

21st Century real economics

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1. Overview

Economics is not just about money, and yet so much of what we hear about economics focuses on money and complex inter-relationships involving things closely related to money, such as interest and exchange rates.

Whether we are trying to make career or consumption choice for ourselves, or govern a country, this can get confusing. Money changes its value over time and between currencies, and the money price of products (i.e. goods and services) often does not reflect very well the resources that went into them.

Arguments from money alone can be unreliable, even deceptive. Predictions from money models can be unsafe because of the many causal effects, including loops and subtle effects whose parameters are hard to estimate accurately. Large, unexpected price

changes on financial markets can be triggered by the rules of financial instruments or badly designed trading techniques, sometimes even obeyed automatically by computers.

This struggle to understand is important because our decisions, whether we are central bankers or ordinary workers and consumers, are important for our own well-being and for the system as a whole.

In this article I discuss economics from a different perspective by considering *real resources* first, such as labour, land, energy, water, minerals, and other living things. From this I deduce some strategies for individuals, governments, and other organizations.

No doubt I am barely scratching the surface of the insights that can be generated by considering real resources first, but what is presented in this publication seems like a worthwhile start.

None of this is against use of money in society, which is far more convenient than alternatives, or its use in regulated, competitive markets. They work much better than planned economies. Money is very useful.

However, there are situations where thinking only in terms of money gets confusing and uncertain but refocusing on real resources brings clarity. There are also well-known problems with prices (e.g. externalities) and deciding how to fix those requires a focus on real resources.

Along the way in this article I will try to keep to facts and deductions that are self-evident and uncontroversial, but occasionally will introduce hypotheses, that are not quite so solid (even though I believe them to be true).

2. Real economic ideas

This opening section explains economic ideas that start with real resources.

2.1 Overview

In summary, the problems we face are that, despite amazing progress and technological improvements, we still do not live in a sustainable way and will have to do more work to solve the problems than we think. Happily, we can make labour available by reducing waste.

The main real economic strategies for having a better economy and better lives for people in a society are:

- Increase the sustainable supply of basic real resources by developing people, sharing work more, and capturing more natural resources.
- Convert basic real resources into products more efficiently (with less waste).
- Convert products more efficiently into pleasant, long, secure lives by improving lifestyles.

These strategies should be easier to execute if more people understand how they will work and make supportive decisions.

The following subsections go into more detail about work, sustainability, waste, technology, lifestyles, resource availability, and other matters. But first, some simple illustrations set the scene.

2.2 Desert island survival

The issues are easiest to understand in a simple situation. First, consider two people surviving alone on desert islands.

E.g. Two people, Adam and Zach, are washed up on the same day on identical desert islands, with only some clothes and a small survival kit each.

They know they will be rescued in one year – if they can survive that long.

Adam has been on survival training courses. He understands that everything he does now contributes to his chances of survival. He knows his priorities and how to use the items in his survival kit. He focuses immediately on clean, fresh water and finds it first by boiling water from a stream and then using a condenser made from the plastic sheet in the survival kit. He does nothing he does not need to do and focuses on survival. He works and rests at the best times of the day and night. After a few days he moves to a better location. He gets a lot of food from the sea using the nylon fishing line in the kit. He carefully studies the food sources of the island, looking for fruits that are safe to eat. After several weeks he has built an extensive shelter and has time to enjoy himself. He starts learning to juggle.

Zach, in contrast, has no survival skills and does not understand the importance of energy, focus, and priorities. He is easily distracted by the strange novelties on the island and exhausts himself on the first day exploring instead of finding safe water. When he does get water, it is from a mountain stream but he fails to boil it and, unknown to him, picks up his first parasite. Lacking focus, he wastes time and materials. He uses the nylon fishing line to try to make a guitar and damages one of the two knives trying to carve decoration on a stone. His physical condition declines and he eventually dies at night from exposure, malnutrition, and disease.

Survival here depends on cutting waste, on knowledge, on exploration and innovation, and on avoiding toxins. Gradually a better life emerges

if these things are understood and done.

The situation is more complicated when a group of people is involved, but the basic issues are the same.

E.g. Imagine that two groups of 10 people are stranded for a year on identical desert islands. Both groups have the same survival kits and two members with survival skills.

One group understands the need for everyone to contribute and that one person's waste is a problem for everyone. They stay focused on what matters, learning quickly from their survival-trained members. Everyone does what they can and avoids wasting water, energy, food, tools, or other resources. The group gradually establishes a sustainable lifestyle on the island, with each person playing a valuable role and no waste. They soon have time for some fun too.

Members of the other group do not understand their situation or how important every contribution is. They struggle to stay focused on survival because some ignore the survival-trained members. Some members will not do their fair share of the work and keep sneaking off to laze about. One member even insists on feeding wild animals with the group's precious food. Other members, despite a good attitude, simply are not as fit, skilled, or intelligent and do not contribute as much to the group's survival.

In response, the more successful members of the group begin to pull away and start hoarding food and other resources. The group fragments. The more successful survivors become so comfortable that they can afford some waste and some even begin to put on weight while throwing away surplus food. The others become

increasingly resentful and desperate as their physical condition declines and death looms.

Survival for these groups depends on the same things plus sharing. The contributions of every person matter. If one person wastes resources, fails to learn, or fails to do their fair share of the labour then this affects others.

The situation is more complicated still when the group is larger or when there are multiple groups that can interact or where people can move from one group to another. Now there are more opportunities for knowledge to be transferred and for specialization of roles to emerge. Groups can exchange products and owe debts to others. However, the basic issues of getting resources and converting them efficiently into long, comfortable, secure lives remain. The value of improving by innovation remains key. Waste by some remains an issue for all. People understanding how to behave remains vital.

After these scene-setting illustrations, the following sections go through fundamental ideas and issues for real economics.

2.3 Work and play

By 'work' I mean all that must be done to support our lifestyles, including providing shelter, food, water, clothing, warmth, opportunities for social contact, healthcare, entertainment, and learning.

Some of this work is done by people working in organizations and being paid money to do it, but a lot of work is unpaid. For example, you probably brush your own teeth and nobody pays you to do that. Still, it's work and even a bit boring.

'Play' refers to things that we enjoy doing. Just occasionally work is also play.

Getting enough physical activity to stay healthy is an important part of the work every person should do. Some people find half an hour on a treadmill in a gym enjoyable, but many of us do not. Work can be play for some people but not for others.

Provided our incomes were not reduced, most of us would like to do less work and have more play. In general, our society having to do more work overall is bad, other things being equal.

2.4 Helping others over our lifetimes

Over our lives we typically contribute different amounts to the lives of others. As infants we depend on others, our parents usually, to look after us. Gradually we learn to do more for ourselves, and then learn to do things for others as well. For some decades in our middle years most of us can do enough to look after ourselves and help others, perhaps our own children and our elderly parents, and also the people we count as customers and colleagues. In the final decades of life we become more dependent on others again.

Outside family groups there is a social expectation of reciprocity. If someone does something for you that you asked for or wanted then it is expected that you will do something for them in return, at some point, and with roughly the same value in some sense.

Money makes this reciprocity much more precise and makes it possible to have reciprocity with people you do not know.

These are some common types of deal involving money:

- Payment: where one party gives products to the other in return for money immediately.
- Credit: where one party gives products to the other in return for money later.
- Loan: where one party lends money to another, who pays it back later, plus some extra money as interest.
- Transfer: where one party gives money to another in return for nothing at all. Transfers include paying taxes, compensation, theft, lottery prizes, and gifts.

One way to live is to provide products (e.g. our labour) to others in exchange for money, and then spend that money later to buy products from them or others. In this pattern, we provide and then later receive.

Loans make it possible to reverse this sequence. Having received the loan it is possible to spend the money to get products, then provide products to others in return for money that can then be used to pay off the interest and loan.

When we take out a loan and spend it we are committed to doing work or handing over other products to repay the loan and interest. Lenders take the risk that we will fail to do this, even though it means suffering considerable consequences.

2.5 Demographics and work

Throughout the 20th century and beyond, countries around the world have gone through a similar demographic pattern: economic development combined with aging (<https://www.gapminder.org/>). A period of rapid population growth has usually been followed by slowing population growth as people begin to feel more secure and have fewer children. In some countries the average number of children per family is less than two, which

means people are not even replacing themselves and populations are declining.

During the initial period of high population growth the ratio of people to working aged people is quite favourable. All the usual economic indicators look good.

However, as the population stabilizes and good healthcare leads to longer lives, the ratio of people to working aged people changes. The population needs to be supported by a dwindling number of workers, and the needs of the very old are considerable. They cannot do so much for themselves and need more care as their health declines.

Remember that by 'work' and 'worker' here I mean work in the broad sense discussed earlier. This does not refer just to people in paid employment or the work they do while in that employment. By 'support' I mean looking after those people, doing work for them, not providing money.

In Europe at present this pattern is being disrupted by mass immigration from north Africa and other regions, but this does not change the overall trend for European countries or for the world. Eventually, we will all face the situation that Japan is now facing.

In the UK, the Old Age Dependency Rate (the number of people at or above the State Pension Age per 1,000 people between 16 and the State Pension Age) has been static at around 300 for a few decades, but is projected to rise to around 400 by 2067 (ONS, 2019). As people have lived longer they have also remained active for longer, which has been reflected in a gradually rising State Pension Age. Nevertheless, the ONS notes that the active elderly, still working, are likely to make the problem less than it might seem. The ONS proposes a more sophisticated measurement designed to

include this effect called the Active Dependency Ratio. This measure also is projected to increase in future, though slowed a little by immigration.

This demographic trend means that human work (among other things) is becoming an increasingly scarce resource and one we need to manage efficiently.

My hypothesis is that, overall, human work is one of the most important limited resources and likely to be the most important to manage efficiently. This is in part because all other actions to manage resources efficiently require human work to put them in place.

Consider this from your personal point of view. Do you feel you usually or always have more to do than you have time for? Are there things you planned to do and wanted to do but never had time for? When you stop to rest do you sometimes feel a bit guilty? When an extra task is given to you, do you feel weighed down just a bit more?

As our diaries become more densely packed with appointments it becomes harder and harder to squeeze something more in. Each rearrangement is more hassle to accomplish. Furthermore, with so much time and energy taken up by one's efficient, high-pressure schedule, it is harder to make time for one-off tasks needed to make changes. Being too busy with regular stuff also makes us too busy to change, and so unwilling to change.

2.6 Sustainability and work

Our way of life today is not sustainable for a variety of reasons, including micro-plastic pollution, 'forever chemical' pollution, groundwater depletion and pollution, and deforestation.

But of all the sustainability issues the one most likely to drive up the demand for human labour is our realization that relying on fossil fuels is not sustainable. They won't last forever and they seem to be affecting the world's climate and sea levels in a worrying way.

The problem of getting work done is one we have sought to solve by using machines that we supply with energy and that do work for us¹.

The amount of energy we consume in this way can be compared to the amount of energy we eat to get a sense of how important these machines are.

In 2015 the UK used 137,430 ktoe of energy (Department for Business, Energy & Industrial Strategy, 2016) and had a population of 65.1m people (ONS, 2016). That's just under 58,000 kcals per person per day, so our machines consume about 30 times more energy than we eat. This gives a sense of just how much we rely on this approach for getting the work done.

We can and probably will push this even further in future, but we need to do it with sustainable energy sources.

For net importers of oil, gas, uranium, and other energy sources this is more pressing still because of the problem of energy security. A country that relies on supplies of energy from another country is at risk of being cut off, if the stakes are high enough. The risk here is surely higher if the energy supplying countries operate as a cartel and have fundamental ideological, religious differences from their customers, regarding them as culturally and morally inferior. As we have seen with Russia in 2022, the risk is also high when the supplier considers itself an

¹ Strictly speaking, we supply energy in one form and, in its conversion to another form, we extract

some useful work. As a result, overall entropy increases and overall energy stays the same.

empire with its energy customers as rivals.

Capturing solar as directly as possible into work, warmth, electricity, and fuels, is probably the long-term best option, but it will be a while before we have all the required technology worked out and in place. Solar panels and wind turbines, however, are now economic in many regions of the world, which is a great step forward, and technologies are developing to store energy on a large scale to cover those windless, cloudy periods.

In the meantime, continued climate change is to be expected along with increasingly extreme weather. For the UK this has meant flooding, snow in winter, and probably there is more of this to come.

Our homes are often 100 or more years old and many not built within the last 40 years are not suited to the future climate. They are poorly insulated, have weak foundations, get damp inside, and crack as the ground shifts. Most homeowners in the UK will be only too aware of these issues.

According to the Department for Communities and Local Government (2015) there were 23.4 million homes in England alone. Larger buildings tend to be more thermally efficient due to their ratio of surface area to volume, so in roughly ascending order of thermal efficiency the homes were as follows:

- Bungalows, 9%.
- Detached and semi-detached houses, 42%.
- Converted flats, 4%.
- Terraced houses, 29%.
- Purpose built flats, 16%.

The age of these buildings is important to their thermal performance. According to

rough estimates by the IHBC (2020), about 13 million of those homes (mostly houses) were built before Building Standards were introduced and only about 5.5 million have been built since insulation in walls became a requirement. This means there are about 17.9 million homes needing extensive insulation of walls (at least).

The ONS (2022) found that almost all homes built since 2012 have good energy efficiency (in the top 3 grades) but homes built before that are much less likely to be efficient.

If roughly 18 million homes had £20,000 of external wall insulation added then the total cost would be about £360bn in money terms. A proportion of these homes would be better rebuilt completely and more of the replacements would be larger buildings with flats. This is just for England. Similar problems face other nations in the UK.

The implications for human workload are enormous. While we may not want to increase our reliance on machines, a huge effort is needed urgently to upgrade our homes and many other aspects of our material world (including energy infrastructure) to make it sustainable and able to withstand what is to come.

And all this while looking after your children and elderly parents.

The fact that some people are 'unemployed', and some of those are genuinely loafing, is not evidence against this theory. It just reflects the inefficient and incomplete sharing of work.

2.7 Wasting real resources

One of the enemies of sustainability and real economic success is waste of real resources. Defining what is wasteful is not always easy but most of us can

recognize obvious examples of waste, such as:

- Leaving the tap running while you brush your teeth.
- Leaving your home heating on full while away on holiday.
- Buying much more food than you need because you cannot decide what you want, then throwing some of it away later.
- Farmers throwing away edible, safe food because it is not quite the right size or shape.
- Making a product at two factories a few kilometres apart in such a way that components must be transported between the factories several times to make the final product.
- Having fun power boating when you could have had just as much fun in another far simpler and less jarring way.
- Having strawberries flown in from a far country so you can eat them fresh in winter.
- Having 3,000 pairs of shoes².

Waste is about the results we get out from the resources put in. If the results make our lives worse (e.g. the results of smoking cigarettes) then the activity is entirely wasteful. If the same positive results can be achieved with less resource use then the waste is the extra resource used compared to the more efficient alternative. Sometimes it is possible to use physics to calculate the maximum theoretical efficiency possible. Doing worse than that is wasteful but it might be waste we cannot easily eliminate. Nevertheless, the theoretical scope for

improvement might motivate us to try to develop better methods.

The real resources that went into providing a product or service might not be accurately reflected in the price.

E.g. A designer handbag priced at £800 might not consume more real resource than an alternative priced at £28. It might be that the expensive handbag is better by design and manufactured more intelligently to a higher standard of finish with less resource use. Alternatively, it might use more resource through using hard-to-obtain materials assembled slowly by hand. Thanks to clever marketing, the pricey product might be no better than the cheaper alternative despite the waste.

Whether consumption is wasteful or not often depends on the quantity consumed. This is because resources used increase in proportion to consumption but the benefit we enjoy does not.

E.g. One handbag is not wasteful; handbags are useful. Six very similar handbags are almost certainly wasteful.

E.g. Eating enough food each day is not wasteful. Eating twice that amount is wasteful and even harmful.

2.8 Technology and work

The relevant technology is that which converts our human labour and other resources into long, happy, secure lives for us, sustainably. The more efficiently (less wastefully) we can do that the better.

Looking back over the past few centuries it is not controversial to say that it is technological improvement that has led

² The number found in the possession of Imelda Marcos, wife of the corrupt former president of

the Philippines. Some of the shoes are now in the Marikina Shoe Museum.

to the massive improvements in lifespan and quality of life enjoyed by many around the world today. It is not an increase in the amount of money in circulation that has done it.

Our ability and willingness to continue innovating remains crucial to our future because there are still so many problems unsolved.

Our technology for converting resources into good lives can usefully be divided into two areas:

- **Supplier technology:** the know-how used by people who supply us with products and services.
- **Lifestyles:** the way we live and the things we choose to achieve the lives we enjoy.

Supplier technology has been improving for centuries and astonishing progress on energy and materials efficiency has been made even in the past couple of decades. Almost everything in utilities, industry, farming, and transport is more efficient today than it was 10 years ago. For example:

- The cost per watt of solar panels has plummeted over the years (Our World In Data).
- The energy efficiency of new car designs has improved too, but because people have bought more SUVs the average energy efficiency of cars sold in the EU has not improved in recent years (Odyssey-Mure).
- During my lifetime I have seen a transition in lighting from incandescent bulbs to compact fluorescents and on to LEDs, with dramatic improvements in efficiency.
- Digital gadgets have stayed about the same size but have greatly increased their abilities.

- The proportion of UK energy coming from renewables has increased dramatically since about 2008, mainly due to more wind turbines and biofuels (Department for Business, Energy, and Industrial Strategy, 2021)
- According to the Office of National Statistics (ONS, 2022), in the last 20 years the UK's energy consumption per person has reduced significantly (leaving aside the reductions due to COVID-19).
- Considerable progress has been made on insulating British homes, though there is still a lot to do just to implement the currently known technologies (Department for Business, Energy, and Industrial Strategy, 2022).

The book 'Factor four: doubling wealth – halving resource use: the new report to the Club of Rome' by Weizsacker, Lovins, and Lovins (1998) detailed many technologies that exist and dramatically improve resource efficiency.

Quantification was a particularly strong feature of the book and, overall, the authors estimated that resource efficiency could be improved by a factor of four using that technology. The book was updated in 2009 and retitled 'Factor Five' to reflect the further improvements in available technologies.

These improvements in supplier efficiency have usually been profitable even without fully accounting for the true costs of fossil fuel pollution and disposal of materials.

There is scope for much more of this and the only real limitation seems to be the expertise of the people involved. If you get advice from someone who really knows the available technologies there are almost always things a person or organization can do to save resources and money at the same time.

Conversely, if you don't know much about what can be done then it will seem that becoming sustainable will be costly, rather than cost saving.

In theory, eventually, humanity may overcome all its challenges by improved supplier technology. One day, perhaps, nuclear fusion will be viable and we will be able to capture virtually unlimited amounts of energy using very common elements.

This will address the problems of atmospheric pollution and energy security and allow us to rely even more on machines to do work our brains and muscles cannot do, or don't want to do.

Perhaps also we will find ways to create materials with all the properties we need without relying on oil and rare elements found only in a few places on earth.

Relieved of existential worries, people might become calmer, more reasonable, responsible, considerate of others, healthier, and less inclined to war and intolerance.

Sadly, this is all far into the future. Theoretical possibilities need to be turned into working technology and then the real work begins. That is, the massive effort to implement the wonderful new supplier technology throughout the world.

In the meantime, we as individuals do not need to wait passively for industry to save us. We can make changes that improve the efficiency of our personal lifestyles quickly and without huge investments. The cumulative impact of such changes by many people would be huge. This publication particularly highlights these opportunities for us as individuals because they usually get less attention than supplier technology.

2.9 Lifestyle choices and work

The choices we make, individually and together, about how to live also drive the amount of work that needs to be done by us as individuals and our society. This can be understood from small, everyday examples.

If you have an empty shelf in your home and put two picture frames and a china ornament on it then you have just increased the work needed to dust the shelf.

If you have to do the dusting yourself then, obviously, your workload has been increased. However, if you pay someone else to do the dusting then they still do the extra dusting and you might need to do a bit more of some third person's work to pay your cleaner.

Whether you do the dusting or someone else does it for you, there is just a bit more dusting work to be done.

In addition, if you bought those items to put on the shelf then you did the work of shopping and someone else did the work of making those items and transporting them to a retailer. Eventually, you will have the chore of disposing of the items, perhaps with the help of people whose job is waste disposal through recycling or landfill.

The impact of your shopping for those items on the way the economy of the world operates is indirect, diffuse, and not immediate. It would be hard to confirm the impact by empirical research even though we know it must exist.

In the short term the items were already in stock so nobody did extra work to supply those items.

However, your purchase is a signal that (added to many others) encourages productive capacity to shift slightly towards more ornaments and picture

frames. The retailer will be just a bit more willing to order more from the manufacturers. The manufacturers will be willing to invest just a bit more in ornaments and picture frames.

Over an even longer period those investments affect the career plans people make – the qualifications they try to gain, the jobs they apply for, and the pay they will accept. Keep up that demand for china ornaments and picture frames and you encourage, just a little, more people to dedicate their working lives to producing those instead of doing something else.

Going back to the more immediate effects of your simple purchase, indirectly, putting those ornaments on that shelf has occupied space in your home that you might have used for something else. If that is so then the cumulative impact of all your shelf filling choices might be the decision that you need to live somewhere bigger.

Moving house is a major life event and lots of work. Building larger houses increases the work done by people who build homes, and all the people who supply the materials to build those homes. Larger homes require more heating and more cleaning.

Only a tiny slice of this work can be attributed to your decision to put two picture frames and a china ornament on that empty shelf, but these tiny decisions have a cumulative impact.

That cumulative impact affects you directly. If you feel like you don't have enough time to rest or play then perhaps that is, in part, because of choices you made whose combined implications you did not see at the time.

The cumulative impact also affects society as a whole, and perhaps our struggles to deal with a host of problems

is a symptom of being overloaded with work that, in part, was created by choices we made without realizing what they would lead to.

Choices about where to live, where to work, where to be educated, and where to go for holidays affect the amount of travelling work we do, and the work done by people who provide the products and services that support our travelling, such as car makers, road repair crews, and train ticket inspectors.

Local planning decisions have a key role. Separate houses usually create more work per person than blocks of apartments.

National decisions can be even more important.

Clearly, the work our choices create is not the only consideration. Our choices also have implications for other resources, and we also seek a good life from our choices. That china ornament perhaps makes us feel good or helps to create the right impression for visitors, and those factors are set against the work and other resource consumption involved.

Beware of assuming that, because you chose to do something, it really was worth the work created (even ignoring the impact on others). Maybe you have been misjudging for years.

E.g. Imagine a hypothetical couple plans to try a new fusion recipe for their evening meal. Late that afternoon they realize the recipe calls for a particular type of organic coconut paste that they do not have at home. Easy ways to deal with this would be to make something else or modify the recipe, replacing the paste with something similar. The stressful, tiring approach that makes more work for a tiny gain would be to leap in the car and go to the shops (in the busy

evening traffic) in the hope of buying the special paste before the shops close and in time for dinner. The stress would be intensified if the item was not in stock.

E.g. Or imagine parents who decide that the local secondary school, while good, is not the best for their daughter and that she should go to an expensive independent school 20 miles away. This begins 7 years of commuting daily for 2 hours and accumulated school fees and travel costs that require years of work by the parents to pay for.

For a fraction of the money they could have bought their daughter hours of one-to-one tutoring each week and still left her extra time to enjoy her life with local friends. One-to-one tutoring is usually much more effective than classes, even at the most expensive schools, so this is a better option educationally as well as easier. In overall work terms the gain for society is much less than the time saved by the daughter. This is because of the tutoring work, which is one-to-one, that replaces the effort by transport companies, which is more labour efficient.

E.g. Or imagine a family whose young son wants a kitten. He pesters and the parents give in and buy one. Not surprisingly, the boy's interest lasts much less time than the cat. It requires care from the parents for a decade, costing many thousands in food costs, vet bills, and cattery fees.

2.10 Increasing real resources

Basic real resources are limited in different ways but sustainable increases are possible and continue. Real resources tend to increase for reasons that are not

directly related to the demand for particular products.

2.10.1 Sustainable increases

Labour is quite restricted. If the population is increased then this increases labour but also the demand for labour. The labour available per person does not change. Some people can work a little longer or acquire improved skills and so do more useful work. However, the scope for putting more people to work is limited by the fact that many people who do not do much work have limited capability (for a variety of reasons). Ideas for increasing the labour resource, including sharing work more, are discussed later in this publication.

Getting resources by mining (e.g. coal, oil, gas, uranium, iron) is often not sustainable because the total available is limited and the fossil fuels are causing dangerous pollution. Mined uranium also generates dangerous waste and some of it has occasionally escaped to cause dangerous pollution.

However, some materials are plentiful and easy to obtain (e.g. carbon, sea water, sand, nitrogen). Switching systems from rare materials that must be imported to abundant materials that are ubiquitous can greatly increase basic real resource supply.

E.g. Lithium-ion batteries are currently the leading technology for storing electricity on a small scale. They require lithium, which is the lowest density metal. Sodium is a similar metal but much, much more widely available and easier to obtain.

Currently batteries can be made using sodium instead that perform almost as well as lithium batteries. Other promising methods of storing a lot of energy on a large scale include heating sand and compressing carbon dioxide. All these rely on materials that are

easily obtained. On a small scale, batteries are being developed that use graphene, which is a form of carbon, another all-too-widely available element.

The available materials can be increased further by recycling.

Getting resources by importing them from other countries is limited because we must do something for the other country in return. Borrowing money to buy the imports only defers the time when the favour must be repaid in real products.

Gathering real resources that fall on our territory (e.g. sunlight, wind, rain) is limited in the short term by the infrastructure we have built. However, this is a major area where investing work and other resources in creating more infrastructure can make a huge difference to the basic real resources available to us.

At present the UK needs more renewable energy gathering and systems to store the energy for hours, days, or even weeks, to deal with cloudy, windless periods.

2.10.2 Drivers of increased real resources

Real resources typically do not increase in direct response to demand for particular types of product. The closest to a direct response is perhaps when a product or service is redesigned to make use of a more plentiful real resource (e.g. switching from lithium batteries to sodium batteries because sodium is far more plentiful).

Labour increases with population and with investments in education. Education is usually aimed at broad areas of employment rather than specific products or services. Education also usually takes place years before people start paid work.

The supply of plentiful chemicals and of renewable energy currently depends on the pace of building new facilities and this in turn is limited by the maturity of the technologies and government decisions. There is little doubt that these will be needed for something.

Therefore, at any point in time there is a roughly fixed supply of basic real resources that is growing gradually on a trajectory largely unrelated to demand for specific products. That supply of real resources is split between the various products demanded. For example, a person trained in engineering will later choose which specific products to engineer.

In this way, real resources are both increasing in the long term and roughly fixed in the short term. If someone takes more than that leaves less for someone else.

2.10.3 The risk of unrealized needs

There is a possibility that, if people cut back on wasteful consumption, the real resources that become more available will not be put to good use and the supply of basic real resources will start to reduce in response.

It is unlikely that starving people will fail to consume more if it is available. However, it is possible that people who feel comfortable now will fail to act for the future.

In the UK, many of our old houses need to be rebuilt and this is only part of constructing a sustainable infrastructure for life in future. New buildings are being built to increasingly high standards, though there is still much more scope for improvement, but old buildings are not being replaced or upgraded as fast as they could be. Most people want their home to be bigger, not warmer.

There is also a need to prepare for an even higher proportion of elderly people than we have already.

A continued effort to understand future needs and explain them to everyone is probably needed.

2.11 Consequences of wasteful consumption

If some people consume more of a product or service than they need then this will almost certainly have a negative effect on society as a whole. There is no way around this through 'trickle down' or 'making the pie bigger' either immediately or at some time in the future. This can be understood by considering real resources.

We start by considering a single product (a good or service). Some very wealthy people might think it is worthwhile for them to consume more of the product than is enough for them. Although the extra utility of yet another car or luxury wristwatch may be small, they can afford it so easily that the momentary buzz of purchase is worth the price.

If some people consume more of that product than is enough for them then there will be less of that product for others. The gain in utility for the over-consumers will be small; that is what having enough means. The loss in utility for those who must go without and do not get enough will be greater. Overall the effect is negative.

It is very likely that the effect will spread to other products.

- Consumers struggling to get enough of the first product will try to obtain substitutes (e.g. rice instead of pasta, polyester instead of wool, a bike instead of a car).
- Suppliers will direct more real resources towards production of the

over-consumed product and away from other products.

The consequence of this will be a loss of utility for consumers of other products too. The total impact is not greater but it is more diffuse and harder to see.

Finally, the over-consumption might stimulate an increase in the supply of basic real resources such as labour and energy. People might choose to work longer hours or start paid jobs instead of staying at home (e.g. to care for children). They will either do the extra work directly or do extra work to create and maintain machines that do the work.

Consequently, the over-consumption leads to more work for people. This is not in itself a good thing because people prefer to play (rest, have fun, socialise). The utility lost through extra work will be high because most people are already working quite long hours and so extra work is tough. This will be a greater loss of utility than that gained by the over-consumers.

So, whether the consequences are some people going without enough or some people doing extra work, more utility will be lost than is gained by the over-consumers. This is a bad deal for society.

Reasoning about this using money and prices is much harder. The initial over-consumption should cause prices of the first product to rise but this will also increase the income of suppliers of that product. Will this be enough to compensate for the higher prices they face? If people work more hours then they will also have higher incomes but will they be better off since prices will also be higher? An expert economist with a well calibrated and realistic computer model might be able to reproduce the conclusions reached by considering real resources. However, I doubt if the

calculations and assumptions required would be as convincing.

While wasteful over-consumption is harmful, reducing wasteful over-consumption should improve the real economy.

If the wasteful over-consumption of a particular product (e.g. gambling services) is reduced then this sends a discouraging signal to providers of those services, their employees, and their investors. Some of those people will begin to switch their resources towards more promising areas.

The promising areas will tend to be those that are already large (with more people entering and exiting each year), or growing, or that are clearly important and likely to grow.

Positive shifts are not necessarily consumption led. If people enter careers and gain expertise or invest in companies then they often develop the ability to offer improved products that are more valuable than were previously available. These increase demand.

E.g. Demand for electric cars was small until the development of lithium-ion batteries and Tesla cars. The demand for electric vehicles has exploded since then.

E.g. If many young people think they can have a good career in sustainable technologies and choose higher education and training that gives them the necessary skills then their abilities will create at least some demand. Their abilities will allow them to offer services beneficial to customers or do a worthwhile job for an employer. With less expertise they would not be able to do that.

2.12 Differences in productive ability

2.12.1 Individual differences

Individuals differ in their ability to do useful work. Some are more rational, intelligent, diligent, and honest than others. Some have more useful knowledge and skills. Some have networks of contacts with other people that help to get useful things done.

These differences in productive ability are driven by many factors.

Genetic endowment is important. Although it is largely a matter of luck, the attributes of parents are relevant and if both parents are unusually intelligent, for example, the outlook for the intelligence of their children is good. Not only are the children likely to have more genetic potential for intelligence but they will have clever home role models, more encouragement to excel academically, and probably better guidance in educational choices.

Nutrition, health, and disability are also crucial drivers. Disability includes invisible problems such as with attention, motor coordination, or cognition.

Age is important and the most productive period of a person's life is likely to be the long period in the middle.

One driver that is probably easier to modify than others is learning. This takes place mainly at home, at educational establishments, and at work. The quantity of learning and what is learned are both important.

In the UK there is major scope for spending less time on learning low-value knowledge and more time on useful knowledge. This could be achieved by changing what is offered at primary, secondary, and tertiary levels, and by changing the choices made by students.

Mathematics is crucial in the UK. Most children struggle with mathematics. That could be because of disability, a period of poor health, less than high intelligence, very poor teaching (which can be devastating for less able learners), and parents unable to help at home.

The result of getting less than a level 6 in mathematics at GCSE level (age 16) is that many important STEM subjects are no longer an option at A level, the next stage for more able students. These include mathematics itself, sciences, and economics. This also means that high-value STEM subjects are not available to them at university.

The implications of poor mathematical ability at age 16 are huge for lifetime contribution to society (and earnings).

And yet, many of the specific mathematical techniques taught in schools and universities could be swapped for alternatives that are more useful in the real world of work. (See Leitch, 2017 and 2021 for detailed suggestions.)

Sadly, there are also young people who are good enough at mathematics at school to take high-value educational courses but instead choose something else (e.g. English literature, fine art, media studies).

The value of a person's work is also driven by the roles that open to them and those they choose. Some roles produce more that is valuable than others. Sometimes it is hard to know if a role is doing useful work at all (e.g. in advertising, psychotherapy), making it harder to ensure that you are always doing something useful. In contrast, there are other roles where you know exactly what you have accomplished (e.g. farming, working on an assembly line).

2.12.2 Group/area differences

There are also important differences in productive ability between groups of people and the people in different geographical areas.

The distribution of productive ability across a population of people is heavily influenced by who joins and who leaves. The recruitment policies of a company and its desirability to potential employees are crucial. The choices people make when they decide to relocate into or out of an area have a similar effect.

Lynn, Fuerst, and Kirkegaard (2018) reviewed research looking at IQ differences between regions of different countries. They identified 22 countries where regional differences in IQ had been found, including the UK. These range from overall north-south differences to differences between districts within cities.

Many possible causes are discussed in this paper but there is strong evidence that selective migration is a major driver. In short, smarter people more often relocate to more affluent areas in search of work. Sometimes the relocation is just a short journey to a better neighbourhood. Sometimes it is migration to another part of a country or another country altogether.

When economic differences between areas of a country seem hard to eliminate, it is probably in part because so many people move out of poor areas if they have the productive ability and resulting income to do so. Moving somewhere nicer is easier than staying where you are and trying to improve your neighbourhood. Sadly, this leaves the poor neighbourhood with fewer people capable of improving it.

In many cases, some geographical advantage makes a location more prosperous. Perhaps it is a favourable

climate, fertile land, a natural harbour or navigable river, or the rise of an industry. Selective migration then takes effect, amplifying the initial advantage. After decades, or even centuries, of this process a pattern of economic difference is established that correlates with a difference in average productive ability.

The differences in IQ also correlate with other variables. Higher IQ areas tend to have higher average income, higher educational attainment, better health, higher socioeconomic status overall, less crime, and fewer babies.

These are just averages and correlations. Not everyone in areas or organizations with lower average IQ has a low IQ. Not everyone with lower IQ living in a poor neighbourhood is a criminal. There are plenty of poor but honest people living in poor neighbourhoods blighted by the criminal activities of a few people. It is one of the reasons that accommodation in those places is cheaper.

2.13 Economic inequalities

There are several ways to measure economic inequality across a population. The measures most often discussed (wealth and income) show high inequality compared to the more relevant measures (real resource consumption and consumption utility). This gives an exaggerated sense of inequality and an unnecessarily negative view of family inheritance. It also creates misdirected outrage, leading people to:

- resent people with wealth instead of people who waste resources; and
- try to spread money more evenly instead of spreading resources more evenly by cutting wasteful consumption.

Here are descriptions of different types of economic inequality with information about their relative sizes:

Wealth in money terms: Wealth inequalities are the largest but not the most important. Wealth is the net value of money and other assets less liabilities and can vary between a huge net debt and even greater net wealth built up over generations.

Wealth inequalities are the largest because they are produced by saving and appreciation of assets (e.g. shares in a company, real estate).

E.g. To illustrate the effect of savings, imagine that it costs £30 a day to live in a country and a person is earning £30 a day, paid in cash that day. Their wealth simply cycles between £0 and £30 daily. Now imagine someone who earns £31 a day. They save £1 a day, so after a year they have £365 more than the person earning £30 a day. The second person is at least 12 times as wealthy as the first person, despite the tiny difference in daily income. After a decade the wealth difference will seem colossal. After a working lifetime, even more so.

In real examples the person earning more probably spends a bit more too, and probably pays a higher rate of tax, but still is likely to save more. Eventually, wealth differences will emerge that dwarf income differences.

Even if everyone consumed at the same rate and kept this up through their whole lives, wealth inequality would be surprisingly high due to the way wealth rises and falls through our lives. Imagine a young person starts out in the world of work with no wealth but earns and gradually builds up savings. Perhaps that person borrows some money (e.g. to buy a home) and pays that loan back. The person strives to build up savings that will

support consumption at the standard rate through retirement until death. On the day of retirement our worker has reached peak wealth. This alone creates significant wealth inequality, though far short of the actual inequality in most developed countries.

Increased market value of assets is another way that people can get wealthy and is typical of ultra-rich people. In theory a person can be extremely rich yet still only have enough income to live modestly.

E.g. Imagine a young woman builds up modest wealth through productive work and saving. She then puts most of her savings into founding a company. For several years she works hard expanding the company and eventually floats its shares on a stock exchange. This brings in additional money to help expand the company but also puts a market price on her shares. The value of her assets now makes her extremely wealthy on paper but she has not sold her shares and pays herself only a modest salary. Her lifestyle is the same as any sensible person with a typical middle-class income and she still spends less than she earns. Being hundreds of times wealthier than the average person does not make her a drain on society – quite the contrary because of her contributions.

She could become a drain on society if she sold some shares and used the money to buy several luxury homes with stables exclusively for her own use, had unseasonal food flown in by private jet, drove a Rolls Royce at 14 miles per gallon, and took up power boating as a hobby.

Pay: What individuals are paid (or the total pay of individuals in a household) varies between nothing and a lot (though

nothing like the heights of wealth). We should expect pay inequality to be high but not as high as wealth inequality.

Income: This includes pay and benefits from the government, so tends to be less varied than pay. Almost everyone gets at least something. Various studies confirm the reasonable expectation that wealth inequality is usually higher than income inequality (e.g. Saez, 2012, looking at the top 0.1% of people in the USA between 1913 and 2012).

Consumption expenditure: As noted earlier, people with higher incomes tend to save more. That means their expenditure typically does not keep up with their income. Many leave quite a lot of wealth to their families, so this gap between income and expenditure is not just a matter of saving for retirement. We should expect this money measure of inequality to show less inequality than income.

Consumption of real resources: The money we spend does not directly translate into consumption of real resources. Typically, spending twice as much money leads to less than twice the consumption of real resources. We buy quality rather than quantity. For example, we might buy a house that is the same size but in a more attractive location, get a haircut by a more skilled stylist, or buy a costly antique.

Real resource consumption inequality will usually be less than consumption expenditure inequality. That is not to say that resource consumption inequality is negligible. Obviously, some people consume far more than others.

Real resource consumption is usually the most visible to others. If someone is wealthy but does not have a large house, large garden (but not for growing food), three cars, two dogs, and so on then we

probably would not realise they were wealthy.

There is research confirming the reasonable expectations we have about different inequalities. Fisher, Johnson, and Smeeding (2015) studied the USA between 1984 and 2011 and found that income inequality (measured with the Gini index) was much larger than expenditure inequality, which was much larger than resource consumption inequality.

Since it is resources that we compete for, resource consumption inequality is more important than the money inequalities discussed earlier in this list.

Consumption utility: The real resources we consume do not perfectly determine the value (utility or happiness) we get from that consumption. The differences can be huge and it is harder to make a generalization about the size of the inequalities compared to others. It may be that consumption utility differences are very large but weakly linked to money inequalities.

By carefully choosing what we buy and how we live we can get a better life with lower consumption. Sometimes products are better by design so they give more and consume less. Sometimes expenditure and consumption are completely unnecessary to achieve our aims.

It is also true that some people need more support than others (e.g. due to disability) so expenditure that is adequate for one person might not be for another.

Some people are angered by family inheritance, typically where the wealth of parents is passed on to their descendants. This, combined with the fact that the children of high earners tend to become high earners themselves, is taken as evidence of injustice.

Two factors explain why the injustice is not as great as it might seem, and one of these relates to consumption utility. First, high earners are more productive, on average, and this productivity is, to some extent, passed on genetically and by nurturing to their children. The children of the rich really are more productive, on average, despite some high-profile exceptions. Even in a society with perfect social mobility, the children of the rich would still tend to be richer too.

Second, even when smart people have a long way to go to close the wealth gap, they can reach high incomes quite quickly and immediately get higher consumption utility from the money they spend.

E.g. To understand how this can happen, imagine two boys born on the same day. One has hugely rich parents but lacks intelligence and self-control. The other has financially poor parents but great intelligence and self-control.

The rich boy is given and then inherits huge wealth but, lacking intelligence and self-control, he wastes his money on booze, girls, and fast cars. He starts most days with a headache. He has no real friends and constantly argues with his family and others in his life. He travels often to the glamorous locations he thinks he should go to, spending hours drunk on planes and waiting in lounges, then sweltering at parties in Monaco. He spends thousands each week on going out in a futile attempt to find friendship and love; all he finds is people hoping to get some of his money. Instead of earning money he loses it through stupid investments in nightclubs. His latest supercar has brought nothing but aggravation. It is almost undrivable in city traffic, scrapes speed bumps, is unreliable, and can only be serviced and repaired at a very few

locations. At least it has not caught fire like the last one. For the rich fool, life is complicated and bewildering. He should be happy but instead he feels ill, tired, depressed, and desperate.

In contrast, the poor boy's high intelligence and self-control quickly earn him excellent qualifications and an interesting job. He is rapidly promoted and his income is soon enough for a reasonably comfortable lifestyle. He spends his money wisely on things that are better by design. He prefers cars that are small, easy to drive, and reliable. He does not commit himself to stressful and unnecessary travel. He marries an intelligent and level-headed woman and starts a family. He has several good friends. Instead of spending money to socialise with them he keeps in touch by video call, by going for walks with them, and by home visits to chat. He sleeps well, is in good health, and has no aches or pains most of the time. For him, life is comfortable, interesting, and worthwhile. He is not wealthy yet, but he has been happy since childhood.

These two fictional cases illustrate plausibly how higher ability ('merit') can give people better lives long before wealth and even income have matched those of others with more money but less ability.

If wealthy people want to help others by reducing inequality, what should they do? Money alone is of limited value. Imagine a person who lives modestly alone in a small house in an ordinary town and drives a small car, but rarely. He works in a local public library and does some charity work. His big secret is that he has £10bn of inherited money stashed in bank accounts across Europe. How could that wealth benefit others in his country?

Spending the money does not create new resources; it just redirects resources from one activity to another. If the money was spent buying resources from other countries that would help his own country but deprive people in other countries of those resources.

If the money was spent on useless frivolities (e.g. a second house with a swimming pool, jewels, the world's most expensive ice cream) then the impact would be to make resources unavailable to others, so that would be bad for society overall. Not spending his secret riches would be better than spending them this way.

The rich person can make a positive difference by spending money on things that lead to efficient use of resources in meeting his real needs and those of others rather than frivolous wants. The rich person cannot create resources simply by spending money. You cannot eat cash or shelter in a bank balance. However, he can direct resources to worthwhile activities by donating to a charity or funding a business that does worthwhile things. Or he can use the money to develop and roll out technology that improves resource efficiency.

What matters is *what* the money is spent on. Although a wealthy person can direct more expenditure than other people, we can all make choices about what we consume and what we do as work.

One important effect of wealth inequality is that it gives rich people power that others do not have. They might use that power well or badly.

2.14 Making money work

The money system, ideally, should be managed so that decisions made correctly on the basis of money correspond to decisions made correctly

on the basis of real resources (including pollution), as far as possible.

This means that people make the right purchases, in the right quantities, at the right times.

- They should not be led to buy more polluting products because the cost of the pollution is not reflected in their price.
- They should not be prompted to accelerate or defer purchases by purely monetary effects such as inflation driven by money supply or by baseless increases in prices.

2.15 Drivers of change

Economies are not natural phenomena in the same way as, for example, tides, chemical reactions, or flows of energy in metals. Economies are created by the decision making of people, which is influenced by how they think their own economy works and how they think they should act. This applies not only to government ministers but to every person in the society and all their economically relevant decisions.

Improving our real economic performance is not just a matter of applying some new tax rates or changing some rules. It requires a better understanding by as many people as possible of how the economy should work and how participants should act for best results.

The main drivers of change towards a better real economy can be divided into:

- Our knowledge of actions we can take (e.g. technologies we can use, products we can buy, adjustments we can make to our lifestyles).
- Our understanding of the consequences of our actions.

- Our preferences, including who we care about and what we want for them.

We also need time to make changes because they often involve considerable design, problem solving, experimentation, revisions, rearrangements with others, and so on.

Government actions such as subsidies, taxes, and bans can sometimes help things along. They usually change the consequences of our actions.

Each of the main three drivers is vital.

Knowledge of possible actions is vital because a person will not usually change until they know a better way. There will be no improvement, however much they would prefer alternatives if they knew about them.

With supplier technology, there are usually specialists such as engineers with detailed, sophisticated knowledge. Their problem can be getting agreement and support from others in organizations they work with – others who might not be as knowledgeable or imaginative.

In contrast, ordinary people considering their lifestyles are often not particularly expert at it. Some are, of course, and may have amazing knowledge of how to live well, treading lightly on the planet while enjoying a healthy and relatively stress free and happy life.

Knowledge of the consequences of alternative actions (e.g. technologies, lifestyle options) is the crucial link between knowing the options and making a wise choice. The consequences are often more varied than people realize. For example, many people think that climate change is the only important sustainability concern, but of course it is not. And beyond concerns about resource efficiency and pollution there are other factors that are important.

E.g. Electric vehicles (EVs) are endlessly cited in the media for their role in climate change reduction but the reasons people have developed and bought them are more varied. EVs also produce no fine particulates when driven so a major gain from EVs will be improved air quality and reduced early death from particulates, which is a large issue in many countries. Perhaps more importantly to sales, many people now see EVs as cool. Tesla made electric cars cool by starting with sleek luxury models (and pushing the technology and performance forward). They are also easy to drive, smooth, and quieter. Maintenance is simpler and cheaper too compared to similarly luxurious vehicles with complex internal combustion engines.

E.g. LED lights are much more efficient than incandescent lights and cleaner than compact fluorescents. The supply technologists have made great strides and most of us have been happy to adopt LEDs into our lives for their good quality light, immediate illumination, long life, low cost (now), and stylish appearance. Governments helped that along by banning incandescent lights after a reasonable time had been given to adopt more efficient alternatives.

People with a weak knowledge of the technologies and consequences are more likely to think that becoming sustainable will be 'expensive'. They are less likely to understand the potential cost savings that can be made by living without needing to consume as much. They are also less likely to think of lower-cost methods for implementing new technologies (e.g. when replacement would have been needed anyway).

Understanding the consequences of actions includes understanding how our waste affects others and understanding

the current challenges of sustainability and aging, among others.

Our preferences also vary between people. Decisions might be based on purely selfish concerns, or might include concern for one's family, friends, wider society, humanity, or the planet and all its species.

For people whose calculations are purely selfish it may help to use tax rules to adjust prices so that polluters pay (though perhaps modified to reflect ability to pay the tax).

Many people are not purely selfish or perhaps they practice an enlightened form of self-interest that recognizes the value of living in a thriving society.

E.g. Many of us recycle plastic. Not just plastic cartons but even those hard-to-recycle plastics. We find somewhere to take them and we make the effort, even though we suspect that our waste plastic is not really recycled at all, or not very efficiently. We do this anyway to send a message to people on the supply side: we care and we want more done about plastic waste.

Because knowledge is central to change, people wanting to promote real economic improvements should put a lot of effort into sharing information and explanations of technologies with everyone they can reach. Complaining at just politicians while alienating ordinary people is the opposite of helpful.

3. Individual lifestyle choices

3.1 Competing for real resources

This section considers in more detail lifestyle choices we make for ourselves. Obviously, a lot of the work and other resource consumption in our lives is the result of decisions made by other people

(especially suppliers), but these are harder to influence.

In weighing up alternatives we may be influenced by purely selfish motives and by a desire to be good citizens.

Many of us have made some lifestyle choices without really understanding the implications for the work we personally must do as a result. Perhaps we thought about the decision with money cost in mind and forgot the other costs.

Now we find ourselves with cluttered homes and far too much to do. We are stressed and frequently feel out of control. Some of that is the result of decisions we made some time ago that we could, with some effort, revise now.

From a purely selfish point of view, considering the real economics of our choices is important and gives somewhat different answers to the money-focused approach.

Real economics is also a useful perspective if we would like to consider our contribution as citizens. From this point of view our lifestyle choices, including home, travel, holidays, occupation, eating, leisure activities, pets, and anti-social behaviours are all important.

Without taking a moral position on this issue, the fact is we compete for human work and other limited, scarce resources. If a person has a huge garden and hires a gardener to look after it once a week then that is labour that someone else cannot buy. If a person buys food for their dog then that uses food production resources that might instead have been used to feed people.

On some occasions, financially wealthy people buy labour for things they don't really need, leaving less labour to do simple essentials for financially less wealthy people.

A wealthy person might think that, by spending their money on anything at all, they are spreading their wealth and giving employment to others, which is good. It is true that they are spreading their wealth and giving employment, but they are also using up labour and other resources so that less is left for more essential things for others. At the very least, the prices of other products will be pushed up, just a tiny bit, as others compete with the wealthy person's spending power.

This is a clear insight from real economics on a point where thinking about just money can lead to a different (and wrong) conclusion.

In a market economy, the expenditure of the wealthy on luxuries tends to increase the price of essentials for everyone, which is much more of a problem for those who are financially less wealthy.

Since realizing this, my choices have changed, but whether you make changes is up to you.

The fact that we *can* afford something financially does not mean that we *should* choose it.

What is needed and what is frivolous? For individual decisions it is for the individual to decide, but it is not entirely an arbitrary decision. What could you survive without if stranded on a desert island? Can you really need another expensive wristwatch if you already have an extensive collection? Of course there are cases where it is not clear if something is needed or not, but there are also many cases where the answer is obvious.

3.2 Apparent counterexamples

Although it is obvious, in principle, that we compete for human work and other limited, scarce resources, in practice this may be difficult to see and some

apparent counterexamples may occur. Also, the supply of many resources is not absolutely fixed, even in the short term.

As described above, the effect of our consumption on how labour is distributed may take time to occur – perhaps years to affect career choices, the creation of training schemes, professional organizations, and so on.

For example, pubs in the UK survived for many decades as places for people to go to drink alcohol and smoke tobacco. They did very well from people with this double addiction.

However, as smoking and drinking have declined in popularity, and since smoking in pubs became illegal, many pubs have closed and others have become much more like restaurants. This shift from serving harmful, addictive drugs to serving food still continues even years after the smoking ban came in.

There may also be cases where spending on frivolous luxuries leads to the development of technology and skill that then proves useful in providing more necessary support to everyone.

E.g. It is often thought that Formula 1 racing car technology transfers to ordinary road cars. In practice I suspect this is very rare and that, if there is any transfer at all, it is usually from the relatively much larger investment in ordinary vehicles to the relatively tiny racing teams. For example, teams have been using carbon fibre body parts for over 30 years but this technology was invented for aeroplanes and still has not become cheap enough for widespread use in ordinary cars.

³ Is that a lot? In 2020 there were approximately 5,500 people employed to install solar panels in the UK (excluding Northern Ireland) (Statista,

3.3 Lifestyle choice areas

The implications of our lifestyle choices are so important the next several sub-sections explore them in much more detail.

The objectives of this analysis are to:

- illustrate the effect of the choices we make, and could make in future; and
- demonstrate the type of analysis that can often be used to assess, quickly, our options.

3.3.1 Gardens

When I was first a house owner, I wanted a garden. As a father, a garden was also good for the children to play in. Now, with my sons too old for that, the garden is a millstone. Just keeping a simple garden under control is a huge and tedious task unless gardening is an activity you love for some reason (which only makes the huge task less tedious).

Many UK homes have a garden and collectively the work involved in maintaining them is enormous.

According to The Horticultural Trades Association (HTA):

- The UK's domestic gardens cover an area about the size of the county of Somerset.
- About 674,000³ people were in paid employment in 2019 in the 'ornamental horticulture and landscaping' market (i.e. gardening as opposed to farming). And of course an unknown amount of unpaid work is done by garden owners.
- The contribution to GDP of this industry was £28.8 bn in 2019, calculated in a way that picks up indirect effects of gardening.

2022). More on related sectors is provided by the ONS (2020).

- The average family spends £150 a year on their garden (but does some unpaid work on it too).
- 75% of adults have access to a private garden but only 51% say it gives them a good deal of pleasure, only 42% say they tend to work in their garden in their spare time, and only 35% grow some food in their outdoor space.

How much gardening do we need?

We can analyse the elements of gardens and criteria for evaluating them. We want gardens that are attractive/impressive, enjoyable, functional, edible, and yet easy to look after.

This suggests we might focus on:

- garden plants that are either very easy to look after (e.g. lavender, box trees, slow growing hebes, small herbs, flowering perennials);
- or edible (e.g. solar gardening with cloches);
- with plenty of masonry that needs no maintenance at all; and
- simple lawn shapes with easy-to-mow edges.

Choosing a hedge or fence for a garden is another example of a choice that drives work. If you go for a hedge made with the notoriously fast growing leylandii tree then major pruning is needed most years. Choose box trees⁴ instead and a light trim is all that's needed. A fence may need no maintenance at all but may need replacing after perhaps 10 to 25 years, depending on its construction. A brick wall might last even longer but is much more work to construct and more energy intensive.

Indoor plants in pots need to be looked after carefully or they die. Each needs the

right amount of water at the right times, and the right temperatures and light levels. Indoor plants can help to clean the air we breathe indoors but there is a price to pay: they must be cared for like babies.

3.3.2 Major social events

Some of the choices we make that create work and consume other resources are driven in part by advertising.

In the UK the cost and rigmarole involved in major social events seem to have grown over the years. Christmas, New Year, Valentine's Day, Mothers' Day, Fathers' Day, Halloween, Guy Fawkes Night – all of these are opportunities for retailers to promote products specifically for those days. Christmas and Halloween seem to have been the biggest growth markets. There are retailers that sell nothing but Christmas decorations.

But these are nothing compared to the costly behemoth of a modern wedding. Weddings are an industry, and that industry manufactures 'traditions' that have become more and more elaborate (and expensive).

According to the UK Weddings Taskforce, this industry employs around 400,000⁵ people in the UK and causes financial expenditure of £14.7 bn a year. The average wedding has 100 guests. The figures they give imply that on average £33,740 is spent on the day itself, £11,486 on gifts, and £7,538 on travel. This sort of money could help a young couple in much more direct ways in their first few years together and when starting a family.

Every time we plan a major social event we have choices about how we do it. Do we buy whatever retailers offer? Do we

⁴ Sadly, an invasive species of moth has arrived in the UK and is gradually destroying box trees as it spreads.

⁵ Is that a lot? Across the NHS there are about 360,000 nurses (Nuffield Trust, 2022).

go all out to display our wealth? Or do we focus on our own personal traditions and favourite rituals, reusing the same objects instead of buying more?

Where I live there is a day that highlights this choice. Just after Christmas, people put their used Christmas trees out by the road so that the local council can collect them for composting. Almost every house puts the carcass of a dying tree out into the road. Those trees grew for years before being cut down.

My wife finds this unacceptable so we have two small trees planted in large pots that we keep alive all year round.

3.3.3 Vehicles

Another area of life where we have a choice between using what is practical and having a lot more is with our vehicles. Some of my neighbours have the modest vehicles they need for their ordinary use. Some have vehicles somewhat larger and more complex than they really need. Some have additional vehicles that are just for fun. One neighbour has two luxury sports cars.

Again, these are choices we make. They create work we have to do, to pay for, maintain, and accommodate the vehicles, and they consume other resources, especially very large and powerful vehicles.

The trend in recent decades towards larger SUVs has somewhat offset the increase in fuel efficiency over the same period. These fatter cars also leave less room on the roads for other vehicles, which is especially noticeable when passing on a narrow urban road. Wide SUVs are a problem in many car parks too. If SUVs park on either side of your car then there is less room for you to get in and out of yours. Being higher than ordinary cars, their headlights are particularly glaring for the car ahead in

busy traffic at night. The SUV's weight and special wheels mean they do more damage to roads and SUV drivers are more likely to leave the road and leave deep ruts in soft grass verges. This problem is severe enough where I live that some homeowners have put rocks on the grass to deter drivers from mounting the kerb.

In a crash the occupants of a smaller vehicle are more likely to be killed or injured.

The emerging issue with larger vehicles, especially SUVs, is that they are part of a slow arms race, whereby the best way to be safer on roads is to get a bigger car. From that develops all the extra work and other resource consumption involved with the larger, more damaging vehicles.

3.3.4 Entertainment

Even what we do when we sprawl on the sofa can make a difference to the total work needed to keep our world going.

Tune in to watch some Formula 1 motor racing on television and you are providing a tiny bit of support to a circus that consumes astonishing amounts of work as well as other resources. No wonder television channels also fill up on cheap-to-make game shows and low-budget documentaries.

If you enjoy 'The Antiques Roadshow' just as much or more than Formula 1 racing then you and your viewing choices can make a tiny but worthwhile difference to how much work needs to be done in our society.

Entertainment requires a lot of work. According to the Department for Digital, Culture, Media & Sport (2022), employees in the relevant sectors in 2021 were as follows:

- Creative industries, 2,300,000⁶.
- Digital, 1,800,000.
- Cultural sector, 708,000.
- Sport, 527,000.
- Gambling, 73,000.

3.3.5 Olympic sports

Are all sports equally good for society?
Should we encourage increased participation and promote professional participation and television coverage of all sports, with no discrimination?

Analysing this question illustrates how we can analyse familiar activities with resources, especially work, in mind, along with other considerations.

Let's consider Olympic sports and sports that might one day become Olympic sports. Some sports have some definite disadvantages:

Generating a lot of extra work without giving much health benefit:

- **Requires a lot of expensive equipment:** e.g. BMX, indoor cycling, sailing, equestrian, swimming, slalom kayak and canoe.
- **Leads to lots of injuries:** e.g. BMX, show jumping, pole vault, boxing, road cycling, weightlifting, hockey.
- **Provides few fitness benefits:** e.g. sailing, shot put, hammer, javelin, equestrian, shooting.
- **Requires physical development too extreme to be healthy:** e.g. marathon, 10k swimming, triathlon, weightlifting.

A bit frustrating to play and watch:

- **Is frequently interrupted by officials** (usually because there is physical contact between competitors that can only be regulated by an

umpire because natural behaviour would be to fight): e.g. taekwondo, boxing, fencing, hockey, football, handball, rugby, squash.

- **Gives the better player only a slightly better chance of winning:** e.g. BMX, football.
- **Relies on subjective scoring:** e.g. the artistic component of gymnastics and synchro swimming, boxing, taekwondo, diving, wrestling, judo.
- **Looks a bit clumsy:** e.g. football because of the physical contact between players and use of only head and feet.

Not encouraging socially desirable behaviour:

- **Uses weapons:** e.g. archery, shooting, fencing.
- **Is a form of fighting:** e.g. boxing, taekwondo, judo.
- **Statistically linked to antisocial behaviour:** e.g. football, boxing.

Restricted participation:

- **Heavily favours players with a particular body size:** e.g. volleyball, basketball, gymnastics.

With these factors in mind, some existing Olympic sports that do very well include:

- middle-distance running
- badminton, table tennis, and tennis

Some sports that are nearly as good are:

- high jump, long jump, triple jump
- running sprints
- indoor swimming
- mountain biking
- rowing, canoeing, kayaking (on flat water)

Some good sports that are not in the Olympics include:

- roller-blade racing

⁶ Is this a lot? Yes, of course. But for comparison, the entire construction industry in the UK

employed only 2,127,000 people in 2021 (ONS, 2021).

- netball
- squash

In contrast, some sports that are even worse than most Olympic sports, even though they are very popular, include:

- F1 racing and vehicle racing generally (cars, motorbikes, planes, boats)
- pub games like snooker, pool, and darts
- horse racing
- kite flying and land sailing.

To some extent the popularity of sports is related to how easily people can participate (e.g. running, football), but there are also sports that are very hard to get into but provide a spectacle (e.g. F1 racing).

We could invent and promote new sports that are designed to provide strong health benefits and a good test of who is best, but with low resource use:

- High jump where you just jump up from a standing start to touch a plate (potentially with a mathematical formula that allows for body height and weight).
- Standing jump using hand weights (an ancient trick that produces slightly larger leaps) to clear a pressure sensitive plate or sand pit.
- Long strides where you count the number of strides needed to cover 50m, with multiple rounds used to establish a winner.
- Throw and catch time trial, where pairs of contestants, each standing in a box marked on the ground, throw a ball backwards and forwards between themselves 20 times against the clock, with the rule being that they can only throw when within their box.
- Gym test competitions somewhat like the old Superstars format with around 10 tests. (Crossfit competitions involve too much equipment.)

- Cycling, rowing, or capstan turning on a machine.
- A new form of badminton with two racquets, one in each hand.
- Electronically scored speed hopscotch.
- A smooth movement competition where a computer uses g-force readings from a belt-mounted gadget and sums them over time as the competitor moves around an obstacle course within a limited amount of time.

If governments directed their money towards the sports with the best net benefits, and if we citizens chose to attend to and participate in those sports too, then over time we would benefit. We would benefit from less boxing, more badminton, and from less show jumping, and more competitive jumping.

3.3.6 *Holidays*

Is the best holiday the holiday that's the longest possible and in the nicest possible location? Not necessarily. People seem to have very different ideas on this but consider these two alternative plans for a family in the UK with two weeks off work they can put to a holiday.

Plan A involves loading up the car on Friday night after the last day of work, driving to Dover, taking the ferry to France, and then driving down to the south of France in one long effort taking several hours. Accommodation is a small hotel near the sea. It's really hot for most of the time.

The journey home is similar, arriving home on Sunday evening with work to go to the next morning.

Plan B involves taking it easy at home for the first weekend, then driving for an hour to the countryside, having a walk, then driving on further for another half hour to a small hotel in the UK. It's hot for two weeks, but nothing like the south

of France, and two days are affected by rain.

The drive home is an hour and a half on the Friday, leaving a weekend to get unpacked and enjoy being at home for a while.

Which plan do you prefer?

If you like Plan A then presumably the extra work involved in travelling is compensated for by your pleasure at being in the south of France and being away for a bit longer. Personally, I want holidays that let me rest and I don't like France or very hot weather so it's no contest.

Or how about Plan C, which is two weeks in Florida at the Disney resort, featuring a very long and expensive journey, punishing heat, and long queues? The work content is even higher with this plan.

One of the most resource-consuming elements of many holidays is the travelling. Air flights in particular involve huge consumption, especially if disrupted.

3.3.7 Food

'Fine dining' is the name given to eating in a restaurant where the food is very expensive, largely because the recipes are complicated and time consuming.

This reaches its pinnacle with tasting menus, which are collections of many tiny portions of different dishes served as one meal.

The irony of fine dining is that the food looks so perfect, so neat, and so regular, that it almost looks like food made efficiently by a machine in a factory to be sold in a supermarket. Indeed, if you really like food that is perfectly formed like this then mass-produced, machine-made food is a good option.

When cooking at home we also have choices, such as with how literally to

follow a recipe. Following recipes literally often means shopping specially for the exact type of dried herb or niche Italian oil specified. Using the same recipe merely as a guide involves just using what you have or buying some reasonable substitute for special ingredients.

A major driver of the resource consumption and work involved with food is the quantity we consume. Consuming more than needed will lead to becoming overweight.

According to Baker (2022), the proportion of English adults who are overweight or obese had risen to 64% by 2019, with 28% being obese. Roughly 1 in 7 children was obese (not just overweight) by age 5 and 1 in 4 obese by age 11. The children aged 5 typically eat only what their parents and other adults have given them. Children in poor families were more than twice as likely to be obese as children in well off families. Obesity is more common in the north of England than in the south.

These statistics indicate considerable scope for eating less with benefits all around.

3.3.8 Pets

'Mummy, all my friends are getting puppies. Can we have one?'

A few years ago the average cost of owning a dog in money terms was around £16,900 over its lifetime (This is Money, 2011), but to that must be added the work of looking after it, including feeding, hygiene, exercise, vet visits, taking to kennels, a larger car, home redecoration, and so on. Want to sell your old sofa on ebay? It will be harder because your home is not pet free.

Cats are slightly more expensive in money terms, but less work for the owner because you don't have to take them

walking every day. It might be argued that the owner of a dog will want to walk every day anyway, for healthy exercise, so the dog does not add to the labour. However, this is not true for small dogs, fat dogs, old dogs, and dogs too badly behaved to allow the owner to just walk. In reality, many owners find themselves spending more time hanging around with a poo bag than walking at exercise pace.

Even a small fish in a tank indoors needs to be looked after.

Pets, like indoor plants, are a bit like babies. They need care and generate work. Even fish need to be cleaned and fed. If you go away for a week then something needs to be done to ensure they are looked after while you are away. If you have a dog and a visitor does not like dogs then you must monitor, control, and probably lock it away somewhere. If your dog bites someone (and it happens thousands of times a year in the UK alone) the stress and work involved are immense for you and the victim.

Despite the costs and inconveniences, pets are very popular in the UK. According to PDSA's PAW Report (2022), in 2022 27% of UK adults owned a dog, giving a population of an estimated 10,200,000 dogs. There were 11,100,000 cats and about 1,000,000 rabbits. The resource consumption, including paid jobs, demanded by this many pets must be considerable.

Pet owners are often caring people who love their animals and care about people too, such as those in poverty. I suspect many pet owners are unaware that their pet ownership competes for real resources (food, medical care, other labour) and so, indirectly, contributes to the hardship of poor people (roughly 13m people, including 3m children, in the UK by typical estimates versus 10m dogs and 11m cats). If this understanding spreads

then we might see more pet owners deciding against allowing their pet to breed and against replacing their pet when it dies naturally.

3.3.9 *Anti-social work creation*

There are many anti-social acts that create work that is useless and should be unnecessary. For example:

- vandalism (damage, graffiti);
- littering;
- not putting your supermarket trolley back, your basket, or your tray in a canteen with self-clearing in place;
- aggressive/criminal behaviour requiring policing, security procedures, security equipment, and inconvenient restrictions on everyone, such as:
 - football match fighting
 - pub brawls
 - mugging
 - riots as cover for looting
- poor health requiring care caused by substance abuse, such as with:
 - smoking
 - alcohol
 - sugar
 - illegal drugs
- lazy failure to abide by public administration procedures, drawing in resources to sort things out, for example with:
 - tax forms
 - social security claims
 - vehicle registrations.

A report by the UK's Home Office in 2004 estimated the annual cost to government agencies of many types of antisocial behaviour, including some listed above:

- Criminal damage/vandalism, £667m.
- Intimidation/harassment, £496m.
- Litter/rubbish, £466m.
- Nuisance behaviour, £355m.
- Vehicle related nuisance, £340m.

- Rowdy behaviour, £249m.
- Noise, £249m.
- Drugs/substance misuse and drug dealing, £132m.
- Street drinking and begging, £126m.
- Animal related problems, £114m.
- Abandoned vehicles, £90m.
- Hoax calls, £49m.
- Prostitution, kerb crawling, sexual acts, £42m.

In total these add up to £3.375bn a year, but this is only the cost to government agencies. Victims of this behaviour also suffer considerable disruption. This information is based on a small sample, many estimates, and is about 20 years out of date. However, it gives some sense of the overall scale.

Arguably, imposing over-complicated and confusing bureaucracy on others is another anti-social behaviour. It is certainly time wasting. However, this is the result of choices by people when working for organizations, so does not belong in this section.

3.3.10 Choice of occupation

We also make a difference by our choice of occupation. For example, a drug dealer makes work necessary that should not be while doing nothing useful. In contrast, most doctors do work that is really needed.

Typically, careers in necessary activities are more secure. In an economic crisis people cut back more on frivolous luxuries. The exception to this is where the demand is caused by addiction.

3.3.11 Stuff

The work involved in getting, storing, maintaining, and then disposing of stuff, things, and general clutter is considerable.

Insurance schedules confirm that in the UK over the past few decades the amount and value of stuff in our homes has increased dramatically. This is especially true for some categories, such as electronic gadgets, but is also true for just about everything else. This includes clothes and furniture, for example.

Having too much stuff is now normal.

A survey of household expenditure across the UK in 2021 by the ONS gives some insights into what we spend money on. The following annual numbers for clutter are quite small compared to some of our larger expenses but clutter spending is on things that usually last for years, so they build up:

- Clothing, £17.212bn.
- Footwear, £4.004bn (men slightly more than women).
- Furniture and furnishings, carpets and other floor coverings, £22.204bn, which includes £1.872bn on 'fancy, decorative goods'.
- Glassware, tableware, and household utensils, £3.328bn.
- Audio-visual, photographic, and information processing equipment, £6.916bn.
- Games, toys, and hobbies, £4.316bn.
- Computer software and games, £1.664bn.
- Equipment for sport, camping, and open-air recreation, £2.184bn.
- Newspapers, books, and stationery, £7.124bn.
- Jewellery, clocks and watches, and other personal effects, £1.872bn.

One consequence of having more and more stuff is that the work of storing it gets disproportionately greater. The problem is that finding space for the last

few things gets harder and harder. Then the thing you need to retrieve is not easy to find or get out because it's behind three other things on a high shelf, in the loft, or in the garage.

As with a congested diary, a congested home makes change harder.

Most of us would benefit from getting rid of stuff faster than we acquire it.

4. Management choices

This section considers choices made by people at work on behalf of organizations.

4.1 What businesses to be in

Focusing on businesses that provide necessities rather than luxuries is a sound business principle. With this approach, demand for your product or service is likely to be more dependable through economic cycles and into the far future. Focus on frivolous luxuries and you may find that demand falls sharply in economic crises and that governments and public sentiment turn against you in time.

Businesses that provide necessary goods and services, and do so efficiently in terms of real resources, also make a superior contribution to society.

4.2 How to be efficient

To become more efficient, businesses should consider real resources – especially labour – not just money.

A typical accounting method for finding potential cost savings is to study the money first to prioritize the search. Priority goes to large expenses, expenses that have increased, and expenses that seem high compared to some other, similar projects or operations. This can be helpful.

However, many more clues to potential savings can be found by studying real resources. What resources are used and how much? Are any of them rare, imported, poisonous, or dangerous for other reasons? How does the actual efficiency compare to the theoretical maximum calculated using physics? What happens to the waste? Have the latest resource efficient technologies been considered for use? What are they?

Money can be deceptive and lead to biased decisions. Checking the real resources used can help to avoid them.

E.g. Imagine that a business currently has 5 offices spread around north London and the Midlands. Hoping to save money it considers moving all employees to one office in Milton Keynes – a roughly central location for them.

On paper this looks like it would save money on rent and on some support staff. The one worry is that some valuable staff might decide to leave rather than put up with a longer journey to work, but it's hard to put that into money terms. Fortunately, the extra cost of longer average journeys to work would not affect the company because it would be borne by the employees.

Or would it? The key point is that most employees will be travelling many more miles each day to work. That travel is itself work that wasn't necessary before.

Over time, those employees will push just a bit harder for pay rises. New employees will either be Milton Keynes residents already or will want just a bit more money to join.

Eventually, the money costs of the extra travel *will* come back to the

company but looking at it in simple accounting terms this is not obvious.

In addition to not wasting their own resources, organizations should not waste the resources of others, such as customers. This is a route to winning and keeping more customers as well as a public service.

Organizations often make extra, unnecessary work for others by careless design of bureaucratic processes. For example:

- Time spent filling in forms to provide information the organization already has.
- Time spent puzzling over confusing or incomplete instructions on a form or in a letter.
- Time spent trying to contact the organization to query confusing instructions (typing messages to a 'bot', waiting on hold, getting cut off and having to start again, being put through to the wrong person, answering security questions repeatedly on the same call, speaking to a robot that does not understand your voice, there being no option that matches what you want, talking to someone who does not know what to do, and giving up and trying again when you have more time).
- Time spent dealing with the consequences of an error caused through confusing instructions.
- Time spent dealing with errors the organization has made, sometimes for no apparent reason.

Some organizations, particularly large ones, seem to have more problems with complexity, confusion, and mistakes.

E.g. Most people who have had dealings with HMRC (the UK's taxation authority), the NHS (the UK's nationalised health service), or British Telecommunications know what it feels like to have your time wasted by needless complexity, confusing instructions, and customer service errors.

A 'usability bug' is a design flaw (e.g. in a computer system or form for customers to fill in) that leaves some users a bit confused, wastes time, causes stress, and may lead to errors. Many usability bugs can be removed with just minimal usability testing. Instead, many organizations do no testing and fail to notice or correct usability bugs when calls to call centres reveal them.

4.3 Behaviours to encourage from consumers

To a small but significant extent, people buy what businesses offer them, even stuff they don't really need. For example, it's hard to believe that British weddings would be as complicated and expensive as they are without a wedding industry constantly suggesting more ways to show your love and impress your guests.

Businesses can create frivolous demand but should they? As citizens, the ethical approach is to encourage sensible spending only, not unreasonable frivolous spending.

There is also, often, a commercial opportunity to offer a no-frills⁷, low-cost product or service.

4.4 Behaviours to encourage from employees

Employees in an organization make lifestyle choices at work too. For

⁷ In the case of weddings this might have to be a small-frills service rather than literally no-frills.

example, some salespeople focus on lavish hospitality – attempting to booze their customers into purchasing. Others just work to help them with the purchase decision, avoiding the expense and physical damage of boozing. Some workers see travel and face-to-face contact as an essential tool. Others work by video calls, saving time and other resources while keeping in more frequent contact. Some like to impress by arriving in a top of the range BMW. Others think a Toyota Prius or Vauxhall Corsa-e makes a better statement.

Organizations can influence these decisions, in some cases quite easily, for the better.

It is also possible to influence the business ideas that employees suggest. They can be thinking about the real economics of products and services.

For organizations that give advice to clients there is also the possibility of using real economic considerations to shape that advice.

4.5 Encouraging philanthropy

Charities in particular have a role in explaining why giving and lending are more ethical than personal consumption spending. A rich person who gives £5,000 to charity usually does more for the economy than one who spends £10,000 on a wristwatch. That's because the £10,000 diverts labour and other resources to a frivolous purpose that could otherwise have been available to do necessary things. Consequently, it puts up the price of necessities for everyone, including the financially poor. In contrast, the charity can spend that £5,000 on essentials.

5. Government choices

Thinking about real resources, especially labour, can also guide government decisions. This includes using different measures of progress and different types of model to guide decisions.

5.1 Measures of economic progress

What should governments measure and monitor? Real economic thinking can help us decide.

It would surely help to get reliable, detailed information about the following:

- **Lifestyle quality:** Health, mood, education, longevity, and so on.
- **Lifestyle efficiency:** The products our lifestyles require, measured in a way that is independent of the resources used to provide that support, so that shifts to easier lifestyles can be monitored.
- **Supplier efficiency:** How much work and other basic resource is consumed to provide the products our lifestyles require, overall and per person, so that improvements in supplier resource efficiency can be monitored.
- **Basic real resource availability:** This includes what is captured (e.g. energy, water, carbon, wheat) and how efficiently work is shared around, indicating where there are people who have too much to do and people with not enough.

Notice that these are counts and measurements of products, lives, and real resources, not amounts of money.

The main indicators should be supported by breakdowns and analyses of their drivers. For example, it would be helpful to know what proportion of the adult population is incapable of paid employment due to ill health, serious

disability, addiction, lack of skills, incarceration, personality disorders, and dishonesty. This might concentrate attention on the high proportion of young people who end nearly 20 years of formal education with no directly useful skills.

The most often mentioned economic indicators today do not deliver any of this information, despite the enormous effort that goes into calculating them. They tend to be money totals and fail to make distinctions between activities that are, in real economic terms, radically different. The same movement in an economic indicator could be the result of an improving or deteriorating real economy, so the indicators are ambiguous.

Gross Domestic Product (GDP) is the total money value of goods and services produced in the country in a year. Higher GDP is usually thought to be better. Increases in GDP are called economic growth.

GDP reflects work done, not why work was done, so increases in GDP can indicate that we are shifting to a more demanding lifestyle. This is the opposite of improvement.

For example, an increase in selling second hand goods (such as using charity shops, online auction sites, car boot sales) reduces GDP compared to always buying goods new. Increasing re-use is a good thing for society but makes the GDP figures look bad.

Selling more alcohol and nicotine contributes to GDP but not to good lives. When criminals do senseless damage to property our lives are harmed but the extra work needed to repair the damage contributes to GDP.

Productivity (in macroeconomics) is the money value of output per person (or working hour), so again it reflects just the money we are willing and able to pay for

work done. It does not discriminate between work we really need and work on non-essentials and remediation that should not have been necessary. It also does not discriminate between gains through efficient use of resources and gains from charging more for products by monopoly power, cartels, and other anti-competitive practices. Increasing productivity can be achieved by persuading or forcing consumers to buy a more expensive version of a product – probably involving greater consumption of resources too. Increasing productivity this way may increase waste in our economy.

Conversely, finding ways to use resources more efficiently enables goods and services to be provided more cheaply, reducing GDP and, potentially, reducing so-called productivity (if labour use is unchanged but some other resource is used more efficiently).

Employment reflects the number of people in paid jobs, not the actual labour contribution of people. If you care for your own children then you are working and contributing labour, but this is not captured in today's employment statistics.

Of course statistics on resource consumption do exist but I have not been able to find any that directly meet the requirements listed above.

For example, for the UK there are extensive statistics on energy use but these do not include the energy 'embedded' in goods and services imported or exported. The UK's energy consumption has reduced, though this is partly due to the decline of energy intensive industries (some of which were exporting their products abroad, effectively exaggerating UK consumption in the past).

The Eurostat productivity statistics on resource productivity go to considerable

lengths to remove the effect of inflation on its reported trends but the productivity reported is per kilogram of resource. Not only is a kilogram of uranium equated with a kilogram of water, but human labour is completely ignored.

The idea of splitting out the effect of our resource-demanding lifestyles from the efficiency with which those demands are met has yet to be implemented properly in official statistics.

One measure that is important in money management but particularly unhelpful for managing real economics is inflation.

Price inflation reflects gradual changes in prices, usually measured by tracking the money price of a basket of products and services. This might be driven by changes in:

- the supply of money (more money pushes prices up)
- interest rates paid by borrowers (lower rates increase spending and push prices up)
- the quality (e.g. freshness, safety, nutritional content) of the products in the basket (higher quality pushes prices up)
- efficiency of production (greater efficiency pushes prices down)
- competitiveness of markets (more competition pushes prices down)
- extent of wasteful consumption (more wasteful consumption pushes prices up), and
- extent of temporary cessation of essential consumption (more caution pushes prices down).

The rate of inflation reveals very little that is useful. A period of deflation is generally regarded by politicians and economists as bad yet some real economic changes (e.g. less wasteful consumption and more efficient production) could produce deflation. At the time of writing the Bank of England

has a target of keeping the UK's inflation rate at 2%, neither higher nor lower, regardless of the real state of the economy. This could incentivize it, at times, to keep wasteful consumption up and discourage efficient production.

Living in poverty appears to be about poverty but is in reality about having a money income a certain percentage below the median of incomes in a population. This measure is misleading in two ways. First, it is relative. People considered to be in poverty in a wealthy country might be considered well off in a poor country. Second, it is in terms of money, ignoring what the money can buy. As technology advances, we get more good living with less resource and this is not reflected in typical measures of poverty.

Similar points can be made about *living standards* when they are based on money and relative rather than absolute. When average pay rises less than average prices, people sometimes assume they are worse off as a result. In money terms they probably are, but in real economic terms they might not be because of the advance of technology.

5.2 Modelling real economies

To support difficult decisions about how to manage a national economy, governments often use quantitative models created by economists.

These should include knowledge of real resources and make predictions for real economic efficiency among other things. This includes:

- What work is done (paid and unpaid of various types), not just the amount of money paid to people to work.
- What people consume, instead of just how much money they spend on consumption.

- The amounts of various pollutants created and released.
- The effects of improving lifestyles and supplier technology.

Some important macroeconomic models today do not consider these crucial factors.

E.g. In the UK, the independent Office for Budget Responsibility does macroeconomic forecasting for the UK government. Although its complex macroeconomic model (OBR, 2021) embeds ideas about how the UK's economy works, its results are also driven by a long list of estimates about the current situation and guesstimates about the future (including how people will react to changes).

The model can be criticized on several grounds and is not particularly reliable, like most macroeconomic models. But one weakness is that almost all its variables appear to be⁸ money numbers. One of the rare exceptions to this is that the model knows how many people there are in the country of various ages, which are real economic numbers. However, it has no knowledge of what they do when they do paid work, what work they do that is not paid for, what skills they have, what they consume, or how good their lives are. The National Accounts provided by the Office for National Statistics have more analysis of economic activity in different sectors, but this is in money terms and still does not distinguish between useful and useless work.

This kind of omission might not be damaging if the purpose of the model was just to predict money phenomena

and there were other models that covered real economic issues and were used. In the case of the OBR's model, this is not happening.

5.3 Policy levers

Collectively, the lifestyle choices of ordinary people and the choices of people working on supply technology are the most important for our overall real economic efficiency. In the UK there are roughly 100,000 people for each Member of Parliament. We massively outnumber them, we work, and they mostly just talk.

Nevertheless, it is easier if governments adopt helpful policies instead of unhelpful ones. They have many policy levers they can pull.

5.3.1 Explanations and information

This is a sensitive but crucial area for governments. Many people do not fully understand how their consumption and work decisions affect them and others. If they knew more, they probably would act better. Without that understanding they may fail to respond to even significant tax and benefit incentives.

But how should a government promote understanding?

Some voters are exasperated by the behaviour of others and would like the government to force the badly behaved to reform themselves. This is what we expect governments to do on crimes like robbery, fraud, and vandalism.

On the other hand, some people do not like to be told what to do, even when they clearly need to change. They feel their intelligence is being insulted, even when they are being told things they do not understand but should.

⁸ It is quite hard to tell what units are used because, although the variables are listed with brief descriptions, the units of measurement are

not stated. This seems to be typical of macroeconomic models.

A British government would be taking a big risk if it told people not to waste resources on frivolous luxuries. The very fact that government says something annoys many people.

Nevertheless, governments can and should explain to citizens the reasoning behind their policies. This will be educational too.

E.g. If an agency to disseminate information about pollution costs is to be created then the minister responsible could explain what costs will be monitored, how they hope the information will be used, and what the positive effects could be if people make use of the information.

Governments can also provide statistics for the measures of real economic performance in documents, on websites, and when giving presentations of progress and policy changes (as was done through most of the COVID-19 pandemic). Statistics might also track specific behaviour changes and changes in attitudes measured through surveys. They might also provide informative case studies of changes people, companies, and other organizations have made.

Governments might also fund publicity campaigns and projects by charities.

5.3.2 *Labelling and rating schemes*

Information that helps people make wise purchasing decisions can be provided in the form of efficiency ratings, not just for the energy efficiency of domestic appliances, but for many other products and services and forms of efficiency, perhaps with a summary efficiency number as is used in Data Envelopment Analysis. These can be made available on product labels and websites.

5.3.3 *Discourage propaganda by news media*

Sometimes news media try to be supportive of policies they like but do it in a biased way that provides ammunition to opposers. We have seen this with Brexit, immigration, and climate change for example. If this happened with wise real economic policies it would be counterproductive.

Governments cannot control the opinions of news media but they can put in place regulation to tackle unfair presentation of information regardless of the topic. This might help to restore the reputation of news media.

5.3.4 *Technical education in higher education*

One of the critical limiting factors in improving resource efficiency is the availability of skilled people to invent and implement new technologies. No doubt many undergraduate courses offered today include significant elements of sustainable technology but this is not the same as a course that covers nothing but sustainable technology.

Higher education can do much more through offering courses on sustainable technologies. This should not be something that students move on to after a basic grounding in general engineering. They should be able to go straight into a course focused on sustainable technologies, covering precisely those basics needed to understand the new technologies.

5.3.5 *Technical education at school*

Education in sustainable technologies could also be greatly expanded in schools and governments usually have significant control over the qualifications offered. In the UK, the usual three sciences (physics, chemistry, and biology) could be slimmed down to make space for a GCSE in sustainable technologies. This would

cover heat pumps, heat exchangers, insulation, solar panels for heating, photovoltaics, wind turbines, battery technologies, and so on.

Done properly and with demonstrations of real equipment, this would be engaging for students. They would become knowledgeable about systems in their own homes or that could be in their own homes if their parents knew more.

A similar GCE Advanced level ('A' level) could also be offered. (The Council for the Curriculum, Examinations & Assessment, based in Northern Ireland, has already developed an 'A' level called Environmental Technology that meets this need.)

5.3.6 *Lifestyle education at school*

Also at school, young people could be educated in how their actions affect others through resource consumption and pollution. This could cover many areas of life in a practical way.

It might also be part of mathematics teaching to cover calculations needed for some resource efficiency choices.

The purpose would never be to indoctrinate children with a lifestyle; it would be to give them the understanding and information they need to make wise choices for themselves.

5.3.7 *Useful knowledge*

More generally, schools could spend more time teaching what is useful in the real, adult world. This would mean less time on Shakespeare and more on how to follow medical advice. Less time on quadratic equations and more time on how to complete tax and social security forms. Less time on the religions of the world and more time on knowing the law. Less time on the Vikings and more time on how to plan financially for retirement.

This would improve the motivation of most students but especially most boys and help to reduce the difference in average educational attainment between boys and girls. In particular, just making English literature an optional GCSE would be a big step forward. This GCSE produces a huge difference between boys and girls and is largely useless.

An important objective of education should be to minimize the proportion of the adult population that is unproductive due to lack of useful skills.

5.3.8 *Preventing unfair competition*

Improvement in resource efficiency typically requires innovation and innovators are often with small companies. There is a risk that large, established companies might use unfair tactics to stop innovative smaller companies disrupting the market with their new technologies. Governments should work hard to prevent this and strongly resist lobbying by companies trying to block new technology.

5.3.9 *Removing unhelpful policies*

Sometimes there are already subsidies and regulations that favour technologies that are no longer the most efficient available. These have become counterproductive and need to be removed.

5.3.10 *Taxation*

Among other things, taxes can have a powerful incentive effect. Specifically, activities that are taxed are discouraged and the heavier the taxation the stronger the discouragement. Governments should not discourage people from doing work for pay, moving home, buying insurance, or passing on their wealth to their children instead of blowing it on useless

consumption⁹. Conversely, governments should discourage people from consuming wastefully and creating pollution¹⁰.

The effect of incentives is likely to be stronger when people know the tax is applied, understand what they are being incentivized to do, and agree that this is good for society. Conversely, a small tax or change in tax level given little publicity, whose rationale many people do not understand or agree with, is less likely to be influential.

Governments can gradually shift the burden of taxation to promote real economic improvement. This will also provide somewhat more accurate information to guide consumption decisions.

Most of the products we buy need to be disposed of eventually. The cost of disposal is not usually linked to the cost of buying the product so we tend to overlook it when choosing products, undermining wise decisions. Taxes can help correct this.

Also, people who create pollution are tipping their waste into the lives of other people and causing them harm. The polluter should pay compensation. It would be too much to expect people to pay for pollution they created when nobody knew it was pollution. However, now we know and polluters should pay.

That approach needs to be softened to help people who are unable to pay. With today's supplier technology none of us can avoid creating pollution but we can

⁹ The UK currently has Income Tax and National Insurance that discourage working for pay, Stamp Duty discouraging moving home, Insurance Premium Tax discouraging insurance, and Inheritance Tax discouraging leaving wealth to others.

avoid creating unnecessary pollution through wasteful consumption.

Taxes can target wasteful consumption in several ways:

- Some products are wasteful when consumed in any quantity by anyone. A sales tax can be added.
- Some products are wasteful when consumed in any quantity by most people but a few individuals need them (e.g. dogs). A sales tax can be added but with the opportunity to claim a rebate for those few special people.
- Some products are wasteful versions of products we need. For example, a car much larger than a person needs. A more complex approach may be needed, worthwhile only for more expensive purchases such as homes and vehicles.
- Some products are wasteful only when consumed in large enough quantities. Here again some ingenuity will be needed to design suitable taxes. There is no simple option.
- A different approach is a progressive consumption tax that taxes money spent on consumption, with higher rates at higher levels of consumption. (See Bhattacharjee et al, 2022, for a recent simulation exploring the effects of such a tax.)

Ingenuity is needed to provide appropriate incentives regardless of whether people are acting as consumers or as suppliers. There is a choice between tax schemes that (1) levy tax at every stage of a supply chain and (2) levy tax on the final consumer and then allow

¹⁰ On a happier note, the UK currently has taxes on some non-essential purchases in the form of VAT and special duties on vehicle fuel, booze, tobacco, and air travel.

economic pressures to push the incentives back up the supply chain.

E.g. The UK's VAT system is a tax on consumption and is even crudely aimed at luxuries. However, it allows suppliers to claim back VAT they have paid on products they bought for their business. If they consume wastefully (e.g. through poor insulation or extravagant offices and travel) then they pay more for those items (the natural disincentive), but pay no tax, even if pollution is involved. This might be reasonable where a business buys an item and then sells it on but is not where the business consumes the product.

Taxation for pollution and disposal needs to be consistent to avoid biased decisions.

E.g. It would be misleading to make travellers pay for pollution when they travel by road but not when they go by rail or air.

Another approach would be to tax more highly companies whose activities are wasteful (e.g. casinos, short-term speculators, brewers).

When taxes on waste and pollution are effective in reducing waste and pollution then tax rates will need to be adjusted to maintain whatever is the required total tax take for a government. This will mean that the people who choose to continue wasting and polluting will find they are paying money at an even higher rate to do so.

In theory, a society using only taxes on waste and pollution where everyone is content with enough and where supplier efficiency is high might not provide sufficient taxes for a government to function. Such a society would be so far ahead of our society today that it is hard to imagine. Might there be other factors

that come into play? In any case, there will be plenty of time to work out a solution to this potential problem.

5.3.11 *Social security*

Governments have a crucial role in organizing some parts of lifelong mutual care between people in a society. If an adult is unable to do paid work then the government helps them get the things they need for life, usually by giving them some money. The design of these arrangements is extremely difficult.

They should recognize the value of useful work that is not paid work. They should encourage sharing of work rather than have some people overworked while others have too little to do for their level of capability. They should provide an incentive to work if you can. They should recognize that some people are extremely difficult to help due to illness, disability, psychiatric problems, addictions, or extremely low cognitive ability. With some people, giving money is not enough and some even reject help because it would interfere with their addiction or triggers their paranoia.

5.3.12 *Loans, grants, and subsidies*

Giving or lending money can encourage desirable activities but governments should take care if this involves picking technological winners. It can be very difficult to predict which of competing technologies will emerge as the leader and there is a risk that picking too early might block a technology that would have been better.

However, from basic scientific facts it is sometimes possible to identify ideas with better potential than others.

E.g. Biofuels have been a significant contributor to the UK's renewable energy, with ethanol blended with petroleum for powering vehicles. This is a government backed scheme. Is it a

good idea? If the ethanol is made from waste biomatter then it is a good use of land. The biomatter would be wasted otherwise. However, if land that could have produced food is used for biofuels then this is probably not a good use of land. Plants capture less than 4% of the sun's energy falling on their leaves in the plant's biomass, and processing this to produce ethanol wastes a lot of that captured energy. When this fuel is burned in an engine, more energy is wasted due to the fundamental limitations of heat engines. In comparison, a photovoltaic cell captures about 20% of the energy falling on it and this can efficiently be turned into vehicle motion. If the government's choices lead to land being dedicated to growing plants just for biofuels then the government is backing the wrong technology.

E.g. Production of proteins in meat for human consumption produces more greenhouse gases than production of plant-based proteins. This is not just because of the methane produced by ruminants (e.g. cattle and sheep). The sun falls on plants, which capture a small percentage of that energy in their bodies, some of it as proteins. If an animal eats those plants then it uses up most of that energy in its life. It has only a small percentage of that energy and that protein left in its body when it is slaughtered. That is a tiny percentage of the tiny percentage of the sun's energy that originally fell on the land used. By cutting out the animal from this process we can ourselves eat a much higher proportion of the energy from the sun, captured in proteins and other nutrients. This is an enormous, fundamental advantage for plant-based proteins, though there may be other factors to consider.

Support can be given to promising research (e.g. into a sustainable technology), promising new business ventures, and people wishing to learn useful knowledge (e.g. of medicine or sustainable technology). At the same time it may be helpful to reduce support for less useful research, businesses, and knowledge.

5.3.13 Regulation

Examples of types of regulation that have been introduced already include:

- Making manufacturers of some types of product responsible for the disposal of their products at the end of their lives.
- Restricting advertising and promotion of harmful products.
- Requiring safety and other warnings on product packaging.
- Bans on the sale of inefficient or polluting technology (e.g. incandescent light bulbs, leaded fuel, CFCs).
- Building regulations that set minimum acceptable levels of thermal insulation.

5.3.14 Public projects and purchases

Governments are huge customers and can use their power to:

- Require suppliers and products to meet performance standards for resource efficiency and pollution.
- Choose suppliers and products that offer excellent resource efficiency and low pollution.
- Build some types of infrastructure (e.g. for transport) that will improve resource efficiency and reduce pollution.

Governments are also huge employers and can use this power to:

- Require employees to learn about the real economic consequences of their choices, especially at work.
- Encourage employees to be resource efficient at work.
- Encourage employees to generate and promote ideas for improved technology.

5.3.15 Using market mechanisms to promote efficiency

Competition between businesses in fair markets helps drive their people to become more efficient and this usually improves real economic performance. Without this competition there is a danger that too many people will be happy to carry on without changing.

Governments can introduce more competition by privatizing public services either completely or by outsourcing some activities. Sometimes competition can be introduced without privatization. However, there must be a genuine risk of a business failing or jobs being lost to motivate change.

5.3.16 Increasing public control

Activities in the public sector are rarely wasteful luxuries. Typically, governments focus on services that are needed, especially by ordinary people. Transferring activities into the public sector provides an opportunity to end wasteful activities. Creating a monopoly puts an end to competitive advertising activity, which is another saving.

Unfortunately, both these moves tend to create growing inefficiency relative to the competitive businesses that would have been operating otherwise. Without competitive pressure, innovation is slower.

5.4 Guiding careers and consumption

Governments are usually frightened of consumer demand falling. They want people to keep on spending – on anything – to keep people in jobs and keep the frantic whirl going. They want people in paying jobs – whatever they are – to keep the money turning through the economy.

In the short term this is reasonable because sudden drops in demand cause unemployment that in turn creates hardship for some. In the long term this is counterproductive.

In the long term we need to move towards efficient consumption and useful jobs. Done gradually over time this could cause a reduction in demand but need not cause unemployment or hardship.

The type of drop in demand that causes job losses is one triggered by a sudden drop in expectations of future economic demand. In this type of crisis people are not trying to refocus on useful work, efficient supply, and efficient lifestyles. They are just trying to get through the next few months.

The type of shift needed is one where people deliberately refocus work on what is needed, with more effort going into caring for the elderly and building sustainable infrastructure. Simultaneously throughout the period of change we as individuals need to (1) deliberately change our lifestyles towards efficient consumption that brings happiness with less work, and (2) deliberate choose or change our skills and career paths towards the corresponding work.

The main challenge is likely to be in accelerating the change, not avoiding sudden crises. Governments can help guide us in the right direction.

To lay the foundations for wise career and consumption choices by citizens, governments can:

- Join in the encouragement to use resources wisely, educating everyone in detail about how their actions affect others and our planet.
- Incorporate this knowledge in schooling.
- Tax wasteful consumption (having explained the reasons for doing so) and so steer consumers to steer businesses towards more necessary products, thus changing the demand for employees.
- Overcome resistance to change that aims to keep things as they are (e.g. schoolteachers and university instructors who want to keep teaching the same material, companies doing low value, high pollution things who want to avoid higher taxes on their products).

On careers specifically, they can also:

- Develop and promote school and university qualifications that focus on the skills needed and waste less time on other things.
- Collect and share information on the career implications of career choices, especially those that steer towards dependable, useful careers and away from speculative bids for stardom.
- Invest in improving mathematical education so that fewer young people are barred from useful careers by early struggles with mathematics.
- Promote development and adoption of standards that make some jobs simpler.

Imagine how this would change the experience of people as they grow up. A different appreciation of the value of good work (less focus on glamorous roles

and more focus on truly valued roles). A clearer understanding of the challenges our society faces. Different skills learned. Different careers advice.

On consumption specifically, governments can also:

- Provide information about the impacts of specific products to aid wise decisions.
- Back this up with labelling.

5.5 Economic crises

Different types of economic crisis require different responses from governments, organizations, and individuals. Crises have different drivers and manifest themselves in different ways. There are often real economic issues (e.g. people not working because of a pandemic, war, or lack of confidence in future demand) and money issues (e.g. the threat of runaway inflation, money market plunges).

My hypothesis is that the key elements of a good response to economic crises are the same as in normal times: (a) cut frivolous consumption, (b) focus on useful work, (c) do that work efficiently, (d) distribute work more evenly, and (e) increase the supply of basic real resources by building additional sustainable infrastructure.

Unfortunately, in a crisis some of these things happen too abruptly leading to hardship (e.g. unemployment) while others are more difficult because of competing requirements from the crisis (e.g. war, treating the sick).

5.5.1 Boom and bust

National economies, and sometimes the economies of large regions of the world, occasionally experience periods of growth, high employment, and optimism followed by abrupt collapses of business

and banking confidence, drops in demand, and job losses.

There may be little or nothing that happens to change views of the future, but people eventually realize that they were over-estimating future growth and profits, and that they would be safer cutting back on investments, avoiding new risk taking, and cutting or deferring expenditure. The suddenness of the realization makes these economic crises deeper and more frightening.

These events are sometimes described as market failures.

In normal times and typical markets the distributed decision making by market participants is wiser than central planners. With distributed decisions we can react to local information and the total thinking effort is spread over millions of minds. This is one major reason why countries with well-managed, fair markets have done better economically than centrally planned economies.

However, this collective wisdom seems to break down at times leading to irrational optimism followed by sudden correction.

It is possible that this suddenness is partly due to herding behaviour, where people tend to go along with others rather than think independently. Research on collective wisdom has shown that it is less reliable when there is little information to go on, there is uncertainty, and most people are reacting to the same meagre information.

Real economic ideas might help to prevent these cycles.

Perhaps the ambiguity of the major economic indicators (discussed earlier) contributes to the uncertainty. If more information about real economic quantities was available, accessible, and attended to by more people then perhaps

there would be less uncertainty and less dangerous herding.

It might also be possible to reduce herding by reducing the number of speculators in financial markets who do no economic or company analysis themselves but instead freeloader off other analysts. They do this by just reacting to price changes without thinking about why those prices have changed. For example, an investor who holds a portfolio that mimics the composition of a major market index (e.g. the FTSE100) can do quite well with little effort because other people have analysed the companies to drive the prices.

A real economic approach might make bubbles less common. It should also improve the response to bubbles when they happen.

When the 2008 crash happened it was a signal that we needed to do more necessary work, less unnecessary work, and consume less. In response, companies laid off workers, especially in manufacturing, construction, and transport & storage (ONS, 2022). At precisely the time when we needed to do more solid, necessary work, companies reduced the number of people employed to work.

This was also a time when we needed to cut frivolous consumption, but the government of the UK responded initially by cutting VAT (a form of sales tax) from 17.5% to 15%, a tax that does not apply to essentials such as most foods and children's clothes.

The Bank of England adopted a similar philosophy, seeking to 'boost the economy' by encouraging people to spend and consume more. Its main levers have been changing its interest rate and buying government debt from financial service companies using money it has created digitally for the purpose. The

main reason for adjusting the interest rate and level of debt buying has been to achieve the target inflation rate of 2%. They aim to keep the inflation rate at 2%, not higher, and not lower¹¹.

Governments chose between austerity and stimulus. The stimulus theory is that government spending can 'kick start' an economy by giving people money that they spend in shops, that stimulates suppliers to produce, and that gets the merry-go-round spinning again.

However, with huge debts and interest payments, many governments preferred instead to cut their expenditure. People complain about this but the reality is that populations have been enjoying public services funded to a significant extent by loans that, eventually, they or their children will have to pay back primarily by doing work.

In an economic crisis the main economic indicator for governments and journalists remains the Gross Domestic Product (GDP). It is even used to define a 'recession'. As discussed earlier, the GDP is just a measure of the monetary value of goods and services produced, regardless of what they were. GDP can be 'improved' by a severe winter, going to war, or knocking down hospitals and rebuilding them for no good reason. Production isn't always useful but it does consume resources.

This is typical money-focused economics, within which consumption and production are just money amounts and it does not matter *what* is being consumed or produced.

¹¹ Why they think it helps the economy to keep prices rising in a way that is unconnected to real resource consumption or competition is not clear to me. It appears to be driven by fear of deflation but Borio et al (2015) reviewed historical evidence

A better way to respond to boom and bust is to recognize that it's not just *how much* work we do, but *what* work we do that matters. We should focus more on work required to support our needs, and less on work required to support relatively frivolous wants. For example, we need to do more on healthcare and flood protection.

A short while after the 2008 crash a UK news programme asked if small businesses could get Britain back to prosperity. To illustrate they interviewed the founders of a new business with an exciting new product, which was tiny cans of pre-mixed alcoholic cocktails.

How is this helping? The product is not necessary, its packaging is resource intensive, and the product itself is unhealthy.

If we are to enjoy the future then we need efficient lifestyles. That is, lifestyles that deliver the long, happy, secure lives we desire – but sustainably.

The effect of finding ever-more efficient ways to support the lives we want should be that money prices of goods and services gradually reduce. Deflation should be normal across the whole economy just as it is for some categories of product, such as electronic gadgets. This would not be recession in the true sense, though it might be classified as recession when only GDP is considered.

We also need to spread work around more evenly.

5.5.2 Other economic crises

Other economic crises are caused by immediately identifiable external challenges, such as war, infectious

of a link between deflation and output growth across 38 countries, finding that deflation is not usually the dangerous phenomenon most economists fear.

disease, and drought or other severe weather. Although the challenges are obvious, their full economic implications might not be.

The response needs to tackle the real economic consequences of the challenge.

E.g. During the World War II the UK was short of supplies, including food. In response, efforts to import from the USA were increased, people turned gardens from flowers to food, and farmers were not conscripted to fight. The moat of the Tower of London was turned into a vegetable garden. Rationing was introduced to spread the limited food fairly across the population.

E.g. During the COVID-19 pandemic a difficult balance had to be struck between economic production and slowing the spread of the virus. In the UK people were told to work at home if they could. Workers doing jobs that were necessary in the short term (e.g. farming, selling food, healthcare) were told to continue, while people doing jobs that were not necessary in the short term (e.g. in bars, restaurants, selling clothes in shops rather than online) were told to close.

E.g. In 2022, prices of many products across the world, but especially in Europe, rose. Major drivers included the rising price of energy due to Russia's reduced supplies of natural gas to Europe and reduced supplies of food from Ukraine. To respond correctly it was essential to understand the real economic issues behind the rising prices, rather than just think of it as 'inflation'. Typically, inflation driven by money supply and price nudging causes prices to always rise. However, prices rising due to temporarily reduced supply can be expected to fall later.

The difference is crucial. If people expect prices to fall in future then they can be happy with temporary financial help from their government or employer. However, if they think prices will never fall then they will want permanent financial adjustments, such as increased pay (with no expectation of pay falling later).

The challenge driving a crisis usually means that work on projects for the future (e.g. sustainable infrastructure) might be delayed while more immediate needs are met. However, this does not necessarily mean that progress towards sustainability is hindered in the long term.

E.g. Russia's invasion of Ukraine in 2022 was coupled with reduced supplies of natural gas by Russia to Europe. Some European countries were particularly dependent on Russian gas. Their immediate reaction was to try to get natural gas from other sources but, long term, the crisis also strengthened the desire to eliminate dependence on natural gas altogether.

5.6 Sharing work

Many people feel overwhelmed by the work they do and there is no shortage of useful things to be done, yet some people are struggling to find paying work. How can this situation be improved?

One reason some people do not have paid work is that they are not capable of doing many jobs of the jobs currently established. This problem is almost certainly greater for young people.

E.g. According to the Office for National Statistics (ONS, 2022), in June to August 2022 unemployed people as a percentage of economically active people in each age group were as follows:

16-17: 21.8%

18-24: 7.5%

25-49: 2.9%

50+: 2.5%

This is the usual pattern by age in the UK.

The higher unemployment rate for young people is unlikely to be entirely due to the time it takes to respond to advertisements, do interviews, and complete paperwork to start work. This is much more likely to be due to their limited skills and evidence of ability.

Young people in the UK receive more than 10 years of education but very few are ready for a job when they leave. They need to be trained. Exceptions include people who take higher education to become doctors and architects, a process that includes work experience and closely job-related education.

There is great scope for making education more relevant to useful work and so getting useful contributions from people from a younger age.

Another strategy is to simplify some work that needs to be done. Standards (e.g. British standards) can help with this.

E.g. In today's homes, many repair jobs and extension projects need highly trained people, such as plasterers, electricians, bricklayers, and plumbers. But suppose more building components were available that were like a giant construction toy (e.g. Lego). If most able-bodied people could build their own home, including services, this would greatly increase the pool of people able to work on construction projects. This development might be encouraged by working on standards for construction components that require little skill to use.

I suspect the trend over the past few decades has been for jobs to get more complicated. Even apparently straightforward jobs now have health and safety rules to follow, other legal compliance requirements, or computer systems to use.

It may be time to reverse this trend. As well as making some work simpler, it may be possible to identify simple parts of more complex work and parcel it into jobs that can be taken by people with lower skill or cognitive ability.

Two helpful trends have promoted work sharing. The internet has made it possible for some intellectual work to be done remotely and sometimes in small bursts that fit around other roles (e.g. as a parent or carer). There may be more scope for this. Job sharing is another trend that has been helpful and might be taken further.

5.7 Essential value judgements

One important area for government within this overall approach is to assess the frivolity of different forms of consumption, and the value of different jobs. This involves value judgements but they are far from subjective opinions.

It is obvious to most people that a doctor is more valuable than a heroin dealer, and that a builder of homes is more valuable than a casino operator. It is also obvious that in almost any situation basic, healthy food is less frivolous than a fifth wristwatch, and that a home to live in is more important than a holiday trip to Australia.

But in more difficult distinctions it may be helpful to devise objective tests, or at least mental experiments, that help with valuation. One test that does not help at all is to look at how much people currently spend on an item, or the total

revenues of an 'industry'. That is because of the following factors:

- **Competition:** Many items we really need, such as food, are produced relatively cheaply and competition keeps prices far below the most we would be willing to pay a monopolist. Where competition is limited and supply is restricted (e.g. oil, diamonds) prices are pushed higher.
- **Error:** Some people make poor decisions about how to spend their money, driven by addiction (e.g. heroin), greed and ignorance (e.g. bitcoin), or social anxiety, to name just a few reasons.

Better tests of value might consider how much people would be willing to pay if there was no competition, or if their income was very low so that they could only afford the essentials.

To identify the effects of poor choices by some people we could look at the most common valuations or consider whether the choices people say they would make if desperately poor or if stranded on a desert island would allow them to survive. If a person says they would rather take to a desert island a record player, a diamond ring, and a box of cigars than a bottle of water, a fishhook, and a magnifying glass (to light a fire) then we can ignore their answers.

5.8 Prediction difficulties

The full impact of government actions for real economics can be hard to predict, though this is largely because those actions are usually achieved through money.

For example, suppose a government raises some money through taxes on one set of its citizens and gives the money to another set as social security payments. This will tend to shift the way real resources are applied to the interests of

those citizens. Those receiving the transfer will get more products while those giving up the taxes will get less. However, it is likely that the taxpayers would have saved some of the money taken as tax rather than spending it soon on products. However the receivers of the transfer will be less likely to save it (since poor people generally do not save as much). Also, the wealthy taxpayers would have been more likely to spend their money on products where the resource consumption per unit of money is less. Consequently, the amount of extra products taken by the receivers of the transfer will be more than the reduction in consumption by the taxpayers. The difference will be made up by everyone else (non-tax-paying and non-welfare-receiving), who will get a bit less.

If a government borrows money to pay for a public building scheme then this means that, initially, resources swing from the lenders to the users of the infrastructure built. Later, when taxation is used to raise money to pay interest and repay the loan, it is taxpayers who will get less resource while the lenders get more. However, perhaps non-tax-paying, non-lenders will also get more because the taxpayers take less and the lenders are wealthy enough not to need to spend much more.

It might be possible, one day, to build models of all these effects and predict the consequences of government actions. In the meantime, the best course of action is to measure resource consumption, resource efficiency, and lifestyles, and pay attention to the details. General prescriptions about increasing or decreasing government expenditure indiscriminately have little chance of achieving good, predictable results.

5.9 Left or right?

In the UK at present no political party seems to understand these issues or have a sensible set of policies. The major areas of policy and disagreement between the left and right are:

Austerity or increased public

spending?: But 'austerity' only refers to public spending so this does not address the lifestyles of most people and is really more of a tussle over taxation levels and how much the next generation of workers will have to work to pay the tax needed to repay debts and cover interest.

Public or private ownership?: But this is not directed at what those businesses do or how they do it. Public ownership might, if properly done, prevent some businesses from pursuing lucrative but frivolous markets. However, public monopolies have in the past tended to be slow to improve efficiency because of low incentives to do so. Without a focus on real economics neither strategy is likely to work well.

Immigration control or non-

control?: An influx of younger people could help to relieve the UK's labour shortage. However, this is not a permanent solution and in the very short term some immigrant workers make a positive contribution immediately while other immigrants do not. For example, a highly skilled, single young adult with good English and no children has a very different impact to a single parent with three children, no skills that are useful in the UK, and no English skills. All require housing, transport, schools, health care, and so on – starting immediately. The scale of this challenge is enormous for the UK at present.

Some immigrants have been brought up with social norms that lead to problems in the UK. For example, the UK is famous for forming orderly queues in most

situations, but this is rare in some other countries. Immigrants must learn the UK's norms quickly or they can disrupt aspects of the UK lifestyle that are already efficient and desirable. Not speaking English is another obvious example.

An additional problem from migration is that the countries people leave typically lose younger, more productive people. Migrants often send money home to their families, but that money must compete for a slice of the reduced supply of labour. Migration that is good for the UK may very well not be good for the home country of the migrant.

If a political party got into power and wanted to encourage people to change their lifestyles in beneficial ways as described in this article it could go about it in a variety of ways. It would probably choose something consistent with its usual approach. At one extreme it might impose strict limits on behaviour, such as by rationing or by prohibiting some behaviours that are currently common. At the other extreme would be a party that did no more than preach the value of hard work and tweak tax rates to influence citizens as they make their otherwise free decisions about careers and consumption. To a small extent, all these methods are already in use in the UK.

5.10 Living beyond our means

The UK population has been insulated to some extent from the reality of its work challenge by unsustainable means.

The UK is a good example of a country that has sold natural resources in an unsustainable way. North Sea oil and gas have been extracted and sold overseas. In return the UK population has enjoyed products and services provided by other countries and so has not had to do as

much work as otherwise would have been the case. In short, North Sea oil and gas have given us a cushy life for long enough to get used to it. Now that those revenues are reducing rapidly an adjustment is needed.

Many other countries have experienced the same, with some countries having wealth that is predominantly from their oil.

The UK has also relied heavily on debt. In other words, getting products and services now in return for, in effect, promising to do something in return later. Private debt mostly consists of mortgages on homes, but even setting this aside for a moment, debt has risen. The UK government's debts have climbed too as it has paid more for public services (and interest payments) than it has raised from taxes and from creating new money for many years now. Its debt was about £2.45 trillion at the end of September 2022 – roughly £36,000 per person in the UK (ONS, 2022).

A proportion of our debt is the UK being helped by people abroad in return for our promise to do the same for them at some point in the future.

Debt is so often to be repaid by the next generation or, in the case of governments, the next government, or the one after that.

The London financial markets are another way that the UK has insulated itself from the work consequences of its consumption. By providing markets for people around the world to use to buy and sell securities speculatively, the UK gains the revenues that come from fees and taxes. This money can be used to buy useful goods and services from overseas.

These layers of insulation have been in place for so long now that it is hard to

remember what it was like before. Some of our wasteful patterns of behaviour have already become traditions.

5.11 Tackling poverty

The problem of poverty generates long and bitter arguments that are politicized to the point where politics gets in the way of solutions. The arguments rage over what counts as poverty, why people are poor, and what should be done about it.

5.11.1 *The political rhetoric*

Political parties in opposition typically want to say that poverty is a terrible problem and the fault of the party in office. The party in office prefers to say that things are not that bad, though they are taking action. One tactic that has become embedded is to use language deceptively.

In the UK and other developed countries the proportion of the population experiencing absolute poverty is low. These are people without adequate shelter and food. This is rare.

What is talked about more often is relative poverty. Various phrases and definitions are used but they all amount to saying a person is poor because many more people in the country are better off financially. A person who is in relative poverty in the UK might be living more comfortably than people in parts of Africa, for example, who are not in relative poverty. In theory, an advanced society could have people living comfortably in luxury who are still technically classified as 'living in poverty'.

The causes of poverty also tend to be presented differently in the opposing political views. One side often argues that all poor people are diligent, sensible people whose poverty is unrelated to their choices. The other side more often

argues that poor people are lazy and should get a job.

Both these oversimplifications lead to oversimplified solutions. One side argues that the government should give poor people more money. The other side argues that poor people should not be given more money and that giving them less would create a stronger motive to stop being lazy and get a job. The commonality is the focus on money.

Focusing on money can lead to policies that do unexpected harm, perhaps even more harm than good.

5.11.2 Definitions of poverty

Definitions of poverty tend to focus on money, rather than looking at what the money can buy in the country concerned. For real economic analysis, definitions are needed that focus on the lives experienced by people and on their consumption of real resources.

A person with an ample supply of products but who wastes them and consequently lives a miserable life involving poor health, unhappiness, and discomfort probably should not be described as poor. However, they might benefit from some help and should get it.

Conversely, a person who makes excellent use of their resources but these are not enough can be described as poor. They also should get help.

5.11.3 Causes of poverty

People are poor for many different reasons, which is why a combination of different helping strategies is needed. Some people only need a temporary loan. Others might need constant personal care for the rest of their lives. Still others have the ability to get a better life by learning and effort, so need advice.

Here is a list of causes of poverty. The length of the list is an indicator of the

complexity of the problems and the need for a varied, responsive approach.

Some people are **less able** to do useful work for others, which affects their ability to earn money through working. Some of these hindrances are temporary while other are not. People may be too young, too old, physically ill, injured, or physically disabled. They may have low cognitive ability or low self-control, be on the autistic spectrum, have attention problems, or more specific learning problems. They may have a psychiatric problem (e.g. schizophrenia, depression, bipolar disorder, OCD, a phobia, generalized anxiety, anger problems, or a very unpleasant personality). They may have an addiction.

Many of these problems can lead to poor performance at school, a lack of qualifications and skills, law breaking, struggles getting work, and poor job performance. With some health and psychiatric conditions, the person has good and bad periods. During the good periods they are relatively capable, though still vulnerable.

Other reasons for being less able include having no useful work skills and having poor English language skills.

Some of these issues respond to encouragement to become more productive, but some do not.

Young people just **trying to get started** often face a combination of problems. In addition to lacking valuable skills they may lack evidence of the skills they have (due to lack of work experience to put on their CVs). They will also often be poor because they have not started to build up the savings that, in future, will make them comfortably well off as they approach retirement.

Some people have **caring responsibilities** at home. They may be

parents looking after young children (a bigger issue with more children), or looking after elderly parents, or a disabled person. They are working, but not getting paid by an employer, or not full time.

Some are poor because they are grappling with challenges and **lack parental support** to help them through. Support that would have helped but which they lack includes an inheritance (rather than inherited debts), a loan or gift to buy a home (rather than renting), the opportunity to live at home with parents, other loans to help with expenses early in life, and free childcare from a grandparent.

Others find themselves poor due to **poor choices**, often **combined with bad luck**. They might have failed to build financial reserves when they could then had problems with nothing to fall back on. They might have taken a financial risk (e.g. started a business, made an investment) that did not work out. Or perhaps they failed to insure a major asset that was then destroyed. Some people are 'spendaholics' who spend compulsively with very poor understanding or control of their financial situation. Some fail to save enough to buy important home appliances and means of transport and so must pay more each week to live. Others make excessive gifts. Occasionally people lose their jobs but feel they cannot tell their spouse, who continues spending money as if they can afford to.

Other poor people are the **victims** of others. They might have been defrauded. They might have become financially dependent on someone who has abandoned them.

Another factor may be **bureaucratic complexities and delays**. The person has applied for benefits due but is still

waiting for them, either because they made a mistake, the bureaucrats did, or it always takes a long time. Alternatively, the person did not apply for all benefits due because of complexity, confusion, or ignorance.

Criminal behaviour is another potential route to poverty. It may lead to imprisonment and difficulties getting legitimate employment. The person may be in the country illegally, or just not legally entitled to do paying work, leading to unofficial employment with low pay and poor conditions.

Some people who appear to be poor are **not really poor** because some or all of their income is not disclosed (committing the crimes of tax evasion and benefit fraud). Sometimes their income is from crime.

There are also people whose **family** has a **history** of long-term unemployment and benefit dependency. For them, legitimate employment is an unfamiliar idea. To others this lifestyle seems lazy. They are not doing their fair share.

Once a person is poor, this can bring some **additional expenses** that only make things worse. They might be renting rather than owning their home or paying higher insurance premiums because of where they live. They might be struggling with expensive, high-interest debts.

The drivers of poverty often come in **combinations**. Consider as three examples people who:

- are young and so have low skills, low evidence of skills, no savings, and for whom all work opportunities are unattractive and poorly paid (even though they might lead to better things)
- have low cognitive ability and poor self-control, with a family history of

long-term unemployment and low education

- are young single parents with no academic or other qualifications and unsupportive parents.

Combinations can be extreme. For example, a person with a serious psychiatric problem, no parents, a serious addiction, and a pattern of criminal behaviour.

A useful review of evidence on the causes of child poverty was published in 2014 (Department for Work and Pensions, 2014).

5.11.4 Solutions to poverty

A society in which fewer people waste resources on frivolous luxury, where work is shared around more evenly, and where supply efficiency is excellent is likely to see less poverty.

More focused methods of alleviating poverty include the following:

Money loans: This could be helpful to capable people who have experienced a setback and to young people getting started. A government might do this for people unable to get commercial loans or loans from their parents.

Money gifts: In other words, benefit payments. These are helpful to many poor people but not enough in many cases. For example, the beneficiaries might waste the money through poor choices or have problems that they themselves cannot solve by spending money.

Gifts of products: One advantage of providing help in the form of products is that it does not depend on the recipient making wise choices for themselves. The products can be exclusively necessary and healthy, such as food banks providing only healthy foods, low cost 'soup kitchen' services offering healthy

foods beyond soup, hygiene services, and gyms. An example of this in action is provision of free school meals for the children of poor families.

Work skills training: This should start at school and in the UK we have much scope for improvement. Higher education also can go further in getting more people ready to do useful work with minimal further training. Once adults have started working there is more scope for adding to their valuable skills and governments can play a role here too.

This would be helpful in particular to young people who are starting out poor.

Money and lifestyle advice and coaching: This also should begin at school and again there is huge scope for improvement in the UK at present. Mentoring/coaching might also be a way to help people through life.

If successful, this might reduce the number of people whose mistakes, risk taking, and bad luck lead them into difficulty. No amount of risk management can completely eliminate this kind of problem but it can make them much less common.

Lifestyle coaching can also help people have a happier life on low consumption, covering daily routines, economical decisions, and relationships with people (which are a major cause of happiness and unhappiness). This might also include helping to form and maintain effective families and guiding parents to help their children appropriately.

Young couples who share a bedroom can save on accommodation costs. A couple who pool their financial reserves and both have the ability to work can sometimes ride out unemployment affecting one of them.

Help with bureaucracy: This includes making official forms easier to complete,

with fewer instances of confusing or incomplete instructions. My personal experience with tax forms is that they are riddled with usability problems that do not get removed over time. Even simple usability testing and fixing, done properly, would remove these. The same is probably true for some other official forms, including those poor people must deal with to get help.

Reducing confusion through clearer, more complete instructions and simpler requirements can reduce workload for public servants and get cases processed more quickly.

Medical treatment and care: These are necessary for many people whose problems cannot be solved by just giving them more money to spend. In the case of addicts, for example, giving them more money risks helping them buy more drugs.

Incentives to make an effort: Some poor people, offered help that goes beyond cash and free products, will angrily reject it. They will complain that they know how to live even as they light a joint or settle down for an afternoon of Xbox play. They will have to be pushed to make an effort to change their lives, become more productive, and less selfish.

5.11.5 Resources not money

The preceding discussion has given several reasons why just giving poor people more money is not a full solution. However, there is a more fundamental reason why money in itself is not the way to tackle poverty.

Transferring money does not in itself make new resources available. Suppose a new tax was introduced that used very high rates to take billions from billionaires and spread it to other people in a

country¹². As a result, the former billionaires are only 100 times wealthier than most people, not 1000 times wealthier. Will this make the poor better off?

Not necessarily. If the rich continue with their lifestyles unchanged, using their remaining financial advantages to buy what they want, just as before, then what is left for others would be unchanged. The price would go up but the quantity of products would not.

(If the poor used their newly received money to buy imports then more work would have to be done later to repay the foreign providers.)

What would actually happen if a lot of money was transferred from billionaires is uncertain. Almost certainly, however, the impact for the poor would not be the transformation many expect.

Another money transfer that would not be helpful in the intended way would be to transfer money from billionaires, by taxation, to pay more to a particular category of people (e.g. public sector workers). This is the idea that encourages many ordinary workers to strike for higher pay. They hope the government will take more from the very wealthy and distribute it to them and their colleagues.

If that was done then the billionaires would still be wealthy enough to buy all the products they want. However, the newly wealthier people would buy more products leaving less for those less wealthy than they are. In short, the money comes from the very wealthy but the real resource transfer would be mostly from the very poor. This is not what the policy would be trying to achieve.

¹² This probably would not be possible because billionaires tend to leave a country that charges

them high taxes. Something like a 90% wealth tax would surely send them running.

The key to alleviating poverty is to improve the distribution of products and real resources, not just to transfer money. Indeed, if the rich consumed less then that would benefit the poor even if no money was transferred from the rich, and even though the rich would become richer in money terms due to their savings.

A further point is that reductions in wasteful consumption need to be spread much more widely across society than just the billionaires. Billionaires are typically thousands of times wealthier than ordinary people but they each do not consume thousands of times more real resource. They might only consume ten times as much, for example. There also aren't many billionaires. If all their excess consumption was stopped and the resources reallocated then the difference for ordinary people would be tiny.

What would make a much greater difference is to reduce wasteful consumption at all levels of income and wealth. In a developed country such as the UK, even households in the bottom 10% by income do, on average, some wasteful consumption, and more is done by richer households. Each household would benefit immediately from its own waste reduction and, indirectly, from waste reduction by others.

6. Further observations

6.1 Not de-industrialization

One approach to thinking about sustainability tends to ignore the labour required. This approach features artisan bakeries, home grown food, tiny boutiques specializing in organic cotton, water filtration by a pond in the back garden, and any level of inconvenience if it avoids using plastic.

This seemingly attractive future is unlikely to be practical on a large scale because it uses human labour inefficiently. We need to make labour more effective so that we can adapt our infrastructure and lifestyles for sustainability and provide care to the increasing elderly.

6.2 Generation differences

My late mother's generation, now in their 80s, is the youngest surviving group in the UK to have experienced a period where real economic ideas were widely understood and practiced.

During the Second World War and the continued period of rationing that followed, British people were highly aware that food and other resources were limited. Rationing ensured that nobody (legally) consumed more than they needed, helping to feed everyone adequately. Encouraged by the slogan 'Dig for Victory', people grew vegetables in their gardens. The moat of the Tower of London was converted into a vegetable plot.

Waste was deplored and public information campaigns helped to drive home messages about making do and mending – not throwing things away that could be used in some way. Stately homes were put to good use as training centres, hospitals, schools, barracks, monitoring centres, and so on.

This was an extreme situation that nobody would voluntarily return to, but the severe challenge of war helped concentrate minds on the reality of economics.

During the 1950s technological progress created rapidly improving lifestyles and by the 1980s it seemed that the value of real resources and their scarcity had faded into the background, eclipsed by money. Many wanted a big house, big cars, lavish holidays in exotic locations,

more clothes, more jewellery – more everything.

We have changed from being a nation that took care of its economy by living efficiently to one that expects the economy to be managed by the Chancellor and the Bank of England.

It is easy to think that there is no need to live in a resource efficient way and that any need or want should be satisfied by society, if only the rich and government would spend the money. In reality, the limited real resources available mean that even an unlimited pot of cash would not solve our economic problems quickly. Spending it rapidly in the UK would simply push up the prices of products and some poor people cannot be helped by money alone because their problems are not economic.

6.3 Social displays

Going through those lifestyle areas you might have noticed that one powerful motive for spending more than is really necessary is social display. For example, you might want to show how successful and rich you are, or that you belong to some group, or show you are a good person.

Supercars, rhino horn shavings, a huge swimming pool at home, monster Christmas lights – these are all examples of consumption that makes no other sense.

Today it looks as though the desire to make displays of this kind is an inevitable, unchangeable aspect of human nature. But is it?

Could it be that, in future, social customs change to such an extent that the most prominent social displays are extravagant gifts to charity, achingly eco-friendly cars and houses, and low impact holidays?

Most of us already view ultra-extravagant spending by celebrities as disgusting, so this would only be the extension of something that is already widespread.

6.4 What can you do with riches?

If you have a huge amount of money but social pressure, the law, or your own sense of morality leads you to avoid frivolous consumption and continue doing useful work for others even though you don't need to, what is the advantage of wealth? One might think that if you can't spend the money there is no point labouring to get it in the first place.

This is not correct because you can spend the money. There are several important reasons why being wealthy is still a great advantage, even if you avoid frivolous consumption and very early retirement.

Security: A reserve of money means that, should you need more money later in life due to illness, disability, or just living a very long time, you have it.

Quality: Where goods or services are available with roughly equal resource consumptions but different quality, then being able to pay to get the best is an advantage. For example, a modest home but in a perfect location, a haircut by the best stylist, perfectly shaped vegetables, and simple clothes by the best designer.

Priority: Money lets you get things sooner, such as healthcare.

Exclusivity: Where something is in such short supply that there is not enough for everyone, money lets you pay to get what others cannot afford.

Possession: Owning antiques, historically significant relics, and important art requires cash but does not necessarily trigger resource consumption. In many cases the items were made a long time ago and no new consumption is required or likely to result.

Power: Having money lets you control people and events. Money lets you solve some of the world's problems instead of having to fret over the abysmal performance of politicians and others that the poor might rely on. You can get things to happen by giving money to charity, by paying people to do tasks you think should be done, or by starting an organization to do that work.

Celebrity: The ability to be in the most desirable locations, possess the most desirable objects, get priority, and make things happen helps acquire status and fame, if that's what you want.

Virtue: Using power to do good works gives a sense of virtue. You can also provide security to your family and even friends and unrelated people you consider deserving.

6.5 How to be rich and good

Some people think that a rich person must also be a bad person. That is not correct. This is how a person can be both rich and good.

6.5.1 Get rich in a good way

The way a person gets rich is crucial. These are the steps to take:

- Get a large income by helping a lot of people at a price they are happy to pay. To do this you will need to do it better than others. Modern technology makes it possible for the good ideas and decisions of one person to affect the well-being of millions of others.
- Use the money from this to expand the scale of what you do and so help more people.
- Create and enhance assets (e.g. a company, buildings) that you own, which makes them more valuable. On paper this makes you wealthier even if you don't necessarily have cash to spend on yourself.

- If you take on employees to help you then pay them a reasonable amount to work efficiently and innovate.
- Protect your wealth from cheats who want to get some of it without doing anything of real value. People like that will not do good with money.
- Crucially, keep your personal consumption modest. Do not be greedy even though you have the money to consume more. Don't waste real resources such as labour, energy, water, and food. This leaves more for other people.

If you do this then your cash reserves and the value of your assets will build up but you are a good person. That money reflects your good standing in society and gives you power to do more. You have provided a lot of help to others but not asked for much in return.

The wealth you have built up does *not* show that you have exploited people. The people you helped and the people you employed all did so voluntarily because they thought it advantageous for them. They all benefited. Your wealth only shows that you could have been even more generous than you were. It is ok to secure your own future and you have shown you are someone who knows how to make good things happen, so money in your hands will be well used.

E.g. Imagine two friends with some savings go into small scale property development. They buy a small, terraced house, renovate it, then sell it for more than they have spent. They develop expertise and a network of reliable tradesmen to do the work. Soon they are also holding on to their properties and letting them to tenants. Crucially, they maintain their let properties more systematically and with more skill and dedication than the tenants themselves would. Their

wealth increases and soon both developers are multi-millionaires, though from their modest lifestyles it is hard to tell. The developers are good and rich.

E.g. Imagine that a genius of eco-tech develops a radical new gadget that makes fuel directly from sunlight at unprecedented efficiency. Her company rapidly gains backers and expands, moving from high priced systems for special purposes to lower priced units for ordinary homes. After the company goes public her shares make her a multi-billionaire but still she lives modestly and occasionally sleeps at the lab or the factory while helping to solve technical problems. Some resent her because of her wealth, her influence, because she gives nothing to charity, or because her children are privately educated. But she is a good person whose impact on society and the planet is hugely positive.

6.5.2 *Use your money for good*

Use your money wisely.

- As a customer, 'vote' with your money for the individuals, companies, and products you want to see thrive. Think about your purchases and reward more than just a good product and price. Reward sustainability and kindness too.
- As an investor, direct your money wisely. Evaluate investments properly rather than just index following, and focus on businesses that will bring a brighter, more sustainable future.
- As a philanthropist (perhaps later in life), think about your gifts and try to make them effective. Don't just give people money they might waste. If you have good ideas to help people then your money might be enough to turn

those ideas into reality. If others have good ideas then you can support them.

- Teach your children how to be rich and good, then leave them money you didn't need to spend on your own consumption.

Sometimes money is not the way to help someone, even if you have lots of it.

E.g. Two brothers take different careers. One is wise and focused, with great skill at managing risk and getting challenging projects done. He builds a powerful, profitable businesses and becomes rich. The other brother is imaginative but reckless and easily distracted. He starts a business but it fails, as does his second, leaving him close to personal bankruptcy. Undeterred, he approaches his now rich brother for financial help to try a third business idea. The rich brother could easily afford to lend or even give the money to his reckless brother but he does not.

Each business failure affects customers and employees too. Helping the reckless brother would probably cause more problems than it solved. The rich brother explains the issue and offers to help his sibling through his immediately financial crisis with an interest free loan but only if he gets an ordinary and undemanding job that does not involve risk-taking decisions. This offer is not received well but after a couple of weeks is accepted. After two jobs in administration and many long conversations with his wiser brother, the reckless brother eventually finds his role as a commercial artist in a medium sized marketing agency.

A very common complaint against rich people is that they could do more to help others with their money. If nobody in their family needs help then what about

others, perhaps in other parts of the world? There are always needy people. It may be true that they could do more but a good, rich person has already done more than most people to help others. Not doing yet more is not evil. It is reasonable to take care of your own security and make time for family and pleasure you surely deserve.

6.5.3 *Mistaken ideas about the rich*

One widespread mistake is to think that wealthy people got their wealth by taking it from others and this why some people struggle to consume enough for a happy life.

As explained above, wealth is just ownership of assets and numbers in a bank account. The wealthy did get their wealth from others, but not necessarily in a way that harmed those others. The rich person might have money from supporting enjoyable and necessary consumption by millions of people and valuable assets due to creating and taking good care of them for others to use.

Another mistake is to think that the rich must be 'hoarding' wealth.

This again confuses ownership of money and assets with consumption, including use of assets. Being wealthy is not in itself the problem. For example, if a wealthy person owns several homes and lets them to tenants then those tenants enjoy use of the homes. But if the wealthy person keeps those homes for their exclusive personal use then that is wasteful and greedy. It is usually better if rich people spend less on their own consumption, rather than more.

Another reason sometimes offered to justify hating all rich people is that they have too much control. They do have more control than others. Their money allows them to make things happen.

Their ownership of valuable assets gives them more power.

However, this is only a problem if they misuse that power. If they got rich in a good way then they will probably continue with that pattern of behaviour and use their power wisely in a way that continues to help others. In contrast, it is a problem if, for example, they fund terrorism, cause hardship for no good reason, or launch endless legal battles that frustrate democracy.

6.6 Organizations for workers

These include guilds (e.g. for bakers), trade unions (e.g. for rail workers), and professional bodies (e.g. for accountants). Members are workers in particular industries or having particular skills. Often the organization itself has employees whose livelihood depends on subscriptions paid by members.

Organizations for workers operate in the interests, primarily, of their members. However, different organizations use very different tactics and have different impacts. In particular, they can have different impacts on the pace of innovation.

Historically, hindering innovation has been characteristic of trade unions in the UK. Their actions have included the following:

- Blocking efficiency improvements (e.g. from computerization) that might have the immediate effect of making a worker's role redundant.
- Blocking adaptations by the business (e.g. to customers using the internet more) that could require adaptation by workers (e.g. working on Sundays).
- Trying to extract higher pay or other concessions in return for accepting innovations.

- Stopping or limiting work as a negotiation strategy, which reduces efficiency, value, and capacity to change and thrive.

In contrast, facilitating innovation is more typical of professional bodies. Their actions have included the following:

- Creating and maintaining respected professional qualifications that prove the knowledge of successful students.
- Hosting continuing professional education events (e.g. webinars, conferences, training events) and publishing journals.
- Hosting networking events.
- Surveying members' pay and conditions, then distributing results to them.

Workers' organizations can take this further with actions such as these:

- Frequently studying changes affecting their members (e.g. demographic, technological) and reporting on growing and shrinking needs, suggesting career strategies.
- Helping members adapt with targeted learning and new qualifications
- Acting as a recruitment agency.
- Talking to employers about ways to support members through career changes (e.g. retirement, training, rotations, planned changes that provide some job security to members).
- Generating, collecting, and promoting innovative ideas more directly.

The overall impact of innovation is typically towards improvement and so facilitating it benefits society as a whole. There should be a way to share out those benefits so that everyone, or nearly everyone, benefits.

Minimizing the setbacks suffered by some individuals is better achieved by actively innovating in good time than by blocking innovation until it can no longer be held back. This can be done by starting innovation as early as possible but doing it incrementally. If a role is made redundant, potentially putting many people out of work, then the impact for individuals is reduced if time is available for people to retire, get jobs elsewhere, or switch into vacancies at their existing employer that open up naturally over time.

Workers who drive innovation rather than holding it back are more desirable for employers, customers, and society as a whole.

E.g. Imagine two workers in an organization. One is constantly looking for and suggesting ways to improve. Her personal productivity improves and she cooperates with good ideas others suggest. Ultimately, she thinks of a way to make her role redundant and suggests it. In a small way this improves resource efficiency and leads to lower prices for customers.

The other worker does not look for improvement and does her best to block ideas suggested by others, including direct instructions from higher up the organization. She does not improve her performance over time.

Clearly, the employer will want to keep the innovator and get rid of the blocker. Employment law may make this difficult. In the longer run, the innovator will have a great career while the blocker will remain unpromoted, insecure, and resentful.

This imaginary comparison gives us some idea of the prospects for workers who block innovation, either on their own initiative or induced by a trade union.

6.7 Quantifying the opportunity

In the long run, improvements in supplier efficiency are likely to be the largest contributor, but how much scope is there for cutting out unnecessary consumption and work by lifestyle and career changes? This question can be considered by individual consumers, by organizations, and by governments.

As consumers we are all unique. Some people have more opportunity to change than others. We can each examine our lifestyles for signs that there are opportunities to move to an easier, more productive life by asking questions like these:

- Do I have any expensive bad habits (e.g. nicotine, alcohol, over-eating)? Am I overweight? Just how much money could I save a year? How much effort and discomfort could I save over a year? (E.g. Cigarettes are about 50p each, so a 5-a-day habit costs just over £900 a year. A can of lager is about 80p so three a week is about £125.)
- Are there time consuming, expensive things that also tie me down (e.g. pets or a demanding garden)? How much time and money could I save by not replacing the pet when it passes away or by making the garden easier to care for? Do I really need over 30 houseplants?
- Do I go along with traditions and social expectations (e.g. at Yuletide, New Year, birthdays) even though I don't really enjoy them, often feel ill afterwards, and the stress of arrangements, travel, etc is considerable?
- Are there things I only do because my work is so tiring and unpleasant (e.g. expensive holidays, maintaining a flat in town, having a luxury car for the

daily commute)? If I changed my work or work location, how much else could be easier?

- Do I have any hobbies or sports that have grown to become very demanding (e.g. sailing every weekend, touring with a choir, competitive bridge, collecting teapots)? Is it worth it or have I just been sucked in? If I cut down my involvement or stopped altogether, what could I do instead that would soon be as pleasing but much easier?
- Is my home cluttered? Is it untidy or do I keep it tidy by packing every bit of storage tightly? How much stuff could I get rid of? How much easier would it be staying tidy with less stuff? How much money and effort could I save by just not buying as much stuff each year?
- Is my career precarious because I do something people can do without in an economic slump or when there is a pandemic? Do I need to develop extra skills to transfer to something more needed or can I just start looking now?
- Will the educational course I am considering equip me to do something useful and important for people? Is it the basis of a job that's really needed? What else could I do?

By looking at the expenditure of households divided into deciles by income (ONS, 2022) and making some rough guesstimates, I estimated that the average financial savings from doing this, but not particularly rigorously, would be about 9% of expenditure. Many poor people could not save this much but wealthier people can often save much more.

This estimate is also relevant to the UK government's perspective. Another rough guesstimate looks at jobs. The analysis is

difficult and approximate using existing data.

Some activities might be completely ended. These include activities that are pure waste (e.g. alcohol, nicotine, gambling) and others that have a positive effect but surely other activities can do the same much more efficiently (e.g. motorsport, show jumping, pets). These alone perhaps could free up a million people to do other jobs.

Other activities have some waste scattered throughout. These include consumption that is harmful if excessive (e.g. food), consumption that is just wasteful if excessive (e.g. cars, clothing, shoes), where most people would be better off doing something else (e.g. teaching English literature in schools as a compulsory subject), and where only some elements are useful and the others could be cut or replaced with something else (e.g. teaching of maths in schools at present). Estimating the jobs involved here is much harder but 10% of the jobs involved would be more than a million people.

Using an analysis of the number of people in different types of job (ONS, 2022) and some guesstimates of what fraction of each type might be wasted, I estimated that about 10% of jobs are waste, which is about 3 million jobs.

People often ask what the government is doing about, for example, funding the National Health Service, finding resources to improve flood defences, or solving energy supply problems. The harsh reality is that it is fighting for resources in a society where many regard having a big new car, more tattoos, another pint, and holidays abroad as more important.

In its efforts to direct resources towards (mostly) necessary and worthwhile activities, the UK government typically spends more than it gets in, increasing its

debt. Even recent UK governments attacked as mean are in fact pushing against resistance.

A government that understood the issues better could make a big difference but would still be limited by what voters will agree to. The huge opportunities for improvement lie not in government decisions but in our sense of what we should spend our money on, what we should make an effort to do, and what temptations we should resist. Our individual choices, as citizens of a large society, control the consumption of resources.

7. Conclusion

Economics is better understood by thinking about real resources, such as work, land, food, energy, and so on. With these in mind it is clear that we currently face a crisis of over-work due to the combination of aging populations, climate change, other forms of pollution, and war.

Individuals, governments, and decision-makers in other organizations can make choices that will help us tackle this situation.

These include reviewing a myriad of choices we make about our lifestyles, many of which have huge implications for us that we have not really understood before.

We can each consider:

- how our organizations, as suppliers, can be more efficient with real resources;
- how we live;
- what we do for a living; and
- how our personal choices affect us and others.

In particular, when we are tempted by advertising, products on display, or the

choices of our friends and neighbours, we can think for a moment about the work implications of the choice, and probably choose a simpler, easier life.

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