021, even as fresh waves of COVID-19 infections were causing economic havoc, “fiscal consolidation” expressed as attempts to control and reduce public spending was already well underway in many middle and low-income countries, owing to the rising levels of public debt accrued over the previous two years, largely because of events beyond their control.³ This inevitably worsened their economic outlook, and prevented even essential public spending on nutrition and health services.

This is why the IMF’s new SDR allocation of 2021 was greatly needed, is entirely consistent with the mission of the IMF, and is in the interests of both these countries as well as the United States. It is also

¹ See for example, Michael Spence, Joseph E. Stiglitz and Jayati Ghosh, “Avoiding a K-shaped recovery”, Project Syndicate, March 24, 2021, <https://www.project-syndicate.org/commentary/global-economyavoiding-k-shaped-recovery-by-michael-spence-et-al-2021-03>

² IMF Fiscal Monitor April 2021, <https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19>

³ IMF Fiscal Monitor October 2021, <https://www.imf.org/en/Publications/FM/Issues/2021/10/13/fiscal-monitor-october-2021>

why the functioning of the IMF needs to be changed to be able to cope with new and emerging global challenges.

The 2021 SDR allocation

In August 2021, the IMF issued \$650 billion worth of its own liquidity, Special Drawing Rights (SDRs). Because SDRs are distributed according to countries' IMF quotas, low-income and middle-income countries received only around \$250 billion, while rich countries got nearly \$400 billion, most of which they are unlikely to use. Even so, the SDR allocation was a lifeline for several developing countries facing severe balance-of-payments problems, and helped to prevent further economic decline.

SDRs have several advantages over other types of international financing:

- They do not add to countries' external debt burdens, which is a major plus point given the increase in public and sovereign debt in most countries during the pandemic. Unlike loans from the IMF and other multilateral lenders, they are non-conditional. This makes them similar to the liquidity expansion automatically available to governments in some advanced economies like the US. They are designed to enable them to be used to strengthen the economy; they do not entail forcing countries to adopt measures like fiscal retrenchment that can damage or reverse the possibilities of economic recovery.
- It enables them to be used without adopting measures like fiscal retrenchment that can damage or reverse the possibilities of economic recovery.
- SDRs are accessible to all countries, including middle-income economies that may face balance-of-payments constraints but are excluded from other multilateral funding. This is critical because most measures adopted by the international community in the wake of the Covid-19 crisis have been directed only to low-income countries, whereas there has been a widespread increase in poverty and economic distress across the developing world, including in some middle-income countries. A large fraction of the world's poorest people live in these countries, and they have limited resources with which to deal with the poverty within their borders.
- SDRs are virtually costless to use. The interest rate to be paid to the IMF is below 0.1 per cent, so they require only a tiny additional fiscal spending when they are used. Most significantly, they do not impose any costs on taxpayers in other countries.

It is difficult to think of an easier way to provide external finance to countries that urgently require it.

What is most significant for forex-constrained developing countries is that SDRs add to their external reserves *even if they are not used*. This can play an important part in stabilizing and providing some cushion to the balance of payments of recipient countries. These additional SDRs provide precautionary reserves that serve an important role because of the greater volatility of international financial markets. The increase in forex reserves can also improve their chances of accessing other forms of finance and reducing borrowing costs of recipient countries.

Of course, these SDRs can also be directly used in various ways. Since August 2021, at least 80 countries have used SDRs for these purposes:⁴

⁴ <https://cepr.net/eighty-countries-have-already-used-their-special-drawing-rights-but-more-are-needed/>

- 32 countries exchanged SDRs for hard currency to the tune of \$11.6 billion, presumably for increasing imports.
- 55 countries used SDRs to pay their IMF dues for \$6.5 billion, which reduced their debt burden and eased repayment concerns in general.
- 39 countries recorded SDRs in the government budget, equivalent to \$31.6 billion, presumably to spend on vaccination, health care and other priorities.

The use of SDRs has been significantly higher than after the 2009 allocation, and it has been more varied, reflecting the flexibility that SDRs provide. This has been crucial for these countries to cope with what has otherwise been an extremely harsh external economic environment, although the amounts are still inadequate to meet the requirement. Most of these uses occurred within three months of the SDR allocation, showing how urgently these resources were required.

It should also be noted that SDR expansion was and remains a crucial measure, because other forms of IMF financing have recently been tightened. In December 2021, the IMF repealed almost all of the flexible access limits on funding that it had introduced during the pandemic, including under the Rapid Financing Instrument introduced in March 2020.⁵ Yet the uneven K-shaped global recovery has meant that many countries remain in severe economic difficulties, which are likely to worsen as the US and other advanced economies move to tighten monetary policy.⁶ There are soon likely to be many more countries requiring some form of external liquidity assistance because of such global processes that are not of their own making.

Impact on the global economy and on the US economy

While the amounts of SDRs utilized so far may appear to be small, they have still played a critical role for the economies that have used them, and even these small increases have mitigated to some extent the extreme increases in global fiscal inequality noted above. This is clearly of great benefit to these economies; which is clearly important for economic justice and reducing global inequality in general. It also has a positive impact in terms of increasing demand in the global economy, which is critical for a sustained and viable economic recovery even in rich countries. And it is also important for geostrategic reasons, serving to reduce international social and political tensions that could spill over with unpleasant consequences.

Indeed, the US economy is also likely to have benefited indirectly through this SDR expansion, because of a revival of its own exports to the rest of the world. Figure 1 shows the monthly pattern of US exports, which increased very sharply in late 2021 in the months after the new SDR allocation, when developing countries were able to access these additional resources. Obviously, many factors played a role in this increase in US exports, but the enlargement of fiscal space and easing of balance of payments difficulties among some previously very constrained trading partners was also important. The

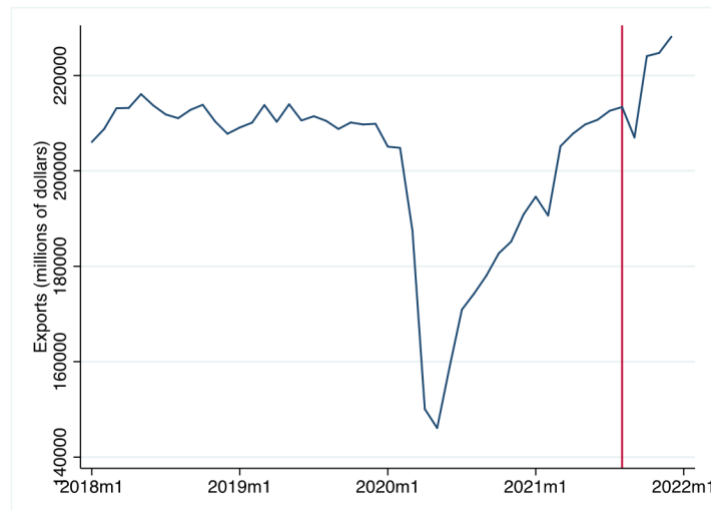
⁵ Only the cumulative access limit (mainly for countries that already have an emergency loan and might need another one) for emergency financing was extended for another 18 months. ^{vi} See, for example, the World Bank's World Development Report 2021.

⁶ Such a proposal was made by the prime minister of Barbados, Mia Amor Mottley at the United Nations Climate Change Conference (COP26) in Glasgow last November. <https://euobserver.com/climate/153407>

importance of a wider global recovery that includes developing countries, for the future expansion of US exports (with all of its income and employment effects in the US) should not be underestimated.

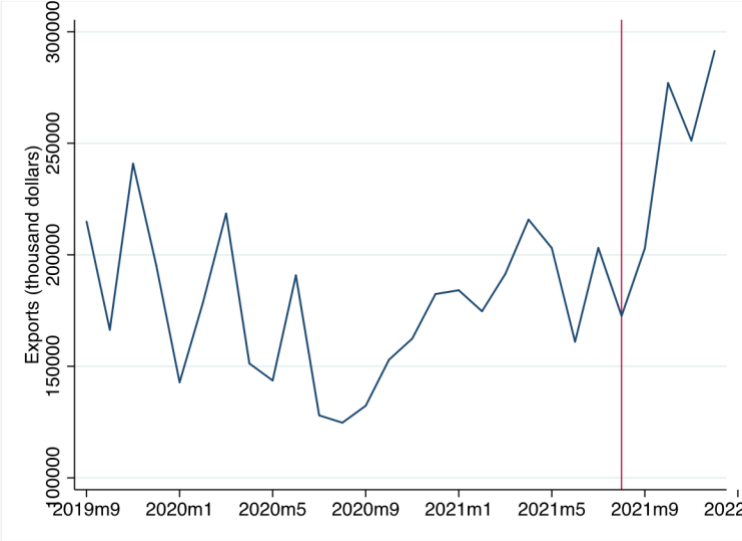
Figures 2-4 provides some examples of changes in US exports to emerging markets and developing countries. In Ukraine, which had been facing severe balance of payments problems well before the current military crisis, and had a very low level of foreign exchange reserves before the new allocation, SDRs were used to repay the IMF so as to reduce its aggregate debt burden, exchanged for hard currency with which it could engage in essential imports, and for increased public spending on covid relief as well as capital expenditure and to cover the deficit without taking on more debt. The importance of such measures for the governments and for the economy and people of Ukraine should be obvious. But it is worth noting that the SDRs issue also enabled Ukraine to increase its imports, and this was in turn associated with a dramatic increase in imports from the US from September 2021 onwards. Similar trends are evident for the Philippines and DR Congo, which also face severe balance of payments constraints. Therefore, in addition to helping the countries that use the SDRs, such imports clearly benefit exporting segments of the US economy.

Figure 1: Exports of the US, 2018-2021



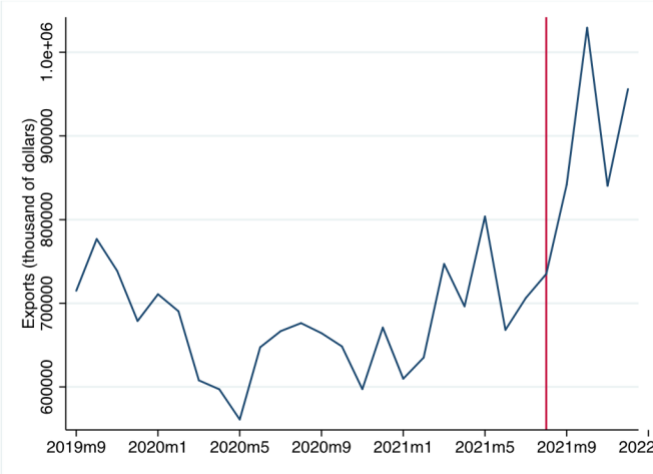
Source: U.S. Bureau of Economic Analysis

Figure 2: Exports of US to Ukraine, 2019-2021



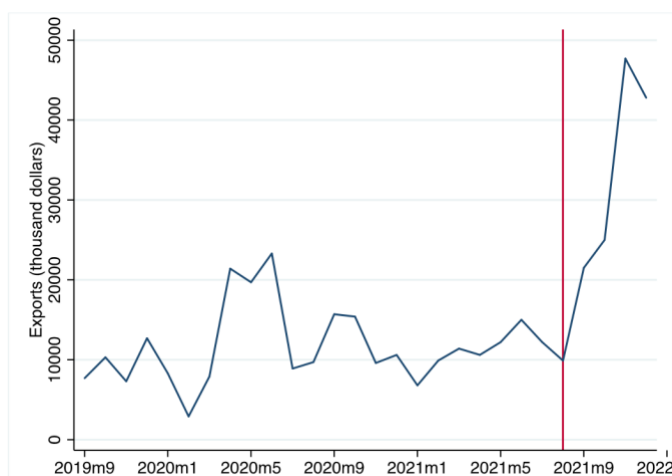
Source: U.S. Bureau of Economic Analysis

Figure 3: Exports of US to Philippines, 2019-2021



Source: U.S. Bureau of Economic Analysis

Figure 4: Exports of US to Democratic Republic of Congo, 2019-2021



Source: U.S. Bureau of Economic Analysis

There is therefore clearly a case for larger and more frequent SDR allocations. In addition to helping countries cope with the fallout of the pandemic, such allocations could be used to provide much needed climate finance to the developing world. It has been persuasively argued that an annual issuance of SDR 500 billion for a certain period could be provided to fund climate action.⁷ Such regular SDR allocations would provide essential resources to bolster mitigation and adaptation efforts in countries where they are most needed, in a context in which advanced economies have not yet fulfilled even their relatively modest pledge at COP15 in 2009 to mobilize \$100 billion per year in climate finance for the developing world. In addition, the SDRs would provide some of the financing required to achieve the Sustainable Development Goals, which currently seem out of reach.

Concerns about SDR allocations

There is a concern that releasing so many SDRs into the global system would fuel global inflation, which is already seen as a concern. There are several arguments to be made against this position. First, the proposed sums for SDR expansion are trivial compared to the increase in liquidity of as much as \$25 trillion fueled by the loose monetary policies in advanced economies since the 2008 global financial crisis.⁸ Total SDRs in the world today amount to only \$943 billion, which is just 7 per cent of the current global reserves of \$12.8 trillion.⁹ Even if the share of SDRs in global reserves were limited to a certain proportion of international monetary reserves, say, 30-40 per cent, there is clearly significant scope for more issuance. Second, the SDRs allocated have rarely if ever been fully or even significantly used—most of the rich economies with global reserve currencies or surplus balance of payments positions find no need to draw on their SDR balances. Therefore, the actual liquidity released in the system tends to be a small fraction of the full new issuance. Third, there is a strong case for arguing that the current

⁷ Such a proposal was made by the prime minister of Barbados, Mia Amor Mottley At the United Nations Climate Change Conference (COP26) in Glasgow last November. <https://euobserver.com/climate/153407>

⁸ <http://fingfx.thomsonreuters.com/gfx/rngs/GLOBAL-CENTRALBANKS/010041ZQ4B7/index.html>

⁹ [https://www.imf.org/en/Topics/special-drawingright#:~:text=To%20date%2C%20a%20total%20of,on%20August%2023%2C%202021\).https://data.imf.org/?sk=E6A5F467-C14B-4AA8-9F6D-5A09EC4E62A4](https://www.imf.org/en/Topics/special-drawingright#:~:text=To%20date%2C%20a%20total%20of,on%20August%2023%2C%202021).https://data.imf.org/?sk=E6A5F467-C14B-4AA8-9F6D-5A09EC4E62A4)

inflation is because of supply constraints and is cost-push determined, and should be handled accordingly. Therefore, attempts to use monetary restraint to control it would not address the root cause of the inflation even as they could damage prospects of recovery.

The other concern within some US policy circles is that SDRs could be used by countries currently facing US sanctions, allowing them access to foreign exchange and dollars in particular as a way out of the sanctions. But *none of the countries currently facing US sanctions of any kind (such as Iran, Russia and Syria) have used the new SDR allocation at all, largely because they are simply unable to do so given the controls in international banking for any country that faces sanctions imposed by the Office of Foreign Assets Control (OFAC) of the US Treasury.* In addition, the IMF does not recognize the governments of certain countries (such as Afghanistan, Myanmar, Sudan and Venezuela) and so they are also unable to use the SDRs that are listed in those countries' accounts. The question of whether such sanctions and lack of recognition are justified or even in the US' best interests is a separate and highly debatable matter; the point to note here is these governments are not able to utilize the SDRs even though they are formally available to them.

Recycling SDRs of rich countries that will not use them

There is a strong argument in favor of finding ways to use the \$400 billion of SDRs allocated to rich countries that are unlikely to need them. While there are no costs to other countries if some countries do not utilize their additional SDR reserves, recycling SDRs could provide enormous benefits to the global economy, by enabling a more equitable and sustained recovery and causing a more widespread recovery of global demand.

As a result, how to recycle or re-channel existing SDRs has become an urgent question. The IMF's proposal to establish a \$50 billion "[Resilience and Sustainability Trust](#)" (RST) is one attempt to recycle SDRs held by rich economies towards developing countries. However, the current plan for the RST would deprive developing countries of many of the advantages of SDRs. To begin with, the amount committed so far is very small, reflecting real lack of ambition. What is more, unlike SDRs themselves which are a debt-free asset, the resources are to be provided in the form of debt that must be repaid (albeit at low interest rates). In addition, they will be subject to IMF conditionalities that have far too often proved hugely [counterproductive](#). The current plan limits the funds to be made available only to low-income countries or those currently under IMF programs, leaving out most of the developing world including the emerging markets. Overall, therefore, this proposal will at best have extremely limited impact, far too little to address the major financing challenges that currently exist. My comments, however, have suggested ways in which a Recycling Fund could easily be structured that would make it more effective. A large part of the funds channeled in this way should be debt-free, especially those provided to low income countries.

There are other means of recycling SDRs that should be considered. These should strive to maintain the features of SDRs that make them an attractive form of financing. That is, ideally they should be debt-free, accessible to middle incomes countries as well as low income countries, and include transparency and accountability safeguards on both providers and recipients. Conditionalities should not be of the kind traditionally associated with the IMF, but rather designed to ensure that the funds are used for urgent social and public health purposes and for the climate transition.

One option is for rich countries to channel their SDRs to regional development banks, which are authorized to hold them. For example, institutions like the African Development Bank could use the SDRs to enlarge their capital base and provide developing countries with more climate finance and

budgetary support for meeting the SDGs. Specifically for climate finance, there is a proposal (made by Avinash Persaud) to create a \$500 billion per year climate finance trust, funded by SDR issuance. The trust would auction funds to countries, with auctions based not on monetary returns but on climate action: successful bids would be those that promise the greatest likely reduction of greenhouse-gas emissions resulting from the proposed investment. There are other ways of using recycled SDRs

It has been argued that such initiatives are not part of the remit of the IMF. But with the world economy facing such crucial challenges, it is important not to be stuck in older categories that may not be relevant to the current context. The need for all international institutions to cooperate is greater than ever, and the IMF can play a critical role in assisting such cooperation, specifically when there are major financial implications.

Some concerns with current IMF practices:

1. IMF Surcharges

One policy of the IMF that is currently counterproductive even in terms of its own goals is the practice of imposing surcharges on some debtor countries. While the IMF's base lending rate is low, it imposes a hefty surcharge on countries whose debt to the IMF exceeds a certain amount, or who have been in debt for more than four years. This punishes countries that the IMF chose to provide large loans to and makes it harder for them to grow out of their debt because of the higher interest costs they are forced to pay. It also reduces their ability to engage in essential public spending necessary to halt the pandemic and reduce its adverse impact. For example, Argentina will have to spend US \$3.3 billion on surcharges from 2018 to 2023, which is 9 times what it would take to fully vaccinate every Argentine against COVID-19.¹⁰ These surcharges are not just a problem for Argentina: the IMF's own estimates based on its WEO model suggest that "the number of surcharge-paying members would increase to 38 in FY 2024 and FY 2025, more than double the current level, and total surcharge income would increase by 50 percent".¹¹ All of this income comes to an unfair redistribution from countries that are already facing extreme balance of payments difficulties to the IMF.

The surcharges have become an important source of revenue for the IMF: it is estimated to receive more than \$4 billion in surcharges through end 2022, in addition to interest payments and fees. This amounts to nearly half of the revenue over this period, and indicates a significant increase in recent years, even though the IMF's own model makes it clear that it does not need this amount to add to its precautionary balances. These surcharges are hugely counterproductive for the countries that are forced to pay them, being imposed when they are already in distress and operating to worsen outcomes for both the borrowing country and its investors, affecting the government's ability to spend on essential services like health, on poverty reduction, and damaging economic prospects into the future.¹²

¹⁰ https://cepr.net/report/imf-surcharges-counterproductive-and-unfair/?_cf_chl_jschl_tk=_pmd_ohhclqt9l0TSyDmjiXIBPdWMaOdiRiPQmIXAsGI2owXQ-1633955388-0ggNtZGzNAnujcnBszQgR

¹¹ <https://www.imf.org/-/media/Files/Publications/PP/2021/English/PPEA2021073.ashx>

¹² Joseph E Stiglitz and Kevin Gallagher, "Understanding the Consequences of IMF Surcharges: The Need for Reform" Policy Brief, <https://www.bu.edu/gdp/2021/10/04/understanding-the-consequences-of-imf-surchargesthe-need-for-reform/>

The ostensible purpose of providing a disincentive for countries to keep borrowing from the IMF cannot be justified, given that all countries now seek to avoid borrowing from the IMF as much as possible, given the onerous conditionalities that are imposed. The costs to the country concerned and to the IMF's own presumed goals with respect to that country, far outweigh the monetary gains to the IMF, which are in any case unjustified. Individual countries cannot be blamed for receiving large loans, when it is the IMF that decides which country to lend to, the amount and the conditions of the loan. Similarly, surcharges cannot be justified as payment for risk: given the IMF's preferred creditor status, there are almost no defaults.

2. *Continued emphasis on conditionalities involving fiscal austerity and regressive taxation in IMF programmes*

The IMF continues to have double standards for some advanced and other countries on countercyclical spending and moves for fiscal austerity. The need for countercyclical macroeconomic policies is widely recognised in advanced economies, including the US; yet developing countries are forced to engage in procyclical policies. As a result, IMF programs impose policies on developing countries in balance of payments difficulties, that are not followed at all by the rich countries that are the major shareholders of the IMF.

This was especially evident after the Global Financial Crisis of 2008-09, but remain true today.¹³ While the IMF leadership explicitly recognised the need for countercyclical spending during the pandemic, and some emergency financing avoided procyclical conditions, in general its programs on the ground typically continued to impose conditions that required very rapid fiscal consolidation (starting as early as 2021) and emphasised relying on regressive forms of taxation like VAT that disproportionately hit the poor.¹⁴ The IMF's own review of its programs and conditionalities in 2018 noted that "Programs also appear to have systematically underestimated the impact of adjustment on growth. The regression analysis suggests that staff underestimated the growth impact of adjustment, both public and private".¹⁵

3. *Inadequate response to climate challenges*

As the pre-eminent multilateral financing institution, the IMF has a major responsibility to recognise the significance of climate change and its macroeconomic, financial and developmental effects, and to work towards addressing climate challenges. This also requires a shift in its own monitoring and surveillance framework, to cover various types of climate risk including physical risk, transition risk, and spill-over transition risk (resulting from climate policies of rich countries that hurt poor countries, such as a carbon tax with a carbon border adjustment mechanism that impacts hydrocarbon producers).¹⁶ In addition, the IMF needs to be bolder in devising financing strategies for climate mitigation and adaptation efforts in the Global South, which are currently hugely

¹³ <https://www.bu.edu/gdp/2020/11/17/imf-austerity-since-the-global-financial-crisis-new-data-same-trend-and-similar-determinants/>

¹⁴ See, for example, Eurodad, "Arrested development: IMF lending and austerity post-Covid-19", chromeextension://efaidnbmninnbpcjpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fd3n8a8pro7vhmx.cloudfront.net%2Feurodad%2Fpages%2F1063%2Fattachments%2Foriginal%2F1608122652%2FArresteddevelopment-FINAL.pdf%3F1608122652&clen=264511&chunk=true

¹⁵ <https://www.imf.org/en/Publications/Policy-Papers/Issues/2019/05/20/2018-Review-of-Program-Design-and-Conditionality-46910>

¹⁶ Luma Ramos, Corinne Stephenson, Irene Monasterolo, Kevin P. Gallagher, "Climate Risk and IMF Surveillance Policy: A baseline analysis".

underfunded. Since such investments fall in the realm of global public goods, it is important that they be dealt with in terms of global public investment, which the IMF (rather than the World Bank) can promote. Clearly, conditions for such finance need to move beyond conditional loans to grants that are based on climate response rather than the standard repayment requirements, particularly for low income countries.

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MMT, post-Keynesians and currency hierarchy: notes towards a synthesis

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Abstract

The main objective of this article is to show that MMT, post-Keynesian and currency hierarchy theorists do not have irreconcilable divergences. In fact, MMT economists support much of the currency hierarchy's advice and analysis for real historic events. The adoption of earlier post-Keynesian conception of money does not change the main conclusions of MMT that there is not restriction on the financing of public spending, but it provides a broad comprehension of many monetary matters, as Latin America economic history evidence.

Keywords: Modern Monetary Theory, Currency Hierarchy, Developing Countries, Balance of Payments Constraint

Introduction

The current moment seems favorable to debate and potential reconsideration of theoretical systems, a situation derived both of developments in the analysis of public financing and the nature of money, but also, largely, due to the particular political and social circumstances observed in many countries. US hegemony is in crisis, as its industrial might decreases and is put in question by China's development. The Asian country is now responsible for a large part of the world's industrial output, boasting a complex and innovative economy. Another point worth noticing is former president Trump's challenge of the basic principles of American politics and society, a situation the US shares with other countries.

Trump's defeat in the last elections was only made possible due to unity of the Democratic Party around Joe Biden, thus overcoming the divide between "establishment" Dems and the self-proclaimed socialists, a minority which nonetheless gets 20% of voter's preference. Since any victory by the party will require such unity, Democrats' long held liberal economic policies are likely to be altered. Biden's economic plan is a result of the new power balance in the party, in the sense that it embraces some of the left's agenda, in a context heavily influenced by the ideas of Modern Monetary Theory (MMT).

According to Screpanti and Zamagni (2005), times of crisis are usually followed by the loss of prestige of the then dominant theoretical system. When societies go through crisis, the need of representing the economy as an organic and organized body weakens, given that such theoretical systems can no longer deal with the real problems put by the crisis. It should be no surprise, therefore, that mainstream orthodoxy has been in dire straits since the financial breakdown of 2008, when it was unable to foresee or explain it, while central banks around the globe implemented unorthodox policies, for example, aggressive monetary expansion and long-term interest rate operations. At the same time, said policies were ineffective in boosting

the job market, where salaries remain stagnated for decades, despite significant productivity gains being observed in the same period. Mainstream authors (O. Blanchard, Dell’Ariccia, and Mauro 2010; O. J. Blanchard and Summers 2017; Fatás and Summers 2018) reacted by revising, at least partially, the role of fiscal policy in the recovery from severe recessions. This made it possible for the mainstream to keep some of its contributions to the real economic agenda, even if at the cost of its internal theoretical coherence.

Economic crisis and policies in the Western hemisphere, as they impact on mainstream economic thought, have opened up room for Modern Monetary Theory. Though still mostly absent in US academics, it has been incorporated into the US hegemonic power balance. This is especially notable in the role assumed by the state in Biden’s plan regarding social welfare and economic and scientific development. As will be seen, the historical analysis of countries like Chile, Mexico, Hungary and, of particular interest in the case of this article, Brazil, also allows for the reflection on ideas proposed by MMT.

As usually happens during a crisis, pressures over the scientific community and individual researchers are weakened, once methodological and doctrine restrictions are lost, consequently releasing creative energies. Researcher’s interests are attracted by real world problems in detriment of theoretical puzzle-solving. Theoretical revolutions take place in such periods, which are marked by confusion in language: this is the context conducive to the establishment of a new theoretical system (Screpanti and Zamagni 2005). Divergencies between MMT and post-Keynesian proponents, the first having originated from the latter, should therefore not be surprising.

However, in order to establish itself as a dominant theoretical system, any school of thought must offer a coherent and complete answer to each problem that emerges or might emerge within a given field of investigation.

The Modern Monetary Theory points out a robust analysis of the functioning of modern treasuries, banks and commercial banks, which shows the current applicability of the fundamental concepts of the Theory of Functional Finance, reinforcing the belief that fiscal policy cannot be limited by the financial limits. The only limits for fiscal policy could occur through the level of employment and inflation.

Despite expanding the possibilities for the practical application of Keynesianism, MMT did not receive a favorable reception among all heterodox economists. In this context, the most prominent criticisms are those that point out the limitations of the monetary conception (Rochon and Vernengo, 2003), by not considering the role of money as unit of account, and how it applies to peripheral economies (Prates, 2020 and Verghnhanini and De Conti, 2017).

The main objective of this article is to show that the absence of financial constraint on public spending will occur as long as the function of money as a means of payment is maintained, even if the functions of unit of account and store of value are lost.

The Latin American experience during the 1980s currency crisis shows that the State was able to finance itself without restrictions, even when contracts started to be denominated in foreign currencies or government bonds indexed to interbank rates. In addition, there was a shortening of the average term of liabilities, including public debt, which had a duration often reduced to a single day.

Thus, as postulated by MMT, there was no restriction on the financing of public spending, but the liability structure brought a series of vulnerabilities to these economies. Therefore, this article will show that an institutional structure of MMT continues to function in monetary crises, but an incorporation of other post-Keynesian monetary concepts and the currency hierarchy can enrich the analysis and provide a functional theory of issues, especially prices.

Furthermore, MMT provides a broad conceptual framework to be used by the state on the periphery, including public banks, which can finance exports and international reserves to overcome the matters of currency hierarchy on the periphery.

A complete synthesis between MMT, post-Keynesians and the currency hierarchy is beyond the scope of this article, the goal of which is to show that divergencies are probably less deep than the heated debate may sometimes appear to indicate. A synthesis between diverse concepts is likely possible without sacrificing any relevant aspects of each of the schools. Besides, presenting a complete theoretical system that deals with the phenomena of the economy, beyond simply stating that what happens is not related to its concepts and proposals, is essential so that a new theoretical system establishes its dominance. Answering to the complex economic context that followed the 2008 crisis is the primordial task for which MMT, post-Keynesians and the currency hierarchy have already developed fundamental ideas, though these ideas are scattered in different publications and lack any cohesive presentation as a proper system.

Modern Monetary Theory and the Periphery

Leading researchers in MMT, such as Wray and Mitchell, analyse matters specific to peripheral economies, especially the delicate equilibrium of its balance of payments, and when considering concrete cases they partially accept the recommendations of structural economics and the monetary hierarchy. It is difficult, nonetheless, to conjugate such recommendations with the monetary concepts of MMT beyond the still incipient analysis of development in peripheral countries.

The frequent crisis related to the balance of payments in peripheral economies could be mitigated by the adoption of floating exchange-rates and accumulation of foreign currencies. To Wray (2015), floating (or managed - in the case of capital controls) exchange-rates broaden the scope and field of action of economic policies.

“A floating exchange-rate (or a managed rate with capital controls) expands the policy space further because the government does not need to accumulate sufficient reserves to maintain a peg. Well-planned use of this policy space will allow the government to move toward full employment without setting off currency depreciation or domestic price inflation.”
(WRAY, 2015)

In practice, the Brazilian experience during the current pandemic corroborates the recommendations of MMT, considering that, even facing the possibility of capital flees in the period, the Central Bank was able to maintain negative real interest-rates. Meanwhile, Congress decided that the National Treasury should finance a robust plan towards helping the poorest and also States and Municipalities, thus elevating public deficit to 13,71% of GDP in the previous 12 months. On the other hand, the impact of the devaluation of 28,93% of the

Brazilian Real in 2020 should not be underestimated, with consequences on inflation, especially on food staples, a situation of growing extreme poverty made worse by the end of Federal government support.

From a structural point of view, Wray (2015) proposes that peripheral countries should increase aggregate demand through policies that do not lead to a considerable increase in external demand, such as import substitution. Programs for creating jobs in labor intensive sectors, that require less imports of capital goods. Besides, governments could implement controls on imports and establish limits for foreign debt. More recently, some economists associated with MMT, such as Nathan Tankus (2018), have argued that monetary sovereignty should be used to boost development banks, as did Brazil during the 2010s, when Treasury bonds funded the BNDES (Tankus 2018; Bonizzi, Kaltenbrunner, and Michell 2019b). Historical experience has shown the potential of such measures not only in Brazil but also in Chile during the 1950s and 1960s, when CORFO (Chilean Economic Development Agency) financed a large program of imports substitution by issuing bonds that could be cashed at face value at the Central Bank, in other words, by issuing currency (Collier and Sater 2004)(F. Rezende 2015).

MMT is sometimes criticized for its resorting to floating rates as a solution for disequilibrium in the balance of payments under any circumstances. However, when reviewing the Hungarian case, Wray (2015) considers that devaluing the currency might be insufficient to re-establish normality.

“The government also borrowed in foreign currency – just about half of its outstanding debt was in foreign currency. The only sources of foreign currency to service both government and private debt denominated in foreign currency are exports or more borrowing from foreigners, or exchanging ever-more Forints to obtain the foreign currency. And there is some default risk on all of this debt since Hungary’s government cannot simply keystroke foreign currency into existence. As markets worried about Hungary’s ability to service the debt, interest-rates rose further...” (WRAY, 2015)

Bill Mitchell (2012) points in the same direction, arguing that devaluing may create their own dynamic without having the capacity to re-establish equilibrium.

“The government will also be pushed towards default by a slowing economy, the massive revaluations of its foreign currency denominated debt as the currency falls and the declining capacity of the economy to generate export growth (as the rest of Europe slows).” (B. Mitchell 2012)

Mitchel (2012) considers that the opening of Hungarian capital accounts and the end of restrictions for citizens to hold foreign currency gave rise to a boom of private lending in foreign currencies, at the same time as public external debt was also rising. Even if the Hungarian government did follow sound fiscal regulations and practices, as those imposed by the Maastricht Treaty, the accumulation of liabilities in foreign currencies was at the root of the crisis. Mitchell argues, thus, that the Hungarian case does not refute MMT’s thesis, because its crisis did not originate on a process of growing debt in local currency.

As for the Mexican crisis of 1994, the main cause lies in the financial deregulation of the 1970s, which led local private banks to take credit in foreign currencies at floating interest-rates. The

country's integration to international finances only deepened as it becomes part of NAFTA. In this interpretation, concepts similar to those of the currency hierarchy are presented (W. Mitchell, Wray, and Watts 2016).

It is, however, difficult to conceive how his ideas on money, notably the broad power of the state to determine its demand through taxation, could explain the link between internal and external crisis and the speculative processes associated with it. In this sense, MMT fails because its explanations for the diverse set of economic problems lack generality, though its institutional analysis on the fiscal capacity of countries with sovereign currencies remain valid.

Criticisms of MMT at the periphery

MMT adequately describes the institutional workings of the Brazilian Central Bank, the Secretary of the National Treasury and the local banking system (Pimentel 2018; F. C. de Rezende 2014; Vieira Filho 2019b) Historical analysis also shows that the National Treasury faced no obstacles in rolling public debt, the cost of which being determined in the relationship between the fiscal authority and the Central Bank (Teixeira Jorge 2020). This suggests that MMT correctly describes the institutional dynamics of countries which, like Brazil, present liquidity in financial markets and no financial restrictions to public expenditure.

However, works of economists associated with the currency hierarchy, mostly based on Latin-American structuralist economics, point out that the macroeconomic dynamics might impose conditions to the freedom of fiscal policy to obtain full employment, especially in its relation to the international markets.

Prates (2020) criticizes MMT's monetary conceptions, affirming that the functions of money should take into account not only its role of unit of account and relating debt and credit, but also as an asset in itself. Furthermore, demand for money and its acceptance would be determined not purely by taxation, but also by contracts and conventions. (Prates 2020; Bonizzi, Kaltenbrunner, and Michell 2019b; Vergnhanini and de Conti 2017; Vernengo and Caldentey 2019).

Its role in taxation would thus not be the main explanation for the existence of modern money. In this sense, the institutions that render possible contracts in time, associating and regulating payments past and future, are essential to the acceptance of modern currencies, which operate in a system marked by uncertainty. These institutions are necessary for money to be accepted as means of payment and value reserve.

The capacity of money to define contracts is fundamental for peripheral economies, as was made clear by the episodes of high inflation observed in Latin America in the 1980s. The prolonged regime of high inflation led agents to question contracts denominated in local currencies, once they no longer adequately referred to real income. Transition into high inflation occurs when its intensity becomes an obstacle to the acceptance of future contracts in said currencies. As it happened, local contracts could still be paid in local currencies, though the guarantee of real value was the indexation to the interbank rates in the Brazilian economy or the dollar in the case of Argentina.

A system based on indexation is fragile in its nature and may conduce a context of high inflation into a regime of hyperinflation, when it becomes so intense that institutional innovations are

insufficient or non-existent and the local currency is replaced by foreign ones (Carvalho 2021). The incapacity of the local currency to denominate contracts can destruct the very capacity of the state to issue a sovereign currency, regardless its role in taxation. Hyperinflation thus puts in question the tax-driven monetary conceptions of MMT. Inflation expectations could influence demand for currency in such a way that the state's taxation capacities can no longer effectively counteract.

“In Russia and Central Europe after the war a currency crisis or flight from the currency was experienced, when no one could be induced to retain holdings either of money or of debts on any terms whatever, and even a high and rising rate of interest was unable to keep pace with the marginal efficiency of capital (especially of stocks of liquid goods) under the influence of the expectation of an ever greater fall in the value of money...” (Keynes 2013)

It should be underscored that his limits between a regime of high-inflation, where indexation still plays a relevant role, and one of hyperinflation, are blurry at best. The acceleration of inflation could reduce the effectiveness of indexation, while external chocks, external debt obligations, unbalances in the public sector and the anticipation of measures of price control could spell doom for a local sovereign currency.

The Brazilian experience in the 1980s reinforces the role of monetary stability for the denomination of contracts and macroeconomic policymaking in general. At the same time, it conspicuously shows the non-existence of fiscal restrictions even when the local currency loses its functions as value reserve and unit of account. The rolling of debt was never problematic, despite the risk of hyperinflation reflecting on the ever shorter terms practiced in the indexation to the interbank rates, themselves closely reflecting the movements of the exchange-rates (Mendonça de Barros 1993; Vieira Filho 2019a).

"It is important to consider the mechanism of destruction of the indexed currency. Very frequently it is heard about the possibility of a flight *en masse* from the indexed currency, motivated by the mistrust of investors. In this situation, the government would not be able to roll its debt and chaos would take over. However, flee where? - we might ask. 'Real goods' would certainly be the answer we get. But the seller of said goods would then have received a check or credit in legal currency and, unless he or she decides to cash it, he then would be holding indexed currency through the application of these resources in the open markets. It is clear that our seller of real goods could also decide not to hold the cruzados (local currency), immediately exchanging them for something else. In this case, the problem is passed ahead to the second seller, and so on, until the last seller makes the deposit on the 'over', balancing the system" (Mendonça de Barros 1993)

The loss of control over inflation in Latin America did not originate from a process of indebtedness in local currencies, as stated in EDWARDS et al. (2019); on the contrary, the rise of external debt in the 1970s and the hike in US interest-rates in 1981 were its main contributors (Ferraz 2017). It is relevant, however, to point to the external structural fragilities of these economies, as do structuralist economics since the 1950s and presently by the school of currency hierarchy.

The latter considers that currencies of peripheral economies are less liquid at the international level, demanding volatile liquidity premiums and higher, more volatile interest-rates. In this context, the logic of speculation of capital flows causes high cyclical volatility in exchange-rates, resulting in difficulties regarding MMT's proposal that floating exchange-rates would allow for the local monetary policy to determine interest-rates. Besides, failing to reach expected positive results, the government might lose investors trust in its commitment to honour debt, which could also result in expectations of devaluation of the local currency and higher long term interest-rates. Currency hierarchy, thus, implies diverse degrees of freedom for the economic policies of countries (Vergnhanini and de Conti 2018).

From a structuralist approach, Oswaldo Sunkel and Stephany Griffith Jones (1986) argue that the process of import substitution, by fostering the production of consumer goods internally, reduces the coefficient of imports, at the same time it requires the purchase of intermediate and capital goods abroad. Imports thus becomes ever more concentrated on capital goods and other essentials such as pharmaceuticals, foods and energy.

Overcoming these obstacles to development presupposes external financing, which in turn increases external debt and renders the recipient economy even more vulnerable to future external crisis. Given that exports of primary goods do not respond to devaluations in the exchange-rate, the adjustment in the balance of payments must occur through the decrease of internal absorption, that is, the state is forced to induce a recession in order to lower imports and promote whatever industrial exports might exist. Development, thus, becomes a process marked by structural dependency, vulnerability and instability. (Griffith-Jones and Sunkel 1986) (Vernengo and Caldentey 2019) (Bonizzi, Kaltenbrunner, and Michell 2019a).

The development process as described above might point to problems in MMT's hypothesis regarding the adjustment of balance of payments through floating exchange-rates, disfavours its application in peripheral countries. Nonetheless, it is also possible to point to virtues in the ideas of MMT and other post-Keynesians not yet considered by policymakers. The structural tendency towards vulnerable external accounts was worsened in Latin America by the adoption of mistaken policies, mostly concerned with increasing external savings through debt and the opening of capital markets. In Brazil, in the early 1970s, external debt was not associated with the increase in imports of capital goods, being directed towards the accumulation of international reserves at a cost superior to that of the external debt itself. With the advent of the oil crisis and its impact on the external accounts, the only policy option was to further increase the external debt until the system of international financing collapsed in the 1980s (Cruz 1999).

In Chile, dictator Augusto Pinochet's (1973-1989) policies were even less rational. The opening of the economy and lowering of tariffs led to growing systemic unbalance, which was compensated by new inflows of foreign capital, resulting in the exploding of foreign private debt, as banks were taking debt in foreign currencies to take advantage of the massive interest-rates spread. External financing reached the incredible mark of 20,7% of GDP in 1981, while external debt mounted to close to 50% of GDP. This allowed for significant appreciation of Chile's exchange-rate, further deteriorating the competitiveness of local industries, at the same time it helped finance the imports of luxury consumer goods in benefit of the country's elites and middle classes. Between 1970 and 1981, imports of perfumes and cosmetics grew by 9,500%; that of alcoholic beverages and cigarettes, 2,400%, luxury clothing, 5,150%, automobiles, 1,249%, TV sets, 9,357%, (French-Davis 2010). Curiously, such policies as promoted by Chile's Chicago Boys are rarely termed populist.

It is at this point that the importance of the Finance-Funding circuit (Keynes, 1937) becomes clear, as it shows that investment does not presuppose ex ante savings in order to be realized, as well as the importance of MMT, as it shows the capacity of a sovereign currency issuer to create the purchasing power necessary to finance public investment. Combined, they make explicit the mistakes of Latin American mainstream economists in their bet on external savings to foster development, even if conditions were not adequate and if, in the end, it led many countries close to hyperinflation.

Vernengo and Caldentey (2019) consider MMT is correct in postulating the non-existence of financial restrictions to expenditures in local currencies. However, the authors point to the undesirable distributive effects of public debt in countries already facing high inequality in income and wealth. Floating exchange-rates also bring additional questions in the case of peripheral economies, beyond the rigidity of imports and the need to promote recessions in order to decrease imports. Inflation in the periphery would be more responsive to costs than to demand, especially the exchange-rate, given that a large part of goods and supplies is priced in US dollars. Interest-rates are then kept at high levels in order to prevent capital from leaving the country and, consequently, inflation and reduction of real incomes, with the expected contractionist impact. Additionally, considering that the private sector in peripheral countries holds significant debt in foreign currencies, devaluations of the exchange-rate heavily impact companies balance sheets, further accentuating the contraction at least in the short term (Vernengo and Caldentey 2019).

Considering a mid-term perspective, export-led strategies could be limited by low productive development, thus being restricted to low value exports. Given the low price-elasticity of such exports, they tend to be unresponsive to devaluations of the exchange-rate, a movement that has costs both in terms of real wages and inflation. Moreover, development through FDI leads to uncoupling of currencies, making agents sensible to expectations of currency devaluation, as well as it puts the productive structure in a subordinate position and requires later remittances of profits abroad (Bonizzi, Kaltenbrunner, and Michell 2019b).

Besides foreign currency flows and international liquidity cycles, in determining an economy's external dynamics one must also consider its stocks of assets and liabilities. The de-dollarization of liabilities of some peripheral economies after the commodities cycle seems to have attenuated external restraints, while creating other mechanisms of dependency as internal credit becomes conditioned to external conditions and exports show a tendency towards primarization of exports. (Biacarelli, 2019; Ocampo, 2007)

The trade of domestic liabilities in local markets, the pre-specification at market prices and prefixation of bonds, which extended the duration of previously just one day in bonds indexed to the interbank rates, all these elements brought about new conditions to the rebalancing of the of the Brazilian economy during the recession of 2015/16:

"The key to understanding such trajectory is in the change of the marketplace in which these instruments are traded, referring specifically to the expressive growth of stocks and fixed-rate bonds in domestic markets. These liabilities, added to the FDI participation in capital, comprise the total of liabilities denominated in local currency... In the context of a partial 'de-dollarization', the rapid devaluation of the currency, after mid-2014, contributed to the improvement of the external position of the country,

contrary to what would traditionally occur. As a significant part of these liabilities is marked at market value, a fall in stocks and bond prices also contributes to said improvement in position. As a result, fluctuations in the stock of external liabilities of the economy and, therefore, of its International Investment Position, completely dissociate from the movements observed in the Balance of Payments" (Biacarelli, 2019).

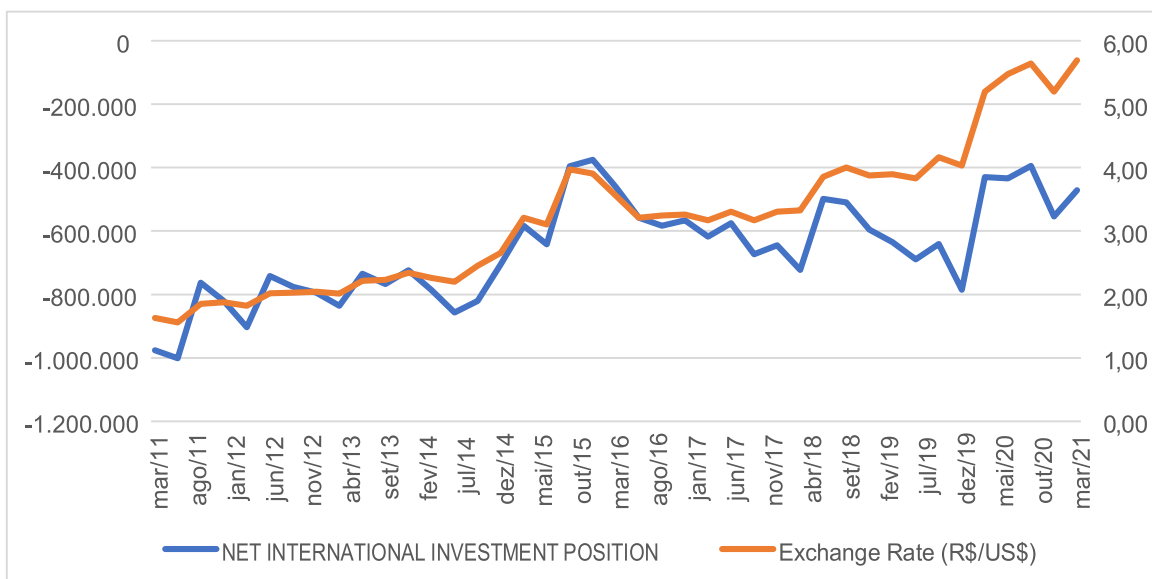
Once more the Brazilian crisis in the 1980s brings elements to the considerations on the importance of assets' structures and how short duration of public debt can condition macroeconomic management.

"The holders of financial assets, thus, also held enormous power of dissuasion over monetary and interest-rate policymakers, based on the threat of quick shifts in positions with explosive effects on assets prices. This capacity of generating grave instability would become the decade's trademark, reflected in, among other elements, the evolution or dimensions, both in absolute and relative terms, of public debt during the worst years of the crisis" (Belluzo, Almeida, 2002).

It is true that the development of secondary financial markets meant greater liquidity for debt bonds in most of the world. However, shorter terms and indexation to interbank rates resulted in short durations, that is, low sensibility of prices to variations in interest-rates. Debt structure then was not conducive to adjustments in prices and quantities to capital flights, at the same time there was little cost in terms of asset prices to promote speculative attacks, making the economy even more vulnerable to these movements.

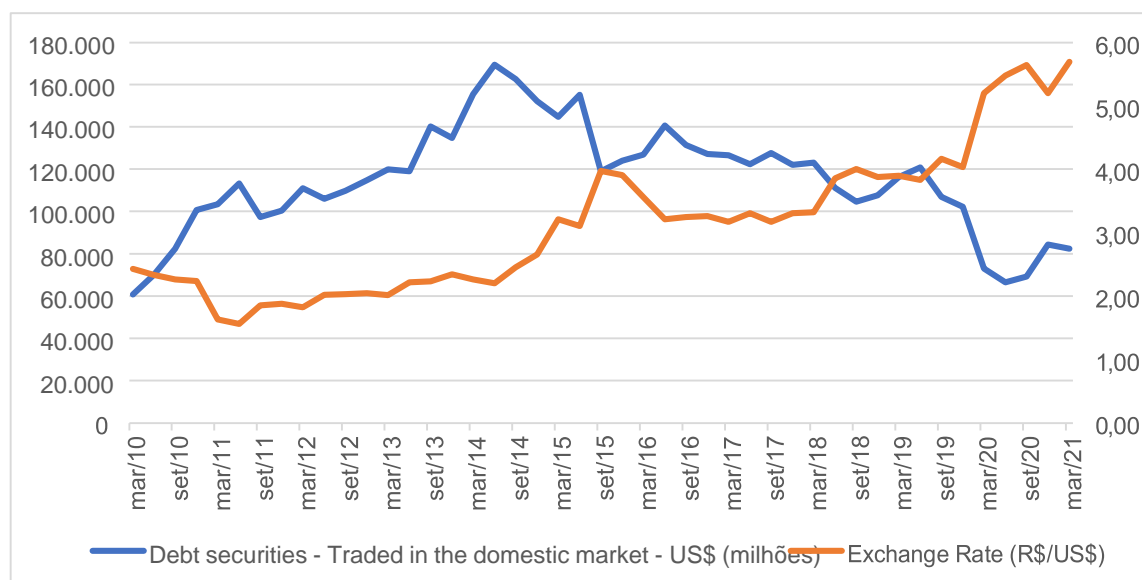
Graph 1 shows the importance of devaluing in the adjustment of "net international investment position" (correlation of 0,8266), a process that relies in the devaluation of domestic assets in dollar prices, as well as in the maintenance of the accumulated international reserves (US\$ 355,6 billion in 2020). On the other hand, debt bonds traded in the domestic market (Graph 2) have also adjusted to the exchange-rate, but less proportionately (correlation of -0,3567), an indication that a high proportion of bonds indexed to the interbank rates and one day duration brings difficulties to the adjustment of the "net international investment position". It also points to the effectiveness of international reserves in broadening the freedom of macroeconomic policies, once it was possible to lower interbank rates since 2016, regardless of international liquidity cycles. This included negative real interest-rates during the first wave of the Covid-19 pandemic, also marked by continuous threats of a coup by president Bolsonaro, a period during which international capital flows towards Brazil were significantly reduced.

Figure 1: Net international investment position (US\$ millions) (left axis) and Exchange-rate (R\$/US\$) (right axis)



Source: BCB

Figure 2: Market Value of Outstanding Debt Securities (US\$ millions) (left axis) and Exchange-rate (R\$/US\$) (right axis)



Source: BCB

The Brazilian case thus shows that public debt plays a greater role than simply assuring returns to money holders, as preconised by MMT, but acts as well as an additional element of adjustment between external assets and liabilities, dissuading speculation against exchange-rates as is may risk losses to the holders of financial assets.

It is worth acknowledging that researchers associated with currency hierarchy did not formulate a theory of public finance in peripheral economies, linking external fluctuations to the financing of public deficits. In this, it fails to show the potential of sovereign states and how their issuing of money for public expenditure is connected with exchange-rate crisis beyond its impact on market expectations.

It is therefore necessary to establish a synthesis between currency hierarchy, post-Keynesians and MMT, allowing for a better understanding not only of peripheral economies and their public finances, but also of monetary economics in general.

Currency hierarchy, post-Keynesians and MMT: notes towards a synthesis

A research program envisaging a synthesis between the most relevant aspects of the three currents of thought could be structured around the following points:

1. The analysis of money acceptance should consider the functions of currency both domestically and internationally, as means of exchange, unit of account, especially as it refers to the denomination of contracts, and value reserve;
2. When considered in terms of its functions, the demand for money does not impact the state's capacity to finance public expenditure without facing financial restraints
3. The degrees of freedom of state action are subject to the impact of international capital flows;
4. Public debt, in particular the structure of public debt, plays a relevant role in reducing volatility of exchange-rates and adjusting net external liabilities;
5. Control of external accounts is essential for the state to determine long term interest-rates without decreasing the duration of assets;
6. The ability to issue sovereign currency brings about important tools to deal with the currency hierarchy and the development process, especially regarding the potential for the capitalization of development banks, a topic certainly deserving of deeper analysis.

A general theoretical system calls for the abandon of the tax-driven monetary hypothesis, which is unable to explain phenomena such as hyperinflation. In this sense, the denomination of contracts should be considered essential to the broad acceptance of money, while its functions as means of exchange, unit of account and value reserve should be kept in the analysis.

This option should not invalidate the postulate according to which countries that issue sovereign currencies do not face constraints to financing public expenditures. As long as money is accepted as means of exchange, there is no reason to suppose any citizen would refuse it, while the state's ability to reduce the terms of bonds and determine indexes and returns assure the rolling of public debt and the acceptance of public bonds. In fact, all essential properties of assets, as proposed by Keynes in chapter 17 of the *General Theory* in terms of "l" liquidity, "c" carrying cost, "r" returns, are at disposition of states. Eventually, all money issued can be converted into bonds, but in situations of high uncertainty a decrease in terms and, therefore, of durations of bonds will be necessary, once liquidity becomes ever more relevant.

It would be insufficient to discuss the essential properties of assets only in its local aspects. As proposed by currency hierarchy, liquidity premiums vary internationally according to each currency's capacity to function as value reserve in global scale, potentially generating instability in peripheral economies. It is therefore necessary to assess the essential properties of money and other assets both domestically and globally.

MMT's postulate according to which the sole purpose of public bonds is to assure returns for money holders becomes less convincing when the external liabilities of peripheral economies come into question: not only its denomination in local currencies is relevant, but also its duration. This allows for part of the adjustment of external liabilities to occur in local currencies, instead of entirely impacting exchange-rates, thus reducing the effects over costs and inflation in these countries.

Proponents of the currency hierarchy correctly assume that financial flows became central to explaining monetary crisis in the context of financial deregulation that followed the collapse of Bretton Woods. It may happen that interest-rates are inadequate to induce investment through the mechanisms of Marginal Efficiency of Capital. Fiscal policy could also become subsidiary to the interests of capital markets, even if those interests are irrational from a post-Keynesian point of view. State control of capital flows and the accumulation of international reserves are thus fundamental in order to strengthen macroeconomic policy vis à vis international liquidity cycles. Only capital controls, international reserves and robust positive results in the balance of payments can avoid violent oscillations in interest-rates. If agents expect a policy of low short term interest-rates not to be consistent in time, long term interest-rates are likely to be elevated (Keynes, 2013).

“The long-term market-rate of interest will depend, not only on the current policy of the monetary authority, but also on market expectations concerning its future policy. Short-term rate of interest is easily controlled by the monetary authority, both because it is not difficult to produce a conviction that its policy will not greatly change in the very near future, and also because the possible loss is small compared with the running yield (unless it is approaching vanishing point). But the long-term rate may be more recalcitrant when once it has fallen to a level which, on the basis of past experience and present expectations of future monetary policy, is considered 'unsafe' by representative opinion”(Keynes 2013).

The monetary authority should then have control over external accounts in order to be able to systematically reduce interest-rates, without having to raise them shortly after as a way to prevent capital flights.

The monetary authority should also pursue low interest-rates in order to influence long term interest-rates. If inconsistent, monetary policy will lead to a rise in M2, as agents hold wealth in money or short term bonds, meaning, in the scope of this article, a shorter duration of public debt.

“Thus a monetary policy which strikes public opinion as being experimental in character or easily liable to change may fail in its objective of greatly reducing the long-term rate of interest, because M2 may tend to increase

almost without limit in response to a reduction of r below a certain figure. The same policy, on the other hand, may prove easily successful if it appeals to public opinion as being reasonable and practicable and in the public interest, rooted in strong conviction, and promoted by an authority unlikely to be superseded" (Keynes 2013).

Currency hierarchy has relevant insights on how exchange-rates and monetary policy can be managed more efficiently, broadening the temporal horizon considered by agents when deciding on long term investments necessary to any economy. If agents expect a low interest rate policy not to be sustainable over time, demand for liquidity related to the speculative-motive should increase, thus reducing the duration of public debt. A decrease in long term interest-rates should then be possible at the cost of loss of control over the structure of public debt.

However, exchange-rate crisis can endure over time, making it necessary for governments to implement a strategy of exports diversification, in line with propositions of structuralist economics, taking into account the price and income elasticities of potential exports. Only by presenting successive positive results in the balance of payments can one prevent a macroeconomic policy from being held captive by subjective market assessments and international liquidity cycles. The use of public development banks funded by countries issuers of sovereign currencies is likely key to development in general and diversification of exports in particular.

Conclusion

The establishment of a theoretical system requires it to explain diverse real phenomena of its field of study. The explanations should be coherent and complete within the fundamental concepts of such system, that is, it should avoid ad hoc or any other explanations based on concepts not akin to that system.

MMT correctly explains the workings of public finances in different countries that issue sovereign currencies, even at the periphery. It is, however, unable to explain in its own terms how external dynamics end up subordinating internal ones, forcing policy-makers to adopt restrictive measures in spite of the sovereign currency.

It seems necessary, then, to abandon tax-driven demand for money, which is insufficient to explain phenomena like capital flights and hyperinflation. Post-Keynesians have already shown enough understanding about monetary phenomena in explaining the importance of money as unit of account and value reserve, as well as the deleterious effects on macroeconomic policy when it does not play said roles.

The functions of money should be considered both in its domestic aspects as well as internationally. Leaving behind tax-driven demand for money in favor of the functions of money does not, however, hinder the state's ability to finance public expenditure without restrictions, at least as long as the currency can be used as means of exchange.

The control of international financial flows is fundamental for peripheral economies capacity to practice systematically low interest-rates and therefore pass them on to long term interest-rates without increasing demand for liquidity in the system. The rise in demand for liquid assets to

satisfy speculative-motive can reduce the duration of public debt, making it hard to adjust external liabilities in moments of crisis, as it may put too much emphasis on the devaluation of the exchange-rates.

The concepts put forth by MMT can be read in parallel with Keynes' idea of finance-funding, as they may help peripheral economies to avoid repeating past mistakes. By acknowledging there is need of ex-ante savings to finance public investments and that the state can generate purchasing power, governments can escape the error of insisting on the opening of the economy with the goal of attracting external savings.

Structural problems regarding the balance of payments still pose a challenge to analysis, given that the need of imports to supply essentials and capital goods remains a reality for most economies. However, the possible use of state funding to boost development banks is promising, despite the said need for imports.

The MMT has the merit of presenting a simple and transparent explanation of the logic of public spending as monetary issuance, of taxation with the destruction of currency and guarantee of its value and of government bonds as a determinant of interest rates. This simple explanation reaches an audience that goes beyond readers of academic studies of economics, which allows a wider audience to be informed about the fiscal possibilities of the State. However, the academic debate should seek to explain the various economic factors, even if an explanation becomes complex and less accessible to many readers. Future research should provide economists with a deeper understanding of the logic of public spending, taxation and government bonds, which in this work is still in initial form.

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Why not Sovereign Money AND Job Guarantee?

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Abstract

The sovereign money system, a radical proposal for the de-privatization of money creation, has been put forward as an alternative to the inherently unstable current monetary that is the root cause of credit and debt bubbles and the consequent recessions. This article argues that a job guarantee program would help policy makers in a sovereign money system determine how much money to create and where to supply it in a counter-cyclical, disciplined, targeted, less inflationary, and less discretionary manner. The core claim of this article is that the combination of a sovereign money system with a job guarantee program supports the earned income of consumers (especially, those most in need), and thus their spending and welfare, without causing concern about issues related to public debt accumulation. In addition, it not only mitigates against excessive private debt,—considered one of the major causes of financial crisis—but also provides “loose” full employment and necessary public goods and services.

JEL Classification Numbers: E42, E51, E58, E62.

Keywords: sovereign money, job guarantee, monetary system, monetary reform, employment

1. Introduction

The vast majority of money creation is currently carried out by the private sector, causing and/or exacerbating a host of issues that stretch from an overshooting money supply, the asset price bubble, and the ensuing financial crises to environmental degradation. The current macroeconomic policy framework and financial regulation does not seem to prevent or ameliorate the problem of deeper and more frequent recessions driven by the financial cycle. In response, the sovereign money system, a radical proposal for the de-privatization of money creation, has been gaining more traction in the academic and policy-making arenas. The proposal of a sovereign money system rests on the argument that the inherently unstable current monetary system is the root cause of credit and debt bubbles. Contributions in support of a sovereign money system include Werner (2012), Anderson and Morrison (2014), Yamaguchi (2014), Mellor (2016), Zarlenga (2014), Striner (2015), Huber and Robertson (2000) and the various publications by the research organization Positive Money.¹

¹ These proposals have been presented under various labels, such as chartal money (derived from chartalism), state money (Werner, 2012), constitutional money (Anderson and Morrison, 2014), public money (Yamaguchi, 2014; Mellor, 2016), US money, meaning US Treasury money, as distinct from corporate Federal Reserve money (Zarlenga, 2014), pure money (Striner, 2015) and plain money (Huber

While sovereign money provides a new alternative monetary system to the current bank credit-driven economy, the proposals do not identify which specific program(s), through which new money is injected, could produce the best macroeconomic results. This article discusses how a job guarantee program can help policy makers in a sovereign money system determine how much money to create and where to supply it in a counter-cyclical, disciplined, targeted, less inflationary, and less discretionary manner. The core claim of this article is that the combination of a sovereign money system with a job guarantee program would support the earned income of consumers (*especially, those most in need*), and thus their spending and welfare, without causing concern about issues related to public debt accumulation. In addition, it would not only help mitigate against excessive private debt—considered one of the causes of the 2007-2008 global financial crisis—but also provide full-employment and necessary public goods and services that are not produced by the profit-seeking private sector.

The paper is organized as follows: first, we briefly explain the sovereign money system as a viable way to address the problems of the current monetary system; in section three, we present the problems that could arise if the sovereign money system were adopted; in section four, we discuss what a job guarantee system is and how it could address the issues put forward in the previous section; in section five, we argue that a job guarantee program is superior in benefits to both universal basic income and demand management policies, both of which are commonly presented as supplements to the sovereign money initiative; in section six, we address the remaining arguments against the viability of a job guarantee system; section seven sets out our conclusions.

2. Sovereign Money System

The sovereign money system has been proposed to address the problems that fundamentally stem from excessive bank money creation. In the current system, most of the money circulating in the USA and many other developed economies is created by private commercial banks. Banks create money when they grant a loan, and the amount generated is precisely equivalent to the value of the loan. Banks do not need savers' deposits or reserves for the lending process, but simply credit (issue) their clients' accounts at the banks (their liabilities).² These newly-created bank deposits (credit) should be considered money because they are universally accepted within national borders, supported by the state and thus free of credit risk to some extent.³ This form of money creation is the result of the evolution of the banking sector in a largely anti-regulatory environment that adheres to the belief in self-regulating markets, especially after the gold-dollar standard in the Bretton Woods era. Since then, private banks have taken a dominant role in money creation, while the central banks reacted and refinanced fractionally, thereby supporting the excessive creation of bank money (Huber, 2020). In such a

and Robertson, 2000). The term sovereign money (the Positive Money group and Huber) will be used in this paper because it best encapsulates the core idea.

² Banks need reserves for providing payment services to their clients but not for credit services. They first grant a loan and then use or look for reserves to provide payment services or to possess required reserves. Bank money creation is therefore not constrained by reserves or savers' deposits.

³ Deposit insurance (the government guarantee on bank deposits) is currently capped at £75,000 per customer in the UK, €100,000 in the Eurozone and \$250,000 in the USA. The government can enhance the liquidity of other monetary instruments by ensuring par convertibility into the national currency and par convertibility among instruments at the same level of the monetary hierarchy (Tymoigne, 2020).

system, a majority of the money supply is determined by the ability and willingness of profit-seeking banks to lend, and of households and firms to borrow, whereas the central bank has a limited and uncertain impact on the money supply.

The downside of the current system is that it entails a myriad of problematic economic, social and environmental consequences. These problems include, but are not limited to the following: procyclical and irresponsible credit creation by banks, which leads to inflation and asset bubble and bust cycles that cause recurrent panics and crises (Del Mar, 1895; Shaw, 1896; Zarlenga, 2002; Benes and Kumhof, 2012; Kindleberger and Aliber, 2015); an allocation of newly-created money towards non-productive and speculative uses, since commercial banks are profit-seeking entities unconcerned with the wider consequences of their decisions (Werner, 2012; Turner, 2015); and finally, the inexorable link between GDP growth and disproportionate increases in debt, which causes an arbitrary and inequitable distribution of wealth and environmental despoliation (Hickel, 2016). Such unrestrained creation of debt and money does not show any signs of being self-limiting, and it demonstrates the failure of attempts by monetary authorities to exert control over bank money creation and the increasing use of money substitutes.

These serious and damaging issues call for a change in the structure of the monetary and financial system, and, in response, the sovereign money system has been put forward as a radical way of preventing the financial crises inherent in the current system. The main proposal is that the power of money creation should be taken out of the hands of private commercial banks and placed solely into the hands of the public sector.⁴ A sovereign money system can be defined summarily as the full nationalization of money and 100% reserve banking.⁵ The central bank would be the only economic entity endowed with the power of money creation. It would determine the proper timing and quantity of money to be injected into the economy, based on monetary policy goals set by the legislative body (i.e., the US Congress or the British Parliament). The treasury would determine where and how this money would make its way into the real economy. The treasury would usually have to decide to whom this money would be allocated and inform the central bank of this in advance so that the latter can make a better decision on the amount of money needed based on an estimation of its likely impact on aggregate demand.⁶ The central bank, with the treasury's help, would ensure that sufficient

⁴ A sovereign money system is, in this sense, a monetary reform rather than a financial reform or policy (or fiscal) reform. This monetary reform is not a one-size-fits-all solution to a variety of economic issues, but makes reform measures in banking, financial market, policy more effective, much leaner and less bureaucratic under a stable well-managed monetary system than they currently are (Huber, 2017).

⁵ Huber (2014) states that a sovereign money system is sometimes mistakenly viewed as a Chicago plan with 100% reserve banking (e.g. Soddy, 1934; Fisher, 1935; Benes and Kumhof, 2012). Although both approaches share the same goal of bringing money creation under public control, the full reserve system is a double-circuit system in which demand deposits (bank money) circulate in the non-bank private sector and reserves (central bank money) are used among banks (account holders at the central bank), whereas the sovereign money system is a single circuit system on the basis of sovereign money only, issued by the central bank. It should also be noted that a sovereign money system nationalizes money, not banking.

⁶ The central bank and the treasury are politically independent in the sense that the former has independence of tools (sovereign money creation) and goals (inflation, etc.) and the latter has no control over when and how much money is created, that is, the sovereign money system separates the monetary power of the central bank from the fiscal power of the treasury (Huber, 2017). However, the treasury and the central bank must work extensively together for monetary and fiscal operations to work properly in order to achieve price stability. The central bank, for example, must take the treasury's preferred methods of distributing money into account in order to decide the optimal amount of any new money injection.

sovereign money is created and circulated in the real economy for the financing needed for the economy's capital development, thus preventing the tendency towards the outgrowth of non-GDP finance over GDP-contributing activities.⁷ This is because when money is used for anything that increases the productive capacity of the economy it maintains its economic value, or the purchasing power, which is, in turn, determined by the overall productivity of the economy with a given amount of money.

In the sovereign money system, commercial banks would be purely financial intermediaries without any power to create money. They would be able to lend money already created (or temporarily lent at an interest rate) by the central bank and/or deposited (or funded) by their clients (creditors).⁸ In this way, the central bank would restrain the banks' ability to create additional money. Since banks are 100% backed by reserves, they do not need publicly-funded deposit insurance, which automatically prevents a bank run. In addition, the deposit-taking/payment services would be completely separate from investment and merchant banking services, and hence there could be no problem of using customers deposits for speculation or "bailing out" speculative activities to save the payment system. This would minimize lender-of-last-resort facility support and its associated moral hazard, and further encourage prudent lending practices. The proposal for a sovereign money system fundamentally rests on the argument that financial instability caused by excessive bank money growth can be avoided by giving the central bank full, direct control of (not merely influence over) money supply and the sufficient and appropriate allocation of money for public purposes.

Under this new monetary system, the central bank would agree to hold a portion of government debt permanently in the treasury account. However, in issuing perpetual zero-coupon bonds (also known as, non-interest-bearing credit with unspecified maturity), the treasury would be creating liabilities that are unlike conventional government debt. These bonds would not incur any financial obligation on the part of the government and thus would remove the need for continuously refinancing public debt. There would be no need for bond insurance or even tax collections to finance government spending.⁹ Newly-created sovereign money would be simply credited to the treasury account at the central bank and distributed into the economy through treasury spending.¹⁰ In this way, the central bank would be allowed to contribute directly to funding the public budget.

⁷ In the same spirit, Huber (2017, p. 167) explains "“Even though debt-free sovereign money is not in itself a promise to repay, it is a promise to be productive, and a promise to keep control of the money supply, excluding overextension as well as shortages, in correspondence with actual levels of economic output.”"

⁸ Sovereign money does not appear as a liability of banks. When sovereign money is obtained by issuing debt, that debt is a liability, but the money obtained is an asset of the banks. Without such money-creating power, banks would still provide account management and payment services (transferring existing sovereign money into and out of accounts).

⁹ Under the sovereign money system, outstanding government bonds disappear as they mature. Moreover, the purpose of tax would be: 1) to create a demand for sovereign money and 2) to adjust aggregate demand to a desired level, but not to fund government spending.

¹⁰ Balance sheet operations for central bank money creation and treasury spending are found in van Lerven (2016, p.50). Other proponents of the sovereign money system suggest that new money on a central bank balance sheet should be treated as government equity not as a government debt, in the same way that treasury coins are currently treated (Benes and Kumhof, 2012; Mayer, 2013; Gudehus, 2015)

The Sovereign money system is designed to stimulate spending in the real economy by increasing the disposable income levels in the private sector without a corresponding increase in the balance of private debt or marketable, interest-bearing public debt. Sovereign money creation will always increase the net financial assets of the private sector (van Lerven, 2016). This implies that the frequency and depth of recessions that come as a result of excessive private debt could decrease. This function is imperative in the current economy that is heavily dependent on leverage for growth. Having less existing debt would create less need to resort to the kind of aggressive growth promotion measures that are implemented at the cost of the environment. Moreover, the need for an austerity policy associated with the accumulation of public debt would diminish. This is why some call sovereign money “debt-free” money inasmuch as it is issued without a matching sale of government bonds.¹¹ Likewise, sovereign-money-funded government expenditure is not defined as deficit spending since the government is not indebted, and thus not liable, to anyone. Attempts to run a balanced (or even surplus) budget to decrease otherwise escalating public debt would not be necessary. The system would thus avoid potential issues related to fiscal deterioration, such as crowding out, Ricardian equivalence effects, and the heightened risks associated with future interest rates, sovereign default, and monetization-driven depreciation and inflation (Kim, 2020). In a nutshell, sovereign money is expected to reduce private and public debt in the economy and minimize their potential adverse impacts on the economy.

Under a sovereign money system, once the central bank decides the adequate amount of new money to be created, the treasury would distribute it through following four channels, according to Dyson, Hodgson, and van Lerven (2016, p.4) from the Positive Money organisation in the UK:

1. *Citizen’s Dividends (equal grants paid to every citizen)*
2. *Increased government spending*
3. *Reduced taxes (through tax reductions or rebates, using the newly-created money to compensate the government for the lower tax revenue)*
4. *Indirectly financing lending to businesses (via banks and non-bank lenders)*

To accommodate the needs of the real economy in the sovereign money system, Dyson, Hodgson, and Jackson (2015) propose a hybrid system in which central bank officials, with their best judgement and discretion, determine the amount of most of the money supply based on its goals, such as reaching a specific inflation rate according to the “target-based” regime, while a smaller amount would be injected “on-demand” to finance lending to businesses outside the FIRE sector (finance, insurance, real estate) to add responsiveness and flexibility to sovereign money creation. Although such a scheme seems better than the current monetary system in which overshooting and undershooting of the money supply frequently has destabilizing impacts on the financial system and the real economy, it is not without potential problems, as will be discussed in the next section.

¹¹ Wray (2019) considers this an “oxymoron” since non-interest-bearing, non-marketable sovereign money is still recorded on the liability side of the government. He claims that money is always debt and sovereign money is fundamentally debt issued by the government with different characteristics.

3. Potential Problems in the Sovereign Money System

One of the critical features of the sovereign money system is its counter-cyclicality. In a recession, demand stimulus through increased sovereign money supply is required to combat the deflationary environment caused by a decline in private sector spending (borrowing) and in the velocity of money. On the other hand, when private sector spending increases, as is characteristic of a boom, money creation must slow down (or even money destruction may be needed). The issue is, while it could operate countercyclically, how could it ensure that the money creation is appropriately modest and disciplined rather than inflationary, and at the same time sufficient rather than deflationary. In the same spirit, Adair Turner (2015), in his book *Between Debt and the Devil: Money, Credit, and Fixing Global Finance*, recognizes that there is no technical limit to such “overt money finance”—a term he uses as somewhat congruent with sovereign money creation—and, as such, there would be great temptation for excessive use. Consequently, he calls for the design of institutional mechanisms to guide the disciplined use of sovereign money when needed.

Another potential problem with money creation in the sovereign money system is one of speed. While sovereign money creation should be countercyclical, it would not do so automatically. Even if policy makers have perfect information and immediately respond to an ever-changing economy, there is a time lag between when policy makers identify problems, such as deflationary pressures, and when an implemented policy (injection of more sovereign money) has real effects on the economy, given that it takes 12 months for a change in aggregate demand to have an impact on inflation (Bank of England, 1999a and Dow, 2004). Moreover, negotiation or disagreement as to optimal policy within the central bank and the treasury in a given circumstance could add more time to the implementation of the policy. As a consequence, it could be difficult for the public sector, with lagging policy response and impact, to address in a timely manner the pressing issues in an inflationary or deflationary environment. Even if the money supply could be made more responsive and flexible through treasury lending programs, such money creation is fundamentally endogenous with no capacity to boost (dampen) a struggling (overheating) economy. For instance, in a balance sheet recession, where households and businesses are focused on de-leveraging, and thus are not incentivized by a lower interest rate to borrow more, this lending program would be ineffective or could even aggravate the situation (Koo, 2011). This implies that the primary method of sovereign money creation (depletion) by central bank officials is more needed, especially in critical times.

Furthermore, there are three layers of uncertainty associated with the central bank's decision as to the appropriate amount of sovereign money to be injected into the economy: 1) the economy is fundamentally uncertain and unpredictable, unlike the ergodic world that is assumed in neoclassical economics (Davidson, 1991; Lawson, 1988); 2) there is no correct model of the economy for the central bank to use as the basis for policy making (Bank of England, 1999b); 3) real time macroeconomic data are not available or, if any are available, they are the product of much revision and guesswork, which provides uncertainty about the assessment of the current economy and the impact of previous policy measures (Orphanides and van Norden, 2002). Due to these uncertainties, policy makers have to use a macroeconomic model and existing data that attempt to reflect the real economy as a guide rather than as a rule. The implication is that policy decisions and their impacts are determined by policy makers' subjective interpretation and judgement of data, their preferred economic

model, and the response of the private sector to a new policy. This degree of discretion leaves the system vulnerable to policy mistakes and failures.¹²

One of the possible policy mistakes in a sovereign money system could be that the central bank/treasury's contribution to aggregate demand outpaces the productive capacity of the economy. Government counter-cyclical spending stabilizes inflation by setting a floor and a ceiling on aggregate demand and profits, but pump-priming of effective demand can induce ever higher profits and inflation (Minsky, 1975; Forstater, 2000). Since World War II, the reactions to recessions have continuously increased the relative size of the government and its primary spending on transfer payments, defense, and interest on debt, which are by nature non-targeted, unproductive, and thus inflationary.¹³ In an economic contraction, a discretionary "stop-go" stimulus policy can magnify an inflationary process, especially if coupled with supply shocks, such as drought, war, and oil price spikes. Minsky (2008) diagnosed the high inflation period of the 70s and contended that inflation was initially triggered by oil shocks and strong unions, but that what prolonged it was the expansionary fiscal policy. In short, a low tolerance of the central bank/government for unemployment and its support for unproductive consumption are conducive to an upward bias regarding prices. It is noted that sovereign money creation in general Keynesian expansionary policy has a strong tendency to fuel inflation.

Another possible critical flaw in the sovereign money system, as in other forms of government expenditures, must also be addressed: political abuse. Stimulus programs designed under a downturn are typically less effective since policymakers tend to pursue political more than economic objectives when the pressure on politicians to do something mounts. As Rajan (2010, p.114) states, "*policy made in the midst of a downturn is often hurried, opportunistic, and poorly thought out. Although deep crises offer an opportunity for serious rethinking and transformation, if new policies have to be devised in response to every downturn, the result is inappropriate, unpredictable, and excessive policy making.*"¹⁴ In the name of stimulus to boost the economy, politicians may come up with new spending, tax, and lending programs, some of which may be intended to serve powerful interest groups and may not benefit the economy in the long run. Even apart from cronyism, partisan behavior would be a factor in policy making. With a limited amount of newly-produced sovereign money, the government in power is more likely to finance projects supported by their own political party. A government decision on how to spend the money and in which form would inevitably be political to some degree.

A further concern is that the discretionary nature of government spending can make households and businesses face tremendous anxiety about the possibility of a program being phased out. This uncertainty creates the very anxiety that the program was designed to avert, and minimizes the stimulative effects of the program due to increased hoarding of sovereign money (a decrease in marginal propensity to consume). The absence of universal health care or

¹² Consider how much policy makers failed in many aspects during the 2007-2008 global financial crisis and the following recession: 1) they had not predicted the crisis; 2) they were not able to correctly assess the depth and severity of the crisis; 3) their policies did not result in the desired outcomes as evidenced by the many ad hoc alternative policies that had to be added to the conventional toolkit.

¹³ Minsky (2008) argues that the only time when such programs are non-inflationary is during financial crises and debt deflation, when households, firms and banks all start to deleverage.

¹⁴ During the Covid-19 pandemic, the long lasting negotiations in the US about the second stimulus package, despite the struggling economy, exemplifies how politicians may care more about upcoming elections than economic objectives.

affordable private medical insurance, as in the United States, compounds the suffering of the unemployed and the poor. Therefore, expanding a safety net program seems more advantageous than a discretionary one.

After considering the lagging, uncertain, inflationary, policy mistake-prone, and discretionary nature of sovereign money creation with its unpredictable impacts, and liability to indiscipline and political abuse, it is hard to be optimistic about this new system. Although issues regarding the creation and allocation of state-created money are open to debate, this paper contends that a job guarantee program is a beneficial form of government spending that addresses the issues discussed in this section, and is, moreover, a more wide-rangingly effective deployment than many of the suggested alternative complements to the sovereign money system.

4. Job Guarantee Program (JG)

A job guarantee program would eliminate involuntary unemployment.¹⁵ This program would offer a job to those who need one but cannot otherwise find work in the private sector. It would be financed by the federal government and administered locally (Wray, 1998; Mitchell and Muysken, 2008). This is because the federal government (the central bank) can create money and thus has the capability to fund the program effectively, while local governments are in a better position to assess the needs of their communities. Individuals employed in the initiative would work on a variety of projects to benefit their localities, such as environmental issues, public education, community projects, and support care for those in need, such as the elderly, disabled, sick, and children. These jobs would be specifically orchestrated so as not to compete explicitly with the private sector, minimizing crowding out. Instead, they would be designed to help the currently unemployed acquire jobs in the private sector by solving the problem of the stigma and lack of skills associated with long term unemployment.¹⁶ For some, the job guarantee program are transitional with the expectation that public sector workers hired under the guarantee necessarily will return to the private sector for employment and should be trained to do so. Although a training component is an important aspect of the program, the objective should be to ensure that employees are highly productive in the tasks they perform under the program.

Individuals employed by the program would be paid minimum wage, along with benefits.¹⁷ Accordingly, it would provide a base level of acceptable and legal employee treatment and pay, as workers who were illegally receiving less pay and/or worse treatment in their current jobs would transfer to the jobs provided by the state. Thus, it would not only address unemployment, but also eliminate low wage, low benefit employment from the economy at large by compelling

¹⁵ The job guarantee program has a long history, but a modern form was developed by Minsky (1965), Harvey (1989, 2000), Wray (1998), Forstater (2003), and Mitchell and Muysken (2008), among others.

¹⁶ The administrative foundation is already in place for such a program in many countries and the job guarantee program would simply build upon it. There is, for example, presently a network of unemployment offices in the US, known as the American Job Centers. Under the job guarantee program, they could act as employment offices through which the program could be administered (Tcherneva, 2020).

¹⁷ Many JG proponents claim 15 dollars an hour should be the minimum wage in the US, but this paper not make such a claim. The hourly wage, for instance, could depend on a country's growth strategy, such as export-led vs. consumption-led growth.

private employers to match the minimum compensation package offered under the JG.¹⁸ Furthermore, it would operate as a permanent employment safety net providing easy access to employment for workers in the labor force (Ormerod, 1994), since anyone who temporarily lost a job could be immediately hired in these programs without worrying about becoming unemployed again. The program ensures that even the lowest skilled, least experienced, most disadvantaged workers are able to find employment as well as skilled and experienced ones, each put into projects that suit their skills and qualifications from technical to intellectual activities. In this way, the nation would always remain at “loose” full employment (Mitchell and Wray, 2005).¹⁹

In addition to ensuring that every willing and able worker in the economy is employed, a job guarantee program would be self-adjusting by expanding in recessions and contracting in booms, in both cases stabilizing and stimulating the economy. This automatic component is a critical feature and one that separates it from other traditional discretionary stimulus proposals. Theoretically, sovereign money would have to be provided in correspondence to the economy's real growth potential and related finance (Dyson, Hodgson, and van Lerven, 2016). This means that central banks would have to respond to the current and forecasted GDP growth as a key indicator among others (despite its shortcomings, as mentioned in the previous section). A job guarantee program can help minimize the discretionary portion of the overall amount of sovereign money to be created, and thus minimize the difficulties in determining the exact optimum amount as well as the aforementioned problems. Instead of applying macroeconomic indicators that are uncertain and lagging by nature to imperfect models and producing policy that may lead to unexpected behavior by economic agents, a job guarantee program would respond directly to a key variable (employment) that determines the private sector's ability to spend. In this way, it would address the root cause (income) before symptoms (decline in aggregate spending or deflation) begin to appear. A job guarantee program would prevent a recession, not just act as a cure as in the Great Depression (Tcherneva, 2020). Thus, the program is both timely and efficient.

Furthermore, the program works as a tool for fiscal discipline. It automatically expands to the extent needed to ensure full employment in a recession. It sets a standard for a minimum level of sovereign money creation and can channel its spending where it is most needed, i.e., directly to the unemployed, by offering a job and earned income to anyone who needs it. Total income will go down as workers who flow into the program are most likely to earn less, but the program will nevertheless sustain their basic spending, thereby preventing further decline in GDP and the general price level. Of course, the central bank can and should create more money than just what is required to operate a job guarantee program, but the program still works as a useful benchmark as to an optimal amount of new money creation without an economic or political dispute. On the other hand, the program will shrink as more workers move to the private sector for higher pay during an economic expansion, which, in turn, necessarily slows down sovereign money creation. In such an inflationary environment, a decline in other forms of discretionary

¹⁸ Even though the government would set fixed wages, market forces would determine the size of the job guarantee program (the ratio of JG employment to total employment) as the program defensively responds to the private sector.

¹⁹ Some skilled workers who become unemployed may prefer to undertake full-time job searching rather than enrol in a job guarantee program as they usually have more savings or receive more generous redundancy payments. The relatively low pay will, in addition, disincentivize those workers from taking a job in the program. Therefore, there is no reason for the program to completely get rid of frictional unemployment.

spending and lending or an increase in taxes may also be necessary. A decline in the job guarantee program, however, can itself act a guide for a more disciplined use of sovereign money. This mechanism can also mitigate against policy mistakes, political abuse, and the uncertain and unpredictable nature of sovereign money creation. Additionally, unlike welfare programs that fade out in a recovery period, the job guarantee program would be a permanent employment safety net, and so make workers feel safer (because of guaranteed job opportunities) and healthier (because of health insurance made accessible by a job).

Similarly, a job guarantee program with a fixed wage provides an in-built inflation control device. In the current system, total income fluctuates by the lost (gained) income of the newly unemployed (employed) in a recession (expansion), whereas total income in a system supported by a job guarantee program varies only by the decreased (increased) total income of workers transferring jobs between the private sector with higher wages and the job guarantee program with minimum wage. Since this compositional shift in employment stabilizes total income, it would dampen demand-driven inflation and deflation. In addition, a job guarantee program would help to reduce cost-push inflation and deflation by stabilizing the price of labor (Wray, 1998; Mitchell and Muysken, 2008). This approach is contrasted with a Non-Accelerating Inflation Rate of Unemployment (NAIRU) regime in which price stability is prioritized over employment because an optimal level of the latter is believed to be achievable only after the former is established. While the NAIRU was somewhat effective in decreasing the rate of inflation in the 80s, it did so at the expense of many individuals who were forced to participate in an anti-inflationary policy that left them unemployed. Moreover, this policy has also been less effective over time (Mitchell & Muysken, 2008), leading to the dismantling of the theoretical and empirical relationship between unemployment and inflation (Arestis and Sawyer, 2003; Borio, 2017; Gordon, 2018; Solow, 2018). The Fed Chairman Powell admitted under oath that the perceived relationship no longer held, especially after the 1990–91 recession (Federal Reserve, 2019).²⁰ Since the method of curbing demand-led inflation by using unemployment as a tool might no longer be useful, a job guarantee program instead is a better alternative strategy for achieving price stability without incurring mass unemployment by minimizing the variance in total income and stabilizing the price of labor.

This initiative has support from across the political spectrum. The issue of unemployment resonates with the vast majority of people and therefore a job guarantee program has received overwhelming bi-partisan support. Over 70% of voters support such a policy, according to a Hill-HarrisX poll (The Hill, 2019). Civis Analytics carried out a poll that was deliberately framed in a partisan way and found that 52% of voters still supported it. David Shore, a senior data scientist involved in the project, declared it “one of the most popular issues we’ve ever polled” (McElwee et al., 2018). This strong bi-partisan support makes the program a favorable allocation of sovereign money. In addition, the program addresses the significant problem of lobbying. For example, in a scenario in which the mechanism of government fiscal policy is decreasing taxes, the paramount question is for whom will taxes be lowered. The answer to this particular question is one that lobbying could exert an enormous amount of influence over. Corporations would have an enormous incentive to take whatever actions were necessary to

²⁰ For instance, production recovered within three quarters in 1991 but it took 23 months from the trough of the recession to recover the jobs lost in the 1991 recession. Regarding the 2001 recession, even though output recovered in just one quarter in 2001, it took 38 months after the trough of the 2001 recession for all the lost jobs to be restored. Similarly, the 2007-2009 recession ended in June 2009 as the economy began growing again, but the unemployment rate did not recover to the pre-crisis level until late 2015 (Paul et al., 2019).

receive favorable tax breaks. By contrast, a job guarantee program is largely apolitical and immune to lobbying. Its local administration would ensure that the projects taken on would actually be beneficial for the community and lobbyists would be unable to influence those decisions on a wide scale. In essence, the job guarantee program ensures that sovereign money would be spent in the interest of the community not that of special interest groups.

A job guarantee program would effectively address two problems that plague the current economic system: unemployment and working poverty, along with a multitude of secondary negative effects. A solution is desperately needed in an economy where the inverse relationship between GDP growth and unemployment has weakened because of technological advancement. A job guarantee program is an unparalleled proposal due to its contribution to full employment, timeliness, less discretionary and political nature, less-inflationary effect, and in-built fiscal discipline (proxy)—for minimum money creation (to augment decreasing income) in a downturn and maximum (to rein in increasing income) in an upswing. Such a mandatory spending program does not imply distrust in a central bank's ability to provide an optimum amount of money and to pursue a flexible monetary policy in a complex system like the modern economy. There are, however, dangers associated with the discretionary nature of money creation, as discussed in the previous section, so minimizing these through a job guarantee program would maximize the benefits of the sovereign money system. Finally, there will be shock effect on investment and credit activity when the changeover is made from the present system to the sovereign money system. The simultaneous adoption of a job guarantee can play a role as the cushion to protect the population at large from the effects of the downturn induced by the system change.

5. Job Guarantee and Other Fiscal Programs

5.1. Universal Basic Income

Universal basic income (also known as Citizen's Dividends, but hereafter UBI) refers to the federal government's provision of an equal amount of money to every citizen regardless of income, and is often put forward as a popular policy in a sovereign money system. Geoff Crocker (2020), among others, claims that technology is the driver of economic structural change and that production increasingly requires a more limited number of highly skilled staff and far fewer low-skilled employees. He notes that this trend inevitably reduces the wage component of output, makes earned income deficient in purchasing the production of the economy. He suggests that the only solution is to pay UBI, to augment earned income in order to sustain aggregate demand. In this section, we will contrast UBI with the job guarantee program to demonstrate that the former is a poor complement to sovereign money creation.

UBI would increase aggregate demand without an increase in aggregate supply, which would give rise to inflation. First, the policy has a negative incentive effect on labor supply because individuals are more likely to leave jobs with low wages or bad working conditions after the inception of such a program. Second, consumption would go up through wealth effects and the reduction of uncertainty (a decline in liquidity preference). Such a combination of decreased aggregate supply coupled with increased aggregate demand would undoubtedly lead to inflation. The most important issue is whether low-income households could purchase essential goods and services, such as food, housing, transportation, healthcare, childcare, at affordable prices. Such inflationary impacts, however, would not improve the situation of the poor as much as is claimed by UBI proponents, since the excess aggregate demand, if not all of it, would be

inflated away. Any attempt to restore the purchasing power of the UBI would simply fuel more inflation. Conversely, a job guarantee program injects newly created money into the lagging sectors where resources and inputs lie idle, thereby increasing the supply of below-potential industries. In other words, sovereign money is directly targeted at those in the least tight labor market and less inflationary sectors. As supply (the production of goods and services) and demand (the creation of new money) increase broadly in tandem, inflation can be avoided to some degree. Additionally, the countercyclical size of the program can stabilize the general price level by stabilizing total income, as mentioned before, whereas UBI has no such mechanism.

UBI is clearly an ineffectual means of income redistribution. It is true that UBI offers income support for households' consumption, especially in face of the loss of income resulting from automation-driven reductions in the labor force. In this way, however, the government finances profits made by businesses and thus also unearned income such as pensions, dividends, and capital gains. In fact, UBI reinforces the current capital-favoring market structure and the dominant power of shareholders (Baranes, 2020). Wealthier households would use their cash subsidy mostly to purchase income generating assets, such as stocks and real estate, thereby feeding their GDP-disproportionate accumulation of financial assets. By contrast, the impoverished parts of the population would spend most of their income on basic necessities without any surplus for acquiring assets. Such a distributional bias, would not only further exacerbate wealth inequality, but also benefit capital revenue at the expense of earned income. On the other hand, the objective of the job guarantee program is to radically restructure the system so that the issue of income inequality is directly addressed. This would be achieved through a direct increase in the income of the lowest wage earners (who would leave jobs with lower pay than the program provides), as well as the unemployed. Galbraith (1998) finds that higher employment tends to be associated with increasing relative wages for the poor and reducing poverty. Thus, regionally-based job creation programs also eliminate inequality between geographical regions by helping communities in disadvantaged areas to maintain continuity of income and labour force attachment.

Unemployment has a vast array of negative social effects, including alcoholism, depression, anxiety, violent crime, and even suicide (Linn et al., 1985; Raphael and Winter-Ebmer, 2001; Nordt et al., 2015). UBI is based upon the conjecture that simply providing individuals with money will solve these problems. This is most probably an erroneous assumption, as evidenced by the fact that individuals' desire for jobs is not purely monetary (Beveridge, 1945; Darity and Goldsmith, 1996; Sen, 1999). From this insight, the conclusion can be drawn that all of the problems connected to unemployment will be better solved through a job guarantee program that addresses the issue directly rather than by monetary measures. In addition to contributing to mental and physical health, the programs also help workers maintain their work habit and skills.

UBI relies on the market to determine the composition of output. Job guarantee initiatives not only support aggregate demand by offering an income (to those who need one most), as UBI does, but also hire workers and allocate resources in order to provide socially and environmentally desirable goods and services (ones that are not considered commercially profitable in the private sector). New Deal work programs, for instance, showed to tackle the environmental issues of the time (Salmond, 1967). A sovereign money system fundamentally solves the affordability problem, but is still subject to real constraints. As long as there are real resources and labor available but not utilized by profit-seeking businesses, employing them to

support local community development and advance environmental sustainability would maximize social value creation.²¹

In summary, job guarantee programs are superior to UBI because the former would not trigger significant levels of inflation, but would alleviate inequality, solve a host of social and unemployment-related problems, and provide public goods and services that society needs. A job guarantee program would result in true economic growth and assist those most in need without the adverse effects that would be created by UBI.

5.2. Demand Management Policies

A job guarantee program is a more effective policy than the conventional “Keynesian” demand management policies, that have been widely adopted in the post-war period. These ineffective initiatives are trickle-down programs, wherein job creation is the last step in a complex transmission mechanism. Unsurprisingly, empirical data demonstrates that these top-down policies have positively affected firms with regards to growth and profits, but have failed to effectively improve employment (Tcherneva, 2013). Moreover, these programs actually exacerbate inequitable income distribution issues since they improve the conditions of highly-paid workers first. They do so under the assumption that these workers spend more, which eventually results in increased employment for the less-skilled workers. These policies have not been successful enough to make any meaningful change in aggregate employment, and furthermore, income growth has become more inequitably distributed with nearly every post-war expansion (Tcherneva, 2014).

In addition, the effectiveness of these programs will continue to diminish as time progresses on account of technological expansion. Some of the world's largest companies, including Apple and AT&T, are experiencing increasing market capitalizations coupled with a decreasing number of employees (West, 2018). Automated systems are now practical substitutes for less-skilled workers (West, 2015; RBC, 2014). Under the post-war Keynesian expansionary policies, there is no assurance that newly-created money will not simply go towards buying machines or asset markets as opposed to hiring people. This is not to say that this program has no positive impact on the economy. However, its effect on employment and the real economy, per dollar of government spending, is far smaller than the effect of a more direct program like the job guarantee. As with UBI, it is highly likely that benefits will accrue to asset holders. The job guarantee program, on the other hand, targets those who are most in need of income and the source of aggregate demand since it “hires off the bottom” (Michell and Wray, 2006). This kind of a bottom-up approach would prioritize increased employment over corporate profit, help to ameliorate income distribution problems, since it does not rely on faulty transmission mechanisms, and provide willing and able workers with jobs in a world where certain forms of human productivity are less and less in demand.

²¹ “JG workers could participate in many community-based, socially beneficial activities that have intergenerational payoffs, including urban renewal projects, community and personal care, and environmental schemes such as reforestation, sand dune stabilisation, and river valley and erosion control.” (Michell and Muysken, 2008, p. 242)

6. Remaining Issues for a Job Guarantee Program

If a job guarantee program is to be implemented, it must be done with precision and forethought. While this paper is strongly in favor of the initiative and considers it to be an extremely effective solution to a variety of problems, there are a few criticisms that warrant consideration. The concerns include the following: the potential disruption of private sector businesses, the possibility of job guarantee workers being stigmatized, and the inability of the program address structural unemployment.

It has been suggested that a job guarantee program would impair private enterprise (Gulker, 2018 among others). This is due to the fact that it could incentivize workers to exit the private sector, thus causing a labor shortage, and that it would inadvertently increase the minimum wage, which some believe would be harmful, particularly to small businesses. First of all, a certain degree of disruption is assumed under this policy. If businesses cannot remain viable without underpaying their workers, they are inefficient and will be replaced by more efficient businesses. The job guarantee program seeks to upgrade the wage and treatment standards of the labor market, and businesses that are unable to function in this new paradigm will become insolvent. The program does not intend to replace effective, equitable private sector businesses and, if properly carried out, it will not do so. Rather, the job guarantee program will increase aggregate demand on account of increased employment, benefiting firms considerably. A simulation carried out by the Levy Economics Institute found that such a program would actually increase private sector employment by 3 to 4 million jobs (Nersisyan and Wray, 2019). Analyses of the work programs implemented under the New Deal in the 1930s have found that they had no adverse influence on private sector employment (Bernanke, 1986; Wallis and Benjamin, 1981). Finally, the Fiscal Policy Institute (2004) found that states with high minimum wages are better for small businesses; to be specific, small businesses actually grow twice as fast in such an environment.

Another concern about this program is the possible stigmatization of workers, rendering them unable to move to private sector employment later (National Resources Planning Board 1942: 221; Salmond 1967; Jensen 1989). The job guarantee is unique in the sense that it has wide support across the political spectrum. This makes it far less likely to create any stigma, as compared to a highly politicized program like welfare. Moreover, the stigma around the workers involved in the program would undoubtedly be less than the stigma around unemployment, which is, of course, the alternative. A well planned, implemented, administered, and audited program would definitely improve the utilization and training of workers' skills and the productivity of the program. A statement from the National Resources Planning Board regarding this issue in the context of the New Deal programs explains that stigmatization was not a significant problem and it decreased over time:

“Yet despite the fact that prejudice against the hiring of WPA workers is known to exist among some private employers, there appears to have been a distinct enhancement of the social status of the project worker. This change of attitude has been in no small measure due to an increased appreciation of the value of the work performed, which in turn has reflected a more mature experience of administration and a more careful planning of projects” (National Resources Planning Board, 1942, p. 250).

Finally, some opponents of the job guarantee program assert that it would not address unemployment brought about by structural changes (Sawyer, 2003; Seccareccia, 2004). Contrary to the critics, a job guarantee is the perfect initiative to solve structural unemployment in a dynamic economy, as the job guarantee program can promote training initiatives (see Mitchell, 1998). Although not all training and education tackle structural unemployment, they improve labor productivity by helping workers in the program attain and use work-related knowledge and skills through on-the-job training. Therefore, projects that job guarantee workers participate in should be designed with technological advancements in mind, so that when individuals are hired out of the program into the private sector they are equipped with relevant skills. It is the case, however, that most of the projects envisioned in a job guarantee program are deliberately labor-intensive and require very little capital equipment and training (Mitchell, 1998) in order to accommodate the least-skilled or a labor segment that experiences the highest unemployment. As such, the public sector can adopt more labor dependent forms of production, with social as well as macroeconomic concerns in mind, freeing up capital that private sector firms can then utilize.

The job guarantee program must be executed carefully. If it is done in such a manner, the benefits will far outweigh the costs. Through proper implementation, it will minimize the damage to private enterprise, serve as an effective stepping stone toward employment in the private sector without stigma, and it will tackle structural unemployment through training and education.

7. Conclusion

Through the course of this paper we have: 1) defined the sovereign money system and the job guarantee program, 2) outlined the ways in which both of these initiatives can solve many of the problems inherent in our current economic system, 3) demonstrated how the job guarantee program is a more effective form of policy than UBI and demand management under a sovereign money system, and 4) addressed possible criticisms of the program. In the evaluation of theoretical proposals, it is important not to lose sight of the real lives at stake and the fact that government policy can exert an enormous degree of influence over the everyday lives of each and every citizen. The paper firmly contends that, through the combination of the sovereign money system and a job guarantee program, the environmental, societal and economic maladies associated with both excessive bank lending and unemployment would be effectively addressed and even remedied. This view is far from illusory, but rather represents a concrete and pragmatic means of moving towards a better future for everyone.

Although there are many remaining issues to be addressed

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Performativity, marketization and market-based central banking

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Abstract

Central bankers have become technocratic authorities with an active role in macroeconomic management. This active role was due to the transition to inflation-targeting, in which prevails the 'expectational governance', the central banks having as their ultimate goal the governance of the future through a symbolic-discursive role. This governance of the future, however, is dependent on financial system. This system exerts a structural power, given its importance in monetary governance processes, which leads to an infrastructural entanglement between the financial sector and the central bank. The latter governs through financial markets, so it is motivated to support structured products markets and other financial practices that facilitate the smooth transmission of liquidity, necessary for the easy implementation of monetary policy. But post-crisis, how liquidity has dried up, there was a crisis of communication, which forced the Federal Reserve and the ECB to resort to an active "balance sheet policy", necessary to preserve securitization processes, ABS and MBS markets, but also market liquidity. In this way, post-crisis, liquidity management becomes more relevant to monetary governability than inflation targeting.

Keywords

Central Banking; Market-based Finance; Liquidity; Power; Structured Assets; Repo.

Introduction

The global financial crisis has highlighted the new trend of market-based finance. This new financial reality is not exclusively the result of innovations in the private sphere, but is also linked to monetary governability, and this governability "(...) generally serves as a grid for the analysis of the power relations, be they micro powers or micro relations of power, concerned at a level of governmental policies" (Aguero 2010).

In this context, the financial sector exerts a structural power (Culpepper 2015), which leads us to the hybrid analysis of the new financial structure, in which prevails the deep integration of the financial sector with central banks, the latter becoming market-based institutions. There is an infrastructural entanglement between these two entities, given that the central bank work through financial markets (Yellen 2014), which means that preservation and even the creation of a liquid financial structure is a prerequisite for governability. Equally, behind this infrastructural entanglement lies the financialization itself, which is a "pattern of accumulation in which profit making occurs increasingly through financial channels rather than through trade and commodity production" (Krippner 2005), financialization facilitated by the marketization of the balance sheets of banking institutions.

Starting from these, the involvement of central banks in enforcing securitisation processes is well known, which have been the basis for the emergence of structured assets that play the role of collateral in debt relationships. That is why it has been stated that the Federal Reserve's policies are geared towards "the well-being and accommodation of finance" (Jacobs & King 2016: 15). But this Anglo-American financial model has also extended to European Central Bank officials through primary training from certain academic institutions (Lebaron 2013), what strengthened market-based finance. This financialization managed to transform the liquidity in the markets (Chiapello 2017), which forced a rethink of monetary policy.

Since the 1980s, central banks have gained a visible role in macroeconomic management, becoming technocratic authorities. They thus began to rely on future-oriented governance techniques, specifically "politics of expectations" (Beckert 2016: 80), replacing hydraulic policies, in which the emphasis was on the trade-off between inflation and unemployment. In this way, the implementation of monetary policy was no longer achieved through monetary aggregates, but by modeling expectations using a discursive frame. But this governance of the future through expectations worked until the beginning of the financial crisis, at which point we witnessed a crisis of communication. This was when central banks, notably the Federal Reserve and the ECB, made the decision to use active 'balance sheets' policies to maintain governability. Starting from these, the involvement of central banks in enforcing securitisation processes is well known, which have been the basis for the emergence of structured assets that play the role of collateral in debt relationships, which confirms the existence of an infrastructural entanglement between the two entities (Braun 2015). Thus, the transition to a "balance sheet policy" was necessary to preserve the institutional context and certain mechanisms on which financial capitalism is based, that is why both the Federal Reserve and the European Central Bank have strongly intervened during the great financial crisis in the markets of asset-backed securities and mortgage-backed assets, which play an essential role in the processes of liquidity transmission and in private collateral production. Equally, even the transition to a floor operating monetary system confirms this infrastructural entanglement, this operating system allowing a central bank to assist financial markets with greater ease. As a methodology, this paper will use the process-tracing approach, which is "a procedure designed to identify processes linking a set of initial conditions to a particular outcome" (Vennesson 2010).

This paper is organized as follows. In the first section we will analyze the transformations of the traditional business model of the banking system, these transformations being due to the processes of marketization and implicitly securitisation. The second section will aim at analyzing the active involvement of central banks in securitisation and financialization processes, namely how central banks were 'institutional enablers' of these practices. In the third section we will discuss in detail the performative, future-oriented role that a central bank plays with the advent of inflation targeting. The fourth and fifth sections discuss the crisis of discursiveness and the active use of the balance sheet to improve the governance capabilities of central banks (Sassen 2006). The last section concludes.

Marketization and integration

The banking transformations that we will discuss in this section are supposed to have had a root cause, although it is not the only one, namely the emergence of liability management (LM) (Beck & Knafo 2020), through which banks became interconnected with money markets. This management was a consequence of the funding pressures that commercial banks encountered

with the advent of Regulation Q and implicitly of the advent of Money Market Mutual Funds (MMMFs). These regulations made commercial banks no longer able to rely on customer deposits as a source of funding, with institutional clients being incentivised to invest in MMFs as they offered a higher interest rate, and Regulation Q forbade commercial banks to change this rate at will. As this way of funding has been considerably reduced, commercial banks have started to use money markets for funding (Beck 2021; Konings 2007), these being the wholesale markets where very short-term credit instruments (IOUs) are traded. Accessing money markets has enabled commercial banks to obtain funding through very-short and short term instruments, such as certificates of deposit (CD). This liability management not only allowed banks to finance their activity, but also to increase leverage (Dutta 2020), to extend credit, and, implicitly, to actively trade securities in money markets. But this leverage and the new trades involved higher risk, all the more so as banks began to open up ever wider positions. And an organic way in which they managed to reduce the risk assumed was marketization, which gave rise to securitisation processes, which is the process by which non-tradable and illiquid assets, such as mortgages, are transformed into tradable securities.

In recent decades the marketization of the balance sheet of commercial banks has prevailed, which "(...) entails that banks finance economic activity through market intermediation rather than through long-term personalized loans they hold on their books and which they grant and monitor through a dense network of relationships linking them to other economic actors" (Godechot 2016). This marketization underlines the fact that the financial system has become a market-based one. Equally, marketization demonstrates that we can no longer discuss a dichotomous relationship between banks and markets (Zysman 1983). In other words, the financial system is market-based, as it was stated, but it is deeply integrated with the banking system, that is why we are witnessing a "functional integration of the banking system with capital markets" (Hockett & Omarova 2017). In this way, banks remain relevant, but their business model undergoes changes, these institutions becoming active in non-core activities, such as securitisation underwriting, derivatives transactions or proprietary trading. Which means that banking activity has increased in proportion to financialization (Christophers 2015), expansion of financial social debt relationships leading to an increase in banking services. But banks are also involved in off-balance-sheet activities to skirt capital requirements and to expand their assets under management, precisely the evolution of these vehicles leading to a decrease in liquidity from the regulated balance sheets of banks (Loutskina 2011). That is why we have also witnessed a new phenomenon, "noninterest income makes up a significant portion of most banks' revenue. As of the first quarter of 2018, noninterest income was a full 34 percent of total bank operating revenue" (Haubrich & Young 2019). Therefore, this evolution to a securitized banking shows that "(...) the link between bank credit and broad money has substantially weakened after the mid-1990s because of the changing nature of the credit creation process where nonbanks' role in financial intermediation has greatly increased" (Ozgur & Erturk 2008).

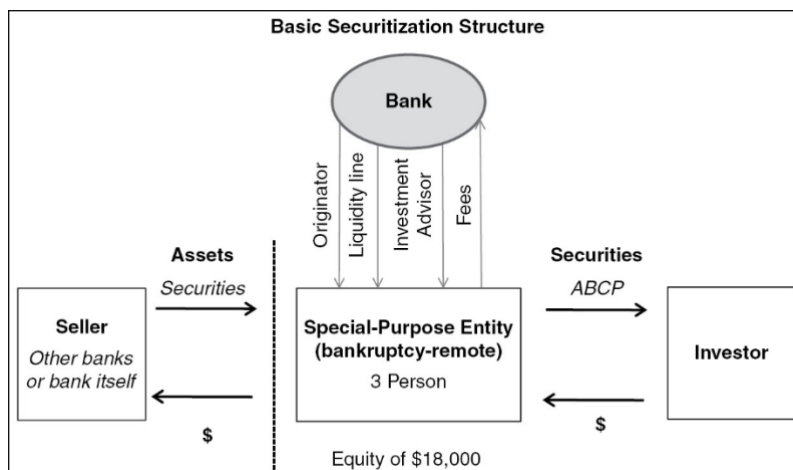
The marketization of both sides of banks' balance sheets underlines the fact that banks are much more actively involved in intermediating loans than in initiating and maintaining them on-balance sheet, "marketization thus combines securitisation—the transformation of financial assets, especially loans, into tradable securities—and growth of trading volumes for each security" (Godechot 2016). On the asset side or in off-balance-sheet vehicles, commercial banks reduced exposure to illiquid mortgages but increased exposure to long-term mortgage-backed assets and asset-backed securities (Pozsar et al. 2010). On the liability side we find wholesale collateralized funding through short-term instruments such as repo transactions. Repo ("repurchase agreement") is a key mechanism for financialized capitalism, a short-term

secured loan whereby financial institutions could lever up and central banks could implement their monetary policy.

Which means that we have witnessed a transition from a deposit-based model to a wholesale funding model. Banks have become active in debt finance, all their actions “(...) in the process of making money have historically come to reshape the latter as liquidity and, in so doing, they have redefined the very 'constitutive rules' (...) of money-making” (Sgambati 2016). This involvement is inherently linked to the transition to non-core activities, which led to a rentier behavior, in which “(...) significant portion of credit is created to finance purchases of financial assets” (Dow 2007). Thus, marketization is an organic consequence of the diversification of bank income sources, but also a way to increase leverage, which helps the new money-making process. Thus, banks have the opportunity to increase leverage by issuing new loans that are to be securitized, they are able to participate in the inflation of the price of some assets, such as the housing sector with the growth of the practice of mortgage securitisation, but also in the creation of new markets. In other words, banks increase their leverage by issuing new loans and engaging in securitisation processes.

As such, marketization leads us to the securitisation process, which represents “a fundamental shift in how finance is done” (Davis & Kim 2015). Securitisation leads to the risk, liquidity and maturity transformations. But these transformations are no longer carried out intra-institutional, but inter-institutional, being a divided process “into several discrete steps” (Helgadottir 2016). The new banking model, deeply integrated with financial markets, is linked to collateral and implicitly repo transactions, securitisation processes helping to create collateral usable in repo transactions, collateral being the “financial lubricant” (Singh 2016). Thus, the structured assets resulting from these securitisation processes, such as residential mortgage-backed assets (RMBS) or collateralized debt obligations (CDOs) could be used by banks to diversify sources of income, but also to increase leverage, given their use as collateral in repo transactions. But in the case of CDOs, it must be specified that they were structured assets divided by tranches, each such tranche having a distinct risk, the lowest default risk having the AAA tranche. Thus, after this structuring process, these tranches became collateral in repo transactions, as discussed, allowing private institutions that held such structured assets to borrow up to 98.4 cents per dollar (Geanakoplos 2010).

But the development of these structured markets it could not have taken place without the active participation of hedge funds, “the rapid growth in CDOs from 2002 onwards bears a close correlation with the growth of hedge funds assets” (Lysandrou 2012). Which means that securitisation processes would not have had the scale that they had only through the banking system. Thus it can be said that financial innovations could not have occurred without a regulated interaction between the central bank and the traditional banking system, especially when we know that few securitisation processes take place without a direct participation of the traditional banking system (Cetorelli & Perisitiani 2012). Thus, banks became important for these securitisation processes, they were “(...) providers of underwriting services in securitisation (...) This is likely the result of their overall expertise—together with that of investment banks—in fulfilling this important role in bond and equity financing, arranging, and selling the offerings for issuing firms” (Cetorelli & Perisitiani 2012). But banks also have a role in creating and sponsoring off-balance-sheet vehicles through credit lines, but also in issuing loans that are to be securitized. The banks earned an income, i.e. fees, from sponsoring a vehicle. See the following figure:



Source: Thiemann, 2018

In this figure, banks offered direct support to a special purpose entity (SPE), in the form of credit lines, which gives this entity or vehicle a rating close to AAA. To support these securitisation processes, that vehicle issued asset-backed commercial paper (ABCP), a short-term funding instrument. At the same time, the sponsor bank or other banking entities could sell assets to these vehicles in exchange for a fee. This simplistic representation emphasizes the diversification of the sources of income of a bank in the new securitized banking system. For example, between 2003 and 2008 alone, fees from the mortgages sold that were to be securitized totaled \$2 trillion (Gapper 2008).

'Institutional enablers' and the central banking role in securitisation

Central banks played an essential role in the emergence of private money production and securitisation processes, the Federal Reserve being considered the "institutional enabler" (Jacobs & King 2016: 9) of this deep integration between capital markets and the banking system. And this integration has strengthened the trend of financialization, this phenomenon can be defined as "the increasing importance of financial markets, financial motives, financial institutions, and financial elites in the operation of the economy and its governing institutions, both at the national and international levels" (Godechot 2016). The Federal Reserve and the European Central Bank supported these securitisation markets because they ensured the creation of liquidity and private collateral, and made monetary governance more efficient. That is why there has been a symbolic relationship between financialization and the growth of the power of central bankers in the United States (Krippner 2011).

In the case of the European Central Bank, financialization is only the unanticipated result of the attempt to initiate a liquid financial structure, in the form of unified repo markets, through which to strengthen monetary governability. But this process of financial integration did not take place at first through securitisation processes, but by encouraging the cross-border use of collateral (Gabor & Ban 2016). This is why, "in its early days, the ECB actively shaped the creation of shadow euros, that is, of shadow money created against the euro-area securities collateral" (Braun & Gabor 2020). Thus, it created a general collateral portfolio (GC) in which all euro area government bonds were traded under the same liquidity or risk conditions, although, in reality, the ECB required a distinct haircut depending on the market valuation of the bonds (ECB 2000: 43). Thus, ECB pursued a repo-driven integration. And this aspect was essential for the

European Central Bank, any major differences between the yield of these bonds affecting the transmission of monetary policy, given the difference in costs and risk perception. This was the moment when “it decided that it would organize the implementation of monetary policy via shadow euros that treated all euro area government bonds as equal collateral” (Braun & Gabor 2020), monetary policy implementation being carried out through repo transactions. Thus, it used a public instrument, government bonds, to expand private debt relationships, financial entities being stimulated to use these bonds as collateral in private transactions. This is the moment when ECB was the catalyst for the development of market-based finance in Europe.

But this solution had to be accompanied by an increase in securitisation processes and capital markets, necessary to complement bank lending. Securitisation is a funding tool for banks and NFCs. These securitisation processes could alleviate the pressure on bank lending due to the reduction of liquidity constraints, while increasing the access of several financial entities to market-based lending, due to the reduction of market risks. At the same time, the transformation of spatially-fixed assets, such as mortgages, into short-term tradable liquid assets, helps institutional investors, who are net buyers of such assets. Increasing market liquidity would help in the process of expanding capital markets, with real benefits on monetary governability. Which means that the ECB has identified the benefits of securitisation, which is why, “the ECB has helped establish, expand, protect and revive repo and securitisation markets, which serve as infrastructure for the implementation and transmission of monetary policy” (Braun 2018).

In the case of the Federal Reserve, there was direct involvement in these securitisation processes, with the fear that government bonds could not support the growing collateral demand. In other words, the reason why the Fed got involved in the development of securitisation was the decrease of Treasury securities that could have been used as collateral, the preferred solution being the creation of private collateral. Therefore, the Fed aimed directly to use market practices to overcome this potential situation, and the solution came with the proposal “(...) to use shadow money creation in order to create private substitutes for US Treasuries” (Braun & Gabor 2020), which also facilitated the emergence of the aforementioned instruments or structured assets, such as residential mortgage-backed assets.

In the case of the Federal Reserve, the discussion needs to be extended. Securitisation processes could not result without the creation of secondary mortgage markets, these markets being the result of the intervention of government-erected institutions. These interventions led to the emergence of Fannie Mae and Freddie Mac, so it was stated that in the mortgage market we were talking about “the visible hand of the government” (Immergluck 2004). Thus, Fannie Mae and Freddie Mac were helping to increase liquidity in the mortgage markets, given that “they purchase mortgages that meet certain standards from banks and other originators, pool those loans into mortgage-backed securities that they guarantee against losses from defaults on the underlying mortgages, and sell the securities to investors—a process referred to as securitisation” (CBO 2010). Freddie Mac was the very first institution to issue a mortgage-backed asset, back in 1983. And these secondary markets are essential because “(...) channels funds to borrowers by facilitating the resale of mortgages and mortgage-backed assets (MBSs)” (CBO 2010). In this way, Fannie Mae and Freddie Mac indirectly helped to globalize and financialize the mortgage markets, “it is the state that re-regulated the mortgage market to enable growth: the US government was actively involved in making the trade in residential mortgage-backed securities possible, in de-linking investment from place, and in facilitating liquidity/tradability” (Aalbers 2009), which means that these markets have become a global phenomenon, in which there is a risk shift from mortgage markets to financial markets (Aalbers 2008). And it was precisely the securitisation processes that led to the financialization

of the mortgage markets, as the structured assets resulting from this process began to be traded on the financial markets.

The performativity of future-oriented monetary policy

In recent decades, there has been a paradigmatic shift in the implementation of monetary policy, with central banks becoming *performative* entities that govern through expectations. Performativity refers to “being ‘able’ or ‘unable’ to transform the world” (McKenzie et al. 2007: 2) through theory, concepts and communication. But the history of central bank performativity did not emerge immediately after the disappearance of the Bretton Woods, there being a period of time dominated by monetarist thinking. Such thinking could be found at Switzerland National Bank (SNB), which made the targeting of monetary aggregates a source of influence of the Central Bank (Wansleben 2018; Friedman 2002), SNB being also among the first central banks to orient fiscal policy towards monetarist objectives (Wansleben 2018). This monetarist thinking was inspired by the Federal Reserve, which approached a monetarist experiment before making the transition to inflation-targeting. The inflation-targeting policy is based on “new neoclassical synthesis”, where central bank policy implementation is modeled by the Taylor Rule. This transition began in the 1990s. In this monetarist age, countercyclicity was ensured by the lack of transparency, more precisely, by the inability of economic agents to identify patterns based on the neutrality of money. Thus, the effectiveness of these monetarist policies was based on “(...) the inability of private agents to recognize systematic patterns in monetary and fiscal policy” (Lucas & Sargent 1979:58, qtd. in Braun 2017).

But the transition to ‘financialized capitalism’ made the targeting of monetary aggregates, which were the prerogative of a monetarist culture, to be abandoned in favor of money and financial markets, these being used as mechanisms by which monetary governability is ensured, in which the main objective became the better steering of short-term interest rates. Thus, the transition to inflation targeting took place, which is based on a performative function of the central bank, in which the activity of these market-based institutions can be seen “as an example of the present use of the future” (Esposito 2018), the role being the performative coordination of expectations. Central banks have thus become sources of logistical power (Joyce & Mukerji 2017). But this transition brought with it another innovation, namely the rise of central bank operational transparency, in which the central bank sought to give predictability to monetary policy actions, and, implicitly, to *narrativize* its activity, “(...) which, in turn, reduces the uncertainty in financial markets” (de Haan et al. 2007). Thus, the Fed and the ECB began to use financialization in their macroeconomic policy-making. As financialization grew in importance, central bankers began to perceive the money and financial markets as governable entities, dependent on expectations. Money markets are considered to be optimal monetary policy mechanisms due to their ability to inform central bankers about market expectations, therefore “are useful to central banks” (CGFS 1999). This was the point at which central bankers began actively communicating their intentions, which forced these markets to adjust to the objectives pursued by the central bank. In this way, the Fed and the ECB were able to performatively govern through expectations, which gave rise to ‘expectational governance’. In this direction, as the short-term interest rate has a high impact on wholesale borrowing costs and implicitly on liquidity access, this confirms the infrastructural entanglement between the financial sector and the central bank. But precisely setting a short-term interest rate confirms the future-oriented policy of the central banks, given that it can produce real effects today only if the expectations of the financial sector regarding its modification are positive. That is why it has been stated that the management of economic expectations plays a key role in the

implementation of monetary policy (Blinder et al. 2008). Starting from this statement, we understand that a central bank has a performative capacity only as long as it has credibility and its actions are in line with its own discourse.

This governance emphasizes that the central bank can control policy by directly influencing economic agents' expectations regarding inflation rate, stock market prices and so on (Beckert 2016) through a symbolic-communicative activity. In this way, central banks no longer base their policies on the rate of inflation per se, for example, but above all on expectations about it. Hence the statement that "expectations matter so much that a central bank may be able to help make policy more effective by working to shape those expectations" (Bernanke 2013). But this performative role gave a central bank the ability to narrativize the future and thus influence it. It has the performative ability to use its own imaginative mechanisms for direct purpose "(...) to produce decidability and actionability" (Power 2007: 5). In this way, narrativization aims to influence economic agents to adjust their financial behavior to suit the expectations created by the central bank. Through this narrativization, it is considered that a central bank can maintain stability in all those financial segments (i.e. money markets) or macroeconomic variables (interest rate) upon which the financialization resides. Thus, the central bank has the ability to control the valuation of financial assets, to help the optimal functioning of market liquidity, so that market-based financial structures become the main tools of monetary policy in the era of financialized capitalism. In this way, through the symbolic-communicative activity and implicitly narrativization, the central bank tends to create certain future-oriented expectations in which uncertainty, as a fundamental entity, becomes contingent, and the future "look like the present" (Martin 2007: 4). In other words, narrativization aims to coordinate the economic agents' expectations through a story-telling process, in which there is an imaginative function. That is why central bankers "are making the economy (...) as a communicative field" (Holmes 2014 qtd. in Braun 2015). Central bankers use narrativization and formalization to give a calculable meaning to uncertainty, by imagining potential situations that can be quantified and calculated, but also by formalizing some economic variables. Central bankers therefore base their policy-making on assuming the possibility of mathematically calculating the natural interest rate, the potential output, necessary for determining the mathematical models. It is precisely this imaginative character that gives central bankers the ability to introduce technologies necessary to intervene on these imagined situations, hence the statement that formalization "(...) of rules, policies, and procedures helps to ensure coordination and can therefore increase global integration" (Gibson & al. 2019). The formalization was achieved by introducing actualized computing devices through which the information is simplified and the future is narrated, such as indicators and graphs, which tell a story about the potential evolution of an economy, which could ensure a more efficient coordination process (Braun 2015: 371). But these computing devices had to be integrated into certain models in order to obtain a future-oriented significance, to become evaluation schemes. Thus, this coordination of expectations was necessary in the context in which there is no full knowledge of the fundamental structures of the economy (Pigeon 2011).

Thus, through narrativization and implicitly modeling, a central bank obtains the ability to exercise authority over expectations, to "govern the future" (Braun 2015). Modeling is important because it will be the basis for optimizing the behavior of economic agents, hence the statement that "the private sector could in principle not be modeled without specifying the monetary policy rule" (Poole & Rasche 2000).

This means that uncertainty cannot be avoided without narrative. It is precisely by imagining potential situations and offering formalized solutions that a central bank can become credible,

making a direct commitment to macroeconomic stability. And it is precisely this imaginative or narrative capacity of the central bank that makes economic agents rely on the fundamental analyzes of this institution, they consider that the central bank has the performative capacity to bring the future to the present, but also to coordinate expectations, which gives it credibility and allows it to achieve its goals, such as low inflation. This rate becomes a communicative problem, there is an intertemporal commitment to keep the inflation rate in line with existing models. This commitment led to a joint relationship, i.e. infrastructural entanglement, between the central bank and the financial system, in which there is a consensus policy between the two entities, with the Federal Reserve “following the market” (Blinder 2004).

But the drying up of post-crisis market liquidity led to a “crisis of discursive central banking” (Gabor & Jessop 2015), which forced the Federal Reserve to resort to a “balance sheet policy” (Borio & Zabai 2016) and a long-term interest rate focus, as we will discuss in the next two sections, to preserve the structured assets markets.

From performativity to actionability

In the next two sections will be analyzed the need for the interventions of the Federal Reserve and the European Central Bank to preserve the securitisation processes, the processes for which the two institutions were 'institutional enablers'. These interventions underline that the Fed and the ECB have become market-based institutions, being involved in the development of financial processes. Thus, starting from the active nature of financial and banking institutions, the Federal Reserve and the European Central Bank they had to implement other monetary instruments, giving up relying strictly on the symbolic-communicative dimension. In other words, these financial practices have strengthened the financial entanglement, with the two central banks having to ensure the optimal functioning of structured asset markets. Thus, as we specified, post-2007, as a “crisis of discursive central banking” (Gabor & Jessop 2015) emerged, both central banks made the transition to a “balance sheet policy”.

As we know, in the modern monetary system we find a complex shift to a market-based financial system, in which tradable securities and dealer-banks prevail, which connects cash portfolio managers, such as MMFs, with risk portfolio managers, such as hedge funds. Thus, the Federal Reserve began to play a role of dealer of last resort to preserve this system, necessary for effective monetary governability. In this direction, in the new monetary system, banks are only a component of liquidity intermediation chains, in which we find other participating institutions, such as shadow banks, but also an increase in the importance of wholesale money markets.

This role of dealer of last resort came naturally in the third stage of monetary interventions post-Lehman Brothers, the first two being the lowering of the interest rate from 5 to 2%, respectively emergency loans (Grad et al. 2016), which we will discuss in this section. Eventually, with the collapse of money markets, “(...) the Fed stepped in as dealer of last resort in the money market, standing between borrowers and lenders who had previously dealt directly with one another in the money market. This intervention more than doubled the Fed’s balance sheet in a matter of weeks” (Grad et al. 2016). Put differently, this was the moment when not only the composition of the balance sheet was affected, but also its size. Prior to this event, we witnessed the emergence of emergency lending programs, which we will discuss further.

After the beginning of the global financial crisis, the Federal Reserve sought to create new “centers of calculation” (Latour 1990), which would improve the effectiveness of interventions

in the context of the shadow banking system and changes in the traditional banking system. Before the financial crisis, Fed aimed to implement an atemporal monetary policy, in the sense that it tried to “pull the future into the present” (Hope 2010), in which the expectations about the future are a fundamental part of the present, as they have the performative capacity to produce results in the present. Which means that the future changes the present, the present becoming a consequence of the future and not vice versa. Thus, monetary policy resided in the governability of “present futures” (Esposito 2015), a future-oriented policy that takes into account the structural changes of modern finance. Post-crisis, the Federal Reserve's goal has been to provide a backstop that would incentivize financial institutions to re-commit to credit provisions. Which means that all the policies that we will discuss immediately do nothing but strengthen the Federal Reserve's finance-oriented policy making (Braun 2018), given the infrastructural entanglement between this central bank and the financial sector. As such, the Federal Reserve has made the transition from a discursive policy to active commitment policies.

At this point, the Federal Reserve governability seeks to ‘create the markets’, not just to follow them, which represents an abandonment of the communicative-symbolic function. This central bank had to implement other instruments to ensure monetary governability. In conditions of liquidity disruption, the communicative capacity of the central bank is altered, it loses its performative capacity and must be replaced by tools that directly shift the market expectations. These are necessary to avoid the expectational crisis. In the case of the Federal Reserve, emergency lending and the role of dealer of last resort implied the implementation of a fundamental change of macroeconomic governance that would fit the financial reality. Thus, the change in the governance paradigm followed as the risk perceptions of the financial sector and implicitly the functioning of market liquidity became essential post-crisis. In this way, the Fed aimed to introduce two novelty processes. First, it turned macroeconomic governance into a strategic problem (Morris & Shin 2008: 88), in which financial expectations must be directly supported by active balance sheet policies, through the transition to the dealer of last resort role. Second, the asset purchasing programs were aimed at “creating the market”, the purpose being also to influence the long-term interest rate and to create a context in which securitisation processes can continue to function, the latter complementing the first objective.

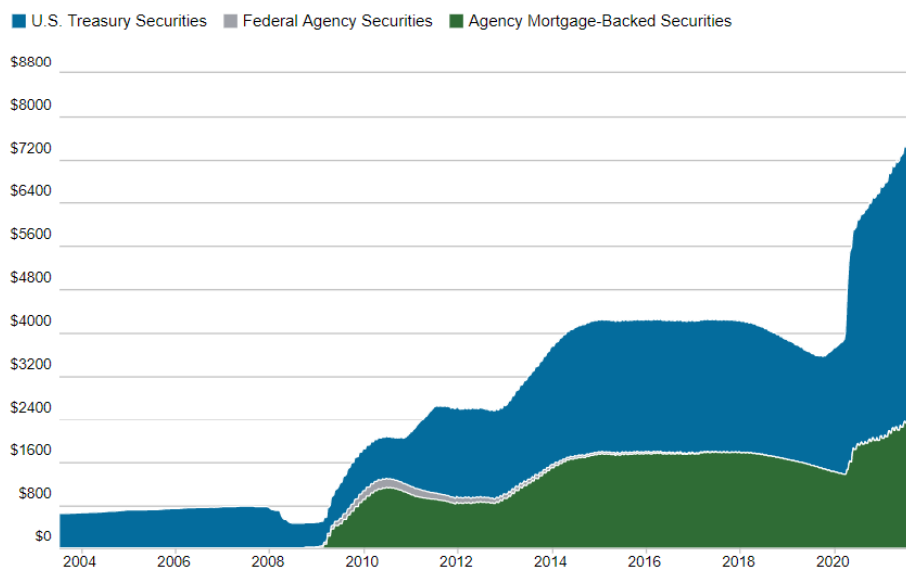
Federal Reserve aimed to create markets by introducing two facilities, namely Term Auction Facility (TAF) and Term Securities Lending Facility (TSLF). The first facility aimed to lend reserves through auctions over a specific period of time, “initially \$20 or \$30 billion, then \$50 billion, and then \$75 billion per auction for terms of 28 or 35 days” (Cecchetti 2008). These loans were collateralized, but unlike the Bagehot rule, the Fed allowed depository institutions to pledge illiquid collateral, such as mortgage-backed assets. Through this facility, the Federal Reserve's balance sheet size has not undergone any changes, as these loans have offset the decrease in outright holdings of securities. But the permissibility to use these illiquid collateral in the form of structured assets was a direct attempt to keep the ABS market active (Cheun et al. 2009). The second facility was a pivotal shift in Federal Reserve strategies (Geithner 2014: 143). This facility was centered on tri-party repo markets. TSLF allowed primary dealers holding agency debt or mortgage-backed assets (MBS) to exchange these structured assets for Treasury securities for a period of 28 days, securities that could then be used in repo markets to meet liquidity needs. Thus, the Fed also became a securities dealer. After these introductory discussions, we noticed that the Federal Reserve not only intervened in the ABS market, but also in the mortgage-backed assets market, these structured assets being essential in the new financial structure. Put differently, as these structured assets played the role of collateral, the worsening market conditions led to a vertiginous increase in haircuts applied to them. Equally, the foreclosure of this market tended to affect securities dealers. Which means the Federal

Reserve had to intervene in this private market, to preserve the liquidity of the system. Especially since the disappearance of this market would have irreparably affected the securitisation market and the implicit private production of collateral. Thus, “from the start of 2008 through the end of 2016, the U.S. central bank’s balance sheet grew from \$900 billion to \$4.5 trillion, with assets now principally consisting of long-term U.S. Treasury notes and bonds (\$2.3 trillion) and mortgage-backed securities (\$1.8 trillion)” (Cavallo et al. 2018). And it is precisely these private interventions in the MBS market that have allowed the continuation of securitisation processes, “(...) knowing that the Fed stood ready to buy, Fannie and Freddie stood willing to purchase and package mortgages” (Grad et al. 2016), which was a performative effect from the Fed. Thus, we observe the Fed’s attempt to act on long-term interest rates through the asset side of its balance sheet, important given that short-term interest rates are already at zero lower bound. Thus, it is no longer based solely on expectations, but on the direct action by which it compresses long-term yield.

Last but not least, another facility that confirmed this infrastructural entanglement was the Primary Dealer Credit Facility (PDCF), which confirmed the important role played by securities dealers in the new financial structure. This facility was created in March 2008 and provided access to traditional Federal Reserve facilities to non-bank primary dealers, such as broker-dealers. At the same time, through this facility, the Federal Reserve “(...) opened the discount window to investment banks for the first time since the Great Depression” (Paulson 2010: 116). Through this facility, non-bank primary dealers could borrow again using structured assets as collateral, such as MBS and ABS. Thus, the Fed again ensured that the securitisation processes will continue to work, as this facility aimed “to reduce interest-rate spreads between the asset-backed securities that can be used for collateral in these loans and U.S. Treasury securities, thereby improving the ability of investors to buy and sell asset-backed securities in financial markets” (Cecchetti 2008), which facilitated the reuse of these structured assets in private markets, given the backstop offered by the Fed.

Finally, post-2008, central banks began to fulfill a role of market maker of last resort, which confirmed the increasing influence of the financial system in monetary governability.

In other words, as “the intensifying financial turmoil over the course of 2008 required larger and larger injections of liquidity into the financial system and made it infeasible for the Federal Reserve to sterilize the resulting increases in reserve balances by redeeming or outright selling Treasury securities from the System Open Market Account (SOMA) portfolio” (Bech et al. 2012), The Fed has made the transition to a floor operating system, in which a massive balance sheet prevails. Thus, “(...) the Fed moved to replace its temporary loans to various elements of the financial sector with permanent holdings of mortgage-backed securities, essentially loans to households” (Mehrling 2010). At the moment, the Fed’s balance sheet is close to \$8 trillion, with US Treasury (UST) and mortgage-backed assets representing the main holdings.



Source: Federal Reserve Bank of New York, 2020.

This transition allows the Federal Reserve to fulfill with greater ease the accommodation of reserves not only to the banking system, but also to other institutions relevant for the transmission of liquidity in the new market-based financial system, such as broker-dealers or Money Market Funds (MMFs). Put differently, this transition naturally followed active interventions in the financial system, being specifically designed to provide a broader backstop to new financial institutions. Thus, for the first time, liquidity and credit structures have become policy concerns, the Federal Reserve becoming a stabilizer, an essential function when a communication crisis has occurred. Through these interventions, the Federal Reserve has ensured that it anchors the confidence of economic agents in the ability to maintain financial stability and governability on long-term. Thus, post-crisis, the new paradigm of governability is not low inflation, but market liquidity management and long-term interest rates, which once again highlights the importance of finance in macroeconomic governance and implicitly in economic growth.

ECB, structured assets and the public backstop of securitisation markets

The evolution of private money production has forced a rethink of monetary policy, “from state institutions to markets” (Krippner 2011). This evolution underlines the public-private hybridity of the financial system (Pistor 2013), given the integration of financial markets with the central bank, where the production of money is private and the liquidity backstop is public. And this integration refers to the tools and purposes of interaction of monetary policy with the private sector, especially when we emphasize that a central bank governs through financial markets, which gives these markets greater importance in the new financial system, “(...) central banks have always shaped financial markets – by changing how they transact with private counterparties, by privileging certain types of financial instruments over others, by building up entire market segments, or by lobbying governments for policy changes” (Braun et al. 2020). This means that central banks are obliged by circumstances to ensure the optimal functioning of financial markets in such a way as not to affect their governability capacity. That is why they have also resorted to certain monetary innovations to preserve the current financial structure, as we will discuss further. Thus, we understand that central banks are not exclusively regulatory

entities, but these public authorities actively participate in financial markets (Hockett & Omarova 2014).

As an infrastructural entanglement prevails between the ECB and the financial sector, this central bank has sought to preserve market liquidity by continuing securitisation processes, which allows it to coordinate in a distinct way the expectations of economic agents. In this direction, the ECB also gave up discursivity and began to actively use its balance sheet, aiming to “change public expectations of their actions tomorrow in a way that improves macroeconomic performance today” (Campbell et al. 2012). Thus, post-crisis, the performativity of the ECB came through the decisions to include longer-term bonds in the asset purchase program (APP), this central bank assuming the role of market maker of last resort. The announcement of these acquisitions was intended to change expectations, not only through the portfolio rebalancing channel, but also through expectations regarding the financial implications of these acquisitions. The mere announcement of the acquisition of assets and the implicit guarantee that the ECB will do “whatever it takes” made economic agents get involved in new securitisation processes.

Indeed, there were secondary objectives. For example, the decision to include corporate bonds in APP is not related to price stability, but to an independent motivation, “which is to support the European Commission’s project for a Capital Markets Union (CMU)” (Klooster & Fontan 2019). This Capital Markets Union would help to diversify sources of income, but also to an easy transmission of monetary policy. It would also help promote market-based finance, which would be an alternative to the bank-based economic system (Braun & Hubner 2020). That is why it has been stated that “(...) ECB acts as a genuine market maker in supporting the corporate securities market and promoting the Capital Markets Union project” (Klooster & Fontan 2019), which was also confirmed by the inclusion of asset-backed securities in the APP. Also, “by taking suddenly-illiquid ABSs onto its balance sheet, the ECB gained leverage over the securitisation market, while at the same time becoming more dependent on it” (Braun 2018), which means that the ECB has been looking performatively to improve the securitisation capacity and to ensure the functioning of market liquidity today. In the absence of these interventions, securitisation would have lost its importance, which would have affected the volume of eligible collateral, with negative effects on interbank and repo interest rates, and this would have affected the transmission of monetary policy. In this way, the ECB actively participated in the creation of market liquidity during a period when it dried up, knowing that the performative activity aimed at maintaining active securitisation processes is dependent on the *ex post* effects expected by economic agents. This is exactly what made the ECB play an important role in this structured asset market also through the loan-level data initiative, which ultimately led to Securitisation Regulation through Regulation (EU) No 2017/2402. This regulation is important because it has created a framework for the STS securitisation, i.e. simple, transparent and standardized securitisation. This framework aimed to increase transparency in the ABSs market, becoming an optimal mechanism for the transmission of liquidity in the financial markets. Otherwise said, “the creation of STS securitisations represents a new age for EU Securitisations” (Shiren & Collins, 2019). The very involvement in this regulatory process, which exceeds the attributions of a central bank, represented a performative paradigm shift, this being a guarantee of the securitisation market support.

That is why the European Central Bank also responded with changes to the Eurosystem collateral framework, which once again confirms the infrastructural entanglement. As the interactions of the central bank with private markets take place through collateralized transactions – repurchase agreements -, this public authority can modify market practices,

reordering the risks of assets that will play a role of collateral. Thus, ECB can affect this collateral framework through two channels, the scarcity channel and the structural channel (Corsi 2019). In the case of the first channel, ECB intervenes through repo transactions or outright purchases in the supply of collateral, which affects their availability. In the case of the structural channel, the ECB "(...) affect the degree of pledgeability of assets" (Corsi 2019), by changing haircuts or the eligibility criterion. Or even by modifying the institutions' access to the permanent facilities of this central bank. This confirmed the ECB's objective to do "whatever it takes".

In the case of ABS, ECB intervened through the structural channel. In other words, until 2014, ECB steadily lowered the eligible rating of ABS, from A-in 2010 to BBB - in 2014, which led to the situation in which "banks did not hold on to those securities, however, but pledged them as collateral to obtain reserves from the ECB" (Braun 2018). In this way, ECB has used a quasi-floor system applicable to the prices of these structured assets. This gave them increased protection and actively participated in the continuation of these financial practices.

Returning to the asset purchase program, this was the moment when the ECB's balance sheet changed not only its composition, but also its size, an event that led to the emergence of the role of dealer of last resort, especially in ABS market. This program was called The Asset-Backed Securities Purchase Programme (ABSPP) and it was precisely aimed at preserving securitization in the euro area. In other words, it represented "a signal from the ECB to markets of its belief that this asset class is an important and sound one" (Bindseil 2015).

This supply of excess reserves led to the change of the monetary operating system, namely the appearance of a floor-type operating system and a massive quasi-permanent balance sheet. Put differently, until October 2008, ECB estimated the liquidity needs of the banking system, and based on these estimates offered liquidity in the form of collateralized loans to commercial banks. Then there was an auction of commercial banks to obtain this liquidity. At the end of the process, the banks that obtained this liquidity indirectly performed a role of primary dealers, which means that they redistributed the liquidity obtained in the interbank system. But the global financial crisis has dried up the interbank market, with commercial banks avoiding redistributing liquidity, raising interest rates on these auctions. That is why, with 2008, ECB switched to a fixed-rate full allotment system, which means that the existence of eligible collateral allows commercial banks to directly borrow all the necessary liquidity, without the need for auctions. This means that this system allows commercial banks to borrow more than in the previous system, this factor also contributing to the increase in excess liquidity. But we emphasize once again the importance of eligible collateral represented in the form of structured assets, such as ABS.

And this transformation underlines once again the infrastructural power of finance, the type-floor system allowing the European Central Bank to formally pursue the objective of financial stability but also keep money market rates low, "(...) an important – albeit by no means the only – role of excess liquidity is to firmly anchor short-term interest rates at the levels judged appropriate by policymakers" (Coeure 2019). But, equally, there is a greater footprint of the financial system in the Eurosystem's monetary policy. At the same time, this new system is "robust to a further expansion of the balance sheet to serve monetary policy or other policy objectives" (Resinek 2019), which means that the ECB will be able to expand its interactions with private financial institutions on behalf of its monetary policy objectives, becoming a financial market-maker.

Conclusions

This paper detailed the performative role that a central bank played in the era of inflation targeting, which depended on the financial sector for both monetary governability and coordination of expectations. One way in which this monetary governability was ensured was through securitisation, which actively participates in the emergence of new collateral usable for the implementation of monetary policy. This is why finance gains a structural power that underlies infrastructural entanglement with central banks. This performativity was based on the symbolic-communicative dimension of the central bank, a dimension that changed post-crisis, when a “crisis of discursive central banking” emerged. At that point, the Fed and the ECB were required to make a commitment to directly rescue these securitisation processes by adopting a balance sheet policy, necessary given that market liquidity was drying up. Thus, along with this point, the communicative role of the central bank has diminished, increasing in importance the active use of the balance sheet, but also the targeting of the long-term interest rate. In this way, central banks have gone from ‘following the market’ to ‘creating the market’.

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The mathematics of profit maximization is incorrect

Philip George [India]

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Abstract

Profit maximization is one of the two main optimising principles of neoclassical economics, the other being utility maximization. In this paper we draw on Chapter 6 of John Maynard Keynes's *General Theory* to show that the mathematics of profit maximization is incorrect. We show, moreover, that marginal cost, a variable fundamental to neoclassical economics, cannot be calculated. We explore the implications for sticky prices, increasing returns, the shape of the supply curve, and market clearing. Finally, we argue that an important reason for the failure of neoclassical economics is that while it pays a great deal of attention to the influence of future expectations on present decisions, it completely ignores the past.

1. Introduction

Most critiques of profit maximization are empirical, arguing that firms in the real world seek to maximize, not profits, but revenue, market share or some other metric. Other critiques, e.g., by Kenneth Arrow (Arrow, 1979), have dwelt on the sociological and moral objections to the profit system. The mathematics itself is rarely challenged. The assumption is that firms can, if they wish to, abide by the mathematics of profit maximization. This paper shows that it is not possible to do so.

2. The Mathematics

We use the math of profit maximization as found in Paul Samuelson's *Foundations of Economic Analysis* (Samuelson, 1947). Current expositions do not vary from this in any significant manner.

"I take as a datum the maximum amount of gross total revenue which can be secured for each level of output. This may be written

$$R = R(x)$$

Let us define profit, net revenue, as the difference between gross revenue and total expenditure,

$$\pi = \pi(x, w_1, \dots, w_n) = R(x) - A - V(x, w_1, \dots, w_n)$$

[Here π is the profit, x is the output, w_1, w_n are variable inputs, A is the fixed cost, and V is a function of output and variable inputs.]

Output will be optimum when profit is at a maximum. Necessary conditions that this be so when all functions are differentiable are

$$\frac{\partial \pi}{\partial x} = \frac{\partial R}{\partial x} - \frac{\partial V}{\partial x} = 0$$

$$\frac{\partial^2 \pi}{\partial x^2} = \frac{\partial^2 R}{\partial x^2} - \frac{\partial^2 V}{\partial x^2} \leq 0$$

Assuming that we have a regular relative maximum, this becomes

$$\frac{\partial R}{\partial x} = \frac{\partial V}{\partial x}$$

$$\frac{\partial^2 R}{\partial x^2} \leq \frac{\partial^2 V}{\partial x^2}$$

This is the familiar theorem that at the optimal output the marginal revenue curve must intersect the marginal cost curve from above" (p. 76).

Samuelson begins by considering the fixed cost as a factor determining profit but in the final equation it vanishes, having been differentiated out of existence. So far as decisions about the final output or price are considered all that matters is the marginal cost; the fixed investment might as well not have been made.

3. Chapter 6 of the *General Theory*

Chapter 6 is probably the most difficult, most neglected and least understood part of Keynes's *General Theory* (Keynes, 1936). Rather than try and explain what Keynes was getting at in the chapter by a direct exegesis I resort to a simple example.

Imagine that you are setting up a hamburger stall. The fixed investment (cost of the structure, equipment etc) works out to \$1,000. The cost of bread, meat, culinary ingredients, labour and other variable inputs is \$1 per burger. You decide to price each burger at \$2. If your belief that people will like your burgers is right you can recover the fixed investment after 1,000 burgers. Until then you make no profit. If your estimate about the market does not work out you will have to shut down the burger stall before you recover your fixed investment.

The first point to note is that you cannot take the price of burgers as "given". The price must be set by you and you have to do it in such a way that you recover all your costs. The second point is that your pricing has to take account of fixed costs. Believing otherwise is to imagine that a shoe manufacturer will invest millions of dollars in a new plant and then price her shoes considering only variable costs, because the cost of the plant is (in the language of economists) a sunk cost and can therefore be ignored. If she were to go by Samuelson's equations the shoe manufacturer would never survive.

This is the point that Keynes sought to explain in Chapter 6: a firm cannot ignore fixed costs when setting the price of its product. Not content with devoting a whole chapter to the idea he went on to elaborate it in an appendix to the chapter. Keynes could well have been anticipating Samuelson and all of neoclassical economics when he wrote: *“Indeed, the notion that the disinvestment in equipment is zero at the margin of production runs through a good deal of recent economic theory. But the whole problem is brought to an obvious head as soon as it is thought necessary to explain exactly what is meant by the supply price of an individual firm”* (p. 72).

The trouble with Samuelson’s analysis is that he believes the firm takes the price of its product as set by the market and decides how much to produce. In reality the firm sets the price of its product and lives with the uncertainty of how much of its output will be bought by the market. The signals it receives from the market are not price signals but quantity signals. The output of the firm is indeed a variable but, in the final analysis, it is decided by the market, not by itself. As so often in economics, the assumptions of the problem are framed the way they are, not because they align with reality, but purely with an eye to mathematical amenability.

After that broad criticism it is time to zero down on the exact mathematical error in Samuelson’s analysis. If the output is the variable being analysed then the fixed investment is not a constant but a variable. It is a decreasing function of output. With each unit of output the fixed cost is reduced by the difference between the price and the marginal variable cost. In our example, the fixed cost as seen by the second burger is not \$1,000 but \$999, because in selling the first burger at \$2 you have recovered \$1 of your fixed investment. The fixed cost after the second burger has been sold is \$998, and so on. Since the fixed cost is a variable dependent on the output, differentiating it does not eliminate it. It vanishes from the equation only after it has been completely recovered.

So, the conclusion that Samuelson derives – that the optimum output occurs when the marginal revenue curve cuts the marginal cost curve from above – is not a universal one but applies only to that subset of firms which have completely recovered the cost of their investment (we assume one-product firms for convenience). Even that may not be true unless it is assumed that the firm can sell all it produces. But that assumption too is part of Samuelson’s analysis, though it is not explicitly stated. Samuelson assumes that the firm is so small relative to the market that it cannot affect the market price but has to take it as given. But this also means that the firm is so small relative to the market that it has no problem selling everything it produces.

As soon as it is recognised that a firm’s pricing must take account of its fixed cost, one is confronted with an insurmountable problem: it is impossible to calculate the marginal cost of output. In our example, how do we distribute the fixed cost of \$1,000 among burgers? If a thousand burgers are sold at \$2, we can distribute the cost among the thousand burgers. But this can be done only after the thousand burgers are sold. It may well be that the hamburger stall has to be shut down before that point because there is no market for burgers. On the other hand, the structure of the stall and the equipment may last as long as 10,000 burgers. In that case each burger would involve a fixed cost of only 10 cents. Or the equipment may last 50,000 burgers and the equipment 10,000 burgers. There is no way that the cost of a burger can be calculated at the margin.

Another point, though, can be asserted without hesitation. As the demand for burgers rises the fixed cost can be recovered faster and the burger can therefore be priced lower. If only 1,000

burgers can be sold each burger must be priced at a minimum of \$2 to break even. If 2,000 burgers can be sold each burger can be sold at \$1.5 and the seller could still break even. Or, to put it another way, as quantitative demand rises the price at which the stall owner is willing to sell burgers falls. This calls into question the conventional shape of the supply curve: it is not inevitably upward sloping but can be flat or even downward sloping.

From the example it is also clear that as demand rises the capitalist enjoys increasing returns. When economists talk of returns they mean technological returns. To take two commodities much loved by economists, if 2 tons of wheat and 3 tons of steel are used to produce 7 tons of steel, then producing 14 tons of steel requires 4 tons of wheat and 6 tons of steel when technological returns are assumed to be constant. When capitalists talk of returns, though, they mean monetary returns. Fixed costs do not appear in the economist's calculations. But when the capitalist produces (and is able to sell) 14 tons of steel instead of 7 tons, her fixed investment is spread over a larger output, she is able to recover it faster, and thus earn a higher profit. Her returns increase with output. Technological returns may well be constant or even diminishing while monetary returns are increasing, and for the capitalist it is the latter that matters. For the capitalist, output maximization *is* profit maximization.

If firms love to merge and increase their scale of production it is primarily for this reason. A larger share of the market means that uncertainty about demand is reduced and fixed costs can be spread over a larger output. Unit costs therefore come down, though that is evident only in the aggregate, not at the margin. Prices can be reduced to boost demand so that even if the rate of profit falls, total profit increases. A small firm may have a very high rate of profit but if its business cannot be scaled, its profits are limited. What matters is total profit, not the rate of profit.

A similar misunderstanding explains why economists are surprised that wages are sticky during a recession. Just as the capitalist is not interested in the rate of profit but only in total profits, so she is not interested in the wage rate but only in the total wage bill. In a recession, the latter can be reduced by leaving the wage rate unchanged but cutting the number of workers on the rolls.

There are other implications as well. When fixed costs are taken into account it is possible to explain why prices are sticky downwards during a recession. In the world of neoclassical economics, when a capitalist finds some of her output unsold, all she has to do is reduce prices until her unsold inventory disappears. In the real world it is not so easy. When demand (and output) falls the capitalist needs to *raise* prices; she cannot afford to cut them. The reason for downward price stickiness is not menu costs or aggregate-demand externality or anything else but the presence of fixed costs that have to be recovered.

Fixed costs also explain why reducing interest rates during a recession has very little effect on investment but merely raises the prices of financial assets. The fall in demand means that even existing investments take longer to be recouped so there is no point in making further investments; the advantage of lower interest rates is dwarfed by the disadvantage of lower demand.

4. What do real capitalists think of marginal cost?

Between April 1990 and March 1992 Alan Blinder, a prominent US economist (he was to be vice chairman of the Federal Reserve Board from 1994 to 1996), interviewed 200 large firms representing 85% of US private, nonfarm, for-profit, unregulated gross domestic product (GDP). The objective was to understand why prices are sticky, not by constructing yet another theoretical model, but by asking the players in the market themselves.

Our interest here is not in the entire study (Blinder, 1994) but in that part of it which concerns marginal cost and the shape of the marginal cost curve. The answers turned out to be so surprising that Blinder (and the interviewers) were not sure that the interviewees had understood what marginal cost really meant. Apparently, the term marginal cost was “not in the lexicons of most businesspeople” (p. 141). The question was therefore translated to “How would you characterize the behaviour of your own variable costs of producing additional units as production rises?” (ibid).

Blinder wrote:

“This proved a difficult question. It often had to be repeated, rephrased, or explained. Even so, 10 of our 200 respondents were unable to answer it. The other 190 executives answered in their own words, sometimes at great length, and interviewers classified the responses into one of five categories offered on the questionnaire” (ibid).

And:

“When juxtaposed against the standard neoclassical assumption that panel e [rising marginal cost] is the rule, the answers are stunning. Only 11 percent of firms reported that their MC [marginal cost] curves are rising (panel e). By contrast, 40.5 percent claimed that their MC curves are falling, presumably *globally* (panels a and b). The good news for the constant marginal-cost theory is that approximate constancy of MC (panels c and d) is the modal case — encompassing 48.4 percent of GDP. The bad news is that this group accounts for less than half of GDP and that almost as many firms say they have *falling MC*” (ibid).

Blinder found the answers difficult to stomach, going as they did against conventional wisdom.

“My own experience as an interviewer leads me to discount these results somewhat because many executives had difficulty understanding the question. Some may have confused marginal cost with average cost (AC), and it is surely not surprising that many firms have falling AC curves. Nonetheless, the discount would have to be pretty severe before we read figure 4.1 as saying that rising MC is the norm” (ibid).

In the light of what we said previously there is nothing surprising in the responses that Blinder got. Firms do not understand what marginal cost is because the thing does not exist. On the

other hand, when firms calculate cost per additional unit of output, they take into consideration fixed costs as well. And when that is done it is obvious that costs fall or remain constant for most firms as production increases.

5. Market clearing, or its absence

Blinder's survey also tells us that market clearing is not the inevitable occurrence that neoclassical economics assumes but a relatively rare phenomenon.

The quantity of goods sold always equals the quantity of goods bought. But that is not market clearing. It is a tautology by virtue of the definition of buying and selling. The concept of market clearing is better understood if we ask ourselves what we mean by the absence of market clearing. And an appropriate definition is: *If firms in an industry are willing to sell more than they do at present if the price of their product remains constant or even falls, then we can say that the market for that industry is in a state of non-clearing.* And conversely, if firms in an industry are not willing to sell more than they do at present unless the price of their product rises then we can say that the market for that industry is in a state of clearing.

In Blinder's survey only 11 percent of firms reported that their costs were increasing with output. Or what amounts to the same thing, 89 percent of firms would have been willing to sell a greater quantity at the current price or a lower price if the demand was forthcoming. But that amounts to saying that only 11 percent of firms experienced market clearing; the rest did not.

6. The absence of a past in neoclassical economics

Many of the errors in neoclassical economics, such as the mathematics of profit maximization, can be attributed to a single cause: the absence of a past.

In formulating the theory of profit maximization, neoclassical economics assumes that the firm makes its daily decisions unencumbered by the past and purely considering the future. But, of course, this is not the case. As soon as the firm makes a fixed investment its primary concern is to recover the cost of that investment. Its past decisions weigh heavily on the pricing decisions it makes today. The fixed investment it has made affects the shape of its supply curve (flat or downward sloping) and the leeway it has in cutting prices in the event of a fall in demand (very little). In neoclassical economics a firm suffers no change in its profit if it cuts prices, but in the real world that is not the case.

A parallel assumption runs through consumer choice theory, which assumes that prices are the only variables the consumer takes into account while making decisions about what and how much to buy. Thus, a common assumption is that if all prices in the economy, including the price the consumer gets for her own labour, are doubled or halved the amount of goods bought will remain unchanged. In practice, we know that this is not true. During the Great Recession, to take a recent example, prices fell at the same time that GDP fell.

The reason was the fall in asset prices, mainly of housing and stocks. An indicator of the loss that consumers suffered in the crash is that the net worth of the median US family in 2010 fell to the level it had in 1992 (Federal Reserve Bulletin, 2012). To make up for that 18-year loss in accumulated saving, families cut their consumption for years with a resultant fall in the growth

rate of GDP. The primary concern of households was to recover their lost saving. To that end they cut the quantity of their purchases. When firms, confronted with a higher inventory, then cut the prices of their goods, households did not respond by increasing their consumption in quantitative terms; instead, they used the opportunity to further increase savings. If they were maximizing anything at all at that point, it was saving. The destruction of their accumulated saving in a market crash that occurred in the past played a controlling part in their behaviour for several years into the future.

It is this behaviour by consumers and firms that violates a key assumption of neoclassical economics. To quote from Arrow's Nobel Prize lecture (Arrow, 1972): "Clearly, if all prices are multiplied by the same positive constant, the budget constraint for households is really unchanged, and hence so are the consumer demands. Similarly, the profits are multiplied by a positive constant, so that the profit-maximizing choice of a firm is unchanged. Hence, the functions $x_{hi}(p_1, \dots, p_n)$ and $y_{fi}(p_1, \dots, p_n)$ are homogeneous of degree zero in their arguments" (p. 114).

This assumption, that household demand functions and firm production functions are homogeneous of degree zero, runs through all of neoclassical economics, from proofs of general equilibrium to expositions of consumer choice theory. Since it is untrue it follows that most of neoclassical economics is incorrect.

If I am permitted to end this section on a somewhat facetious note: if neoclassical economics has no future, it is because it has no past.

6. Conclusion

In making their pricing decisions firms have necessarily to keep their fixed costs in mind. As soon as this fundamental truth is recognised, we can understand why the math of profit maximization is incorrect, why prices are sticky during economic downturns, why the conventional shape of the supply curve must be questioned, why firms normally experience increasing returns, and why market clearing is not a given.

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The ‘Great Disinflation’: The Importance of the ‘China Factor’ Is Overstated. A Note

Leon Podkaminer [The National Bank of Poland]

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Abstract

Contrary to common beliefs China’s integration into the global manufacturing system does not seem to have depressed the wage shares in the advanced countries. If anything, it also failed to raise unemployment rates in the advanced countries. The ‘Great Disinflation’ theory advanced by Goodhart and Pradhan is unconvincing and so is their conclusion that the approaching great demographic reversal augurs an inflation revival.¹

Keywords: globalisation, wage shares, inflation, demographic reversal

JEL Codes: E24, E31, F15, F62

The recent work by Goodhart and Pradhan (2020) suggested that the long era of low inflation might be coming to an end: ‘... globalisation and demographic shocks have led to an extraordinarily deflationary trend over the last 30 years ...’ (p. 9). ‘The integration of China into the global manufacturing complex by itself more than doubled the available labour supply for the production of tradeable products among the advanced economies’ (p. 2). ‘... The economic effects of this have been a dramatic ... weakening in the bargaining power of the labour force ... no wonder that the deflationary forces have been so strong ...’ (p. 5). But ‘... The Great Reversal Is Now Starting ...’ (p. 9): ‘... a sharp decline in the number of those entering the labour force ...’ plus increased demand for labour needed for looking after the elderly, whose numbers will increase very strongly and rapidly (p. 11).

This Note argues that the effects of China’s integration into the world economy may not have had much of a disinflationary effect on the advanced economies until relatively late. Moreover, it suggests that the repression of wages in the advanced economies took place *before* the full-scale integration of China into the global trading system. Demography need not have been responsible for the repression of global inflation. Therefore, the approaching demographic reversal does not necessarily augur a revival of high inflation.

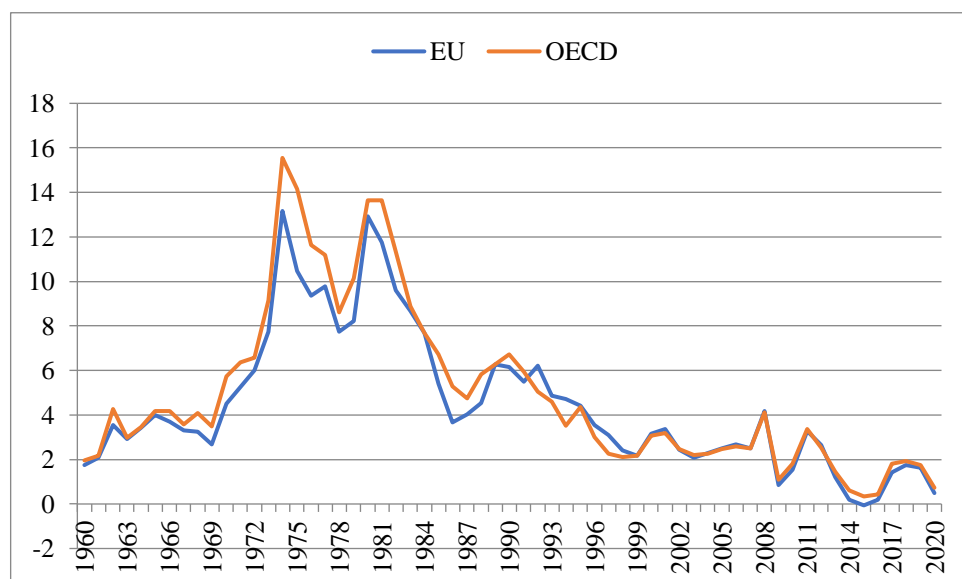
¹ The views expressed in this text are those of the author and do not necessarily represent the views of the author’s employer.

A brief history of disinflation in advanced economies

The collapse of the Bretton Woods system in the early 1970s coincided with inflation rising in the advanced economies. The two exogenous oil-price shocks (1973 and 1979) hitting the global economy provoked high inflation which peaked in 1975 and 1980-81 (see Figure 1).

Moderate/low inflation (starting from around the mid-1990s) was preceded by several years of gradual disinflation which may be attributed to several factors. First of all, a plunge in oil prices (1986). Besides, economic growth during those years, additionally punctuated by recessionary episodes (1981-82, 1993), was anaemic. Later recessionary episodes (2002-03, 2008-09, 2012-13) occurred already during the low inflation years. Those episodes may have kept inflation under control as well. Low and unstable growth itself was, arguably, a consequence of economic policies enacted, especially in the 1980s and until the mid-1990s. During these years real interest rates were abnormally high: the monetary policies were instrumental in restricting both inflation and economic growth.

Figure 1: Inflation in the advanced economies since 1960



Source: WDI

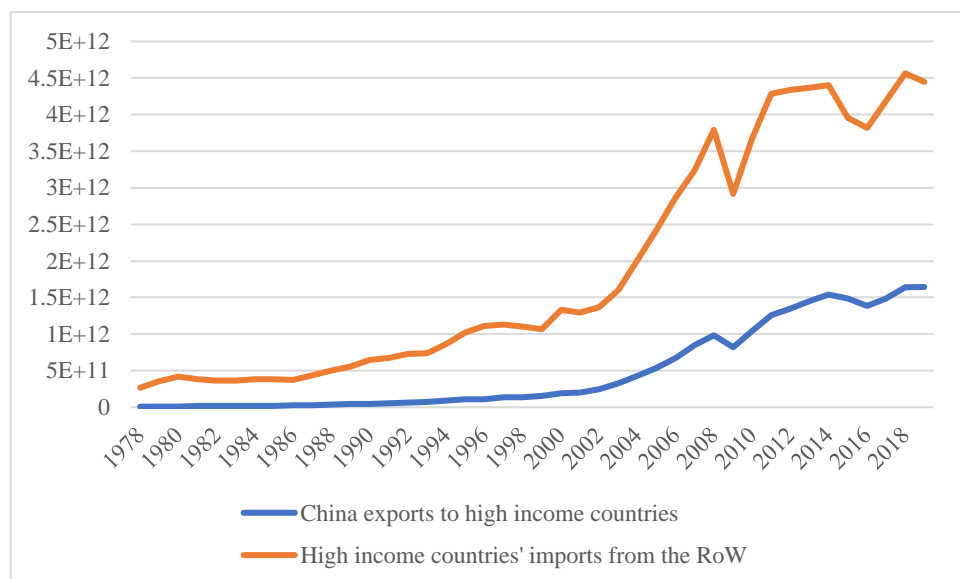
The 'China factor' may have operated since about 2005 but ...

China entered the World Trade Organisation in 1997. But it took several years for China to become an important partner of the advanced countries.² Chinese merchandise exports to high income countries had long been insignificant as compared with the high-income countries'

² The same applies to the former Central and East European 'planned economies'. In the early 1990s these countries experienced 'shock therapies' (administered by the fans of the 'Washington Consensus'). The 'therapies' were followed by long and dramatically deep recessions. These countries' industrial capacities were (unconstructively) destroyed in the process. Later (around or after 2000) Central Europe (but not Ukraine or Russia) was gradually integrated into the global (actually West European) economy.

merchandise imports from the rest of the world (i.e. from the low and medium income countries)³. Only by 2003 Chinese exports to the high income countries started to rise (Figure 2).

Figure 2. Chinese merchandise exports to the high income countries and merchandise imports from the rest of the world by the high income countries (in USD)



Source: WDI

The integration of China into the global economy effectively started around that year, not quite ‘30 years ago’⁴. Until that year Chinese exports to high income countries were minute compared with total imports of the high income countries, or even relative to their imports from other low-to-medium-income countries. Thus, it is perfectly reasonable to expect the post-2003 developments to have had some impact on the economic fates of the latter. But there is little justification for the claim that China’s exports could have played a significant role in the initial years of intensified globalisation (since around 1990 until the early 2000s).

... it did not affect wage shares in the high-income countries

The presumed deflationary consequences of China’s integration into the global economy should have materialised through the repression of wages in the high-income countries (via a

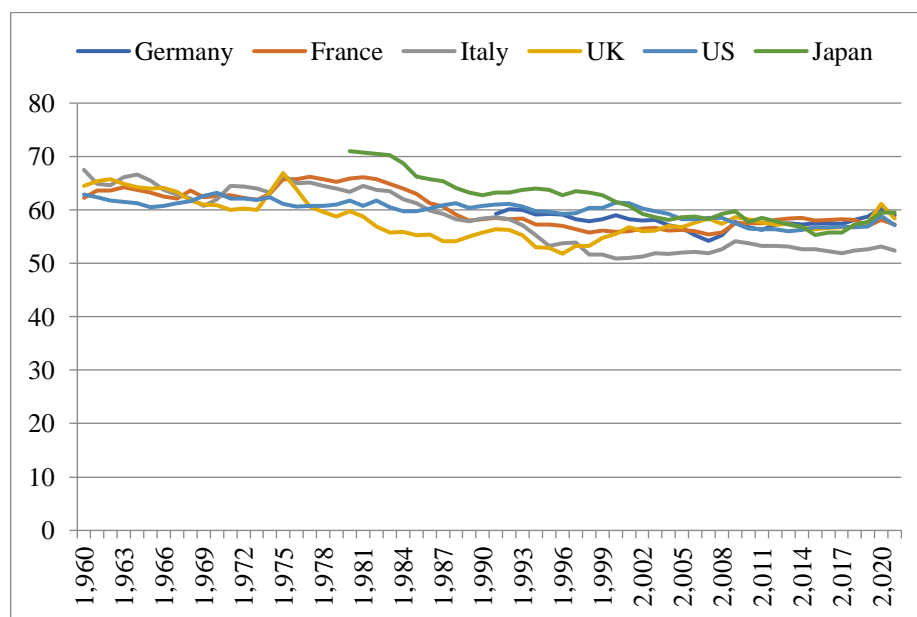
³ The high income countries trade primarily with themselves. Collectively their ‘inward’ trade accounts for about 70 percent of their total merchandise exports and 65 percent of their total merchandise imports. Imports from China accounted for 3.5 proc. of the total merchandise imports of the high income countries in 1997. By 2004 that share had increased to 6.8 proc. Recently that share is about 13 proc. (down from the peak of 14.2 in 2015).

⁴ Goodhart and Pradhan book ‘was mainly written in 2019’ (p. 213). The implied starting date for China’s entrance into the global economy is 1989 – much too early by any account.

‘dramatic weakening of the labour’s bargaining power’). But this presumption is hard to square with the available data on the (adjusted) GDP labour share.

Figure 3 suggests that the GDP wage shares in the major advanced countries had followed declining trends until the early 1990s. Later on, these shares either stabilised or even rebounded slightly (see Table 1).

Figure 3: Adjusted GDP labour shares, major advanced countries



Source: AMECO.

Table 1: Changes in the adjusted GDP labour shares, major advanced economies .

	Germany	France	Italy	UK	US	Japan
1960-1975		3.5	-1	2.4	-1.8	
1975-1990		-7.5	-8.1	-11.1	-0.3	-8.3a
1990-2005	-2.7b	-2.1	-6.4	0.9	-2.5	-4.1
2005-2020	3.7	1.9	1.1	4.4	0.6	0.9

Source: AMECO. a: years 1980-1990. b: years 1991-2005

Evidently, the downward adjustments in the labour shares occurred *before* China’s exports effectively entered the world market (and before the full-scale liberalisation of trade and capital flows that took place around 1990). In most cases the years 1975-1990 were really critical in that respect. But the years 2005-2020 witnessed some rebound in the labour shares. Data on the average unemployment rates convey much the same message: unemployment tended to contract *after* 2003 (see Table 2). Apparently, the fast rising Chinese exports did not push the

employees in the advanced countries out of work – at least within a couple of years following 2003. (After 2008 the unemployment rose, evidently under the impact of the Great Recession and – in the Euro Area – also during the secondary recession in 2011-12. The later recovery pushed the unemployment rates further down.)

Table 2: Average unemployment rates

	1990-95	1996-99	2000-03	2004-07	2008-15	2016-19
Euro Area	9.6	10.4	8.4	8.5	10.3	8.8
UK	9.1	6.8	5.2	5.1	9.9	4.3
USA	6.4	4.8	5.1	5.0	7.1	4.2
Japan	2.5	3.9	5.1	4.3	4.4	2.7

Source: AMECO.

Concluding remarks

The 'Great Disinflation' since about 1990 appears to have coincided with progressing globalisation and a seemingly massive increase in the global availability of labour force. However, China's expansion, effectively since about 2003, cannot be really invoked to explain the deflationary tendencies. Contrary to common beliefs China's integration into the global manufacturing system does not seem to have depressed the wage shares in the advanced countries. If anything, it also failed to raise unemployment rates in the advanced countries. The 'Great Disinflation' theory advanced by Goodhart and Pradhan is unconvincing and so is their conclusion that the approaching great demographic reversal augurs an inflation revival. An alternative explanation of the inflation trends since the mid-1980s may point out to the fact that, contrary to 'common knowledge', the deepening and widening globalisation has depressed global economic growth (Podkaminer, 2015, 2021, 2022). That, in turn, may have been instrumental in restricting global inflation.

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