SARASIN

The world in a dilemma between prosperity and resource protection

Sustainability rating of sovereign bonds 2010

Sustainable Swiss Private Banking since 1841.

Contents

On the brink of sustainability

Dear Reader

After the turbulence of recent years, it's a relief to see the world gradually returning to normal.

But where exactly is the path taking us? Certainly not back to the normality we were familiar with at the start of the millennium, when the industrialised nations still more or less dominated the world's economy and political stage. Today we are on the threshold of a new era characterised by dramatic economic, social and environmental change. The recent economic maelstrom, whose epicentre was first and foremost in industrialised countries, has added further momentum to this transformation, but the critical forces that will drive change in future will come mainly from developing countries.

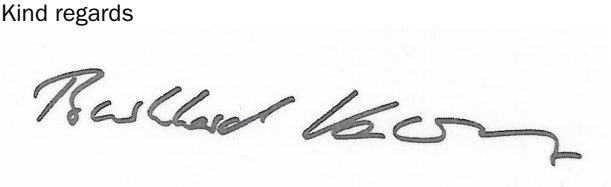
Some countries which historically were prone to running up high debts, such as Brazil, have for example emerged from the financial crisis comparatively stronger, while regions previously considered to be stable, such as the peripheral EU countries, have run into difficulties. Furthermore, many emerging economies are already recording the same rate of dynamic growth they were achieving before the financial crisis. Last year alone, China increased its gross domestic product by 8.7% – a very brisk pace of expansion that was driven not only by public spending, but moreover by domestic consumption, and whose vigour also spilled over into a number of neighbouring economies. Similar trends can be seen in India and Brazil.

Although the seemingly unbridled dynamism of many emerging economies provides greater prosperity for many sections of the population, at the same time it brings with it problems such as pollution, as well as the quality and availability of resources. These challenges are being exacerbated in many of these countries because of rampant population growth. The latest UN report on the water situation, for example, warns that unless appropriate countermeasures are taken, the number of people suffering from water shortages will quadruple from around 700 million at present to 3 billion people in 2025 – most of them living in what are currently emerging economies.

Given this backdrop, we can already observe how many of these countries are making substantial investments in education and training, as well as in research and development. The focus is increasingly on solutions that address the thorny problems of the future such as mobility or shortages of energy, water and food, in a sustainable manner and with a long-term perspective. According to the international climate protection organisation, The Climate Group, China is already one of the most prolific producers of photovoltaic and wind power systems, and is world leader in batteries for electric cars. On top of that, it is estimated that there are already over 50 million electrically powered motorbikes and cycles currently on the road in the Middle Kingdom.

Emerging economies have enormous potential to expand and consolidate their role in the new world order. If these countries also make the effort to ensure the right balance between their economic, social and environmental development, it could mark the start of a very productive and sustainable normality. We shouldn't wait for these opportunities to present themselves, but should proactively seek them out.

Kind regards



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Summary

Natural resources, along with capital goods and human resources, are the foundation for every type of commercial activity. They are put to effective use in producing the goods and services which emerge at the end of the business chain. On the one hand this brings an improvement in quality of life, while on the other it also encourages the proliferation of capital goods and human resources. At the same time civilisation's drive towards greater affluence is steadily depleting the planet's natural resources. Improved efficiency and effective economic, political and social processes are therefore needed to ensure that individual countries are able to maintain their productive capacity – and ultimately their credit standing – in the long run.

Sovereign bonds and sustainability

By issuing bonds, governments undertake to accept an immediate payment from investors today, in return for making interest payments and a final capital repayment at some point in the future. Their ability to meet the promised payments depends to a large extent on their future tax receipts. This requires a sustainable tax base, which needs to be present mainly in the form of future goods and services. This in turn depends on a country's available resources and its efficiency in converting these resources into goods and services. A nation's ability to meet its future payment obligations – in other words its credit standing – is therefore closely connected to its productive capacity over the long term.

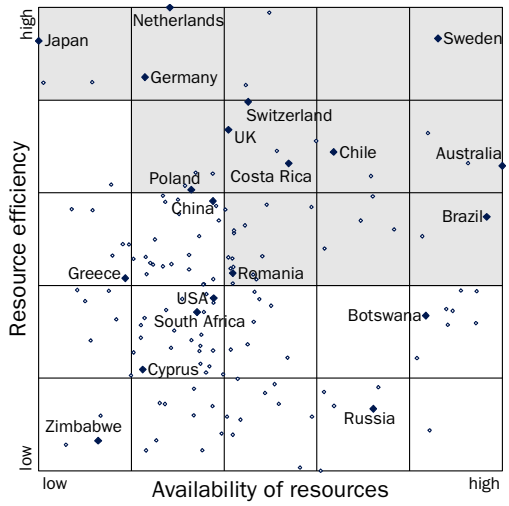
Resource availability and efficiency

Every form of commercial activity relies on the availability of resources. The absolute foundation here is provided by nature, with its very diverse offering of resources which in most cases are only available in finite quantities (such as oil and coal), but also include land and water. Capital goods and human resources are important as well. They are used in the production of goods and services at the end of the business chain which on the one hand improve quality of life and on the other further boost the proliferation of capital goods and human resources. At the same time the planet's natural resources continue to be depleted by emerging and developing countries striving to improve their living standards, while the richer countries try to preserve their affluence. One of the basic tenets of sustainable development is therefore that natural resources must be used as sparingly as possible. This can be encouraged by making sure the right framework is in place in areas such as the economic structure, sovereign governance and social conditions.

Sustainability matrix

Only countries with ample resources and/or good resource efficiency can hope to maintain a growth path over the long run. Using these two criteria – availability of resources and resource efficiency – it is possible to plot the individual countries on the Sarasin Sustainability Matrix (Fig. 1). The countries with the top ratings are those with generous resources – such as Brazil and Australia – along with the highly efficient countries of Scandinavia, north-west Europe, and Asia. These countries can expect their credit ratings to stabilise, or possibly even improve, over the long run. On the other hand, limited availability of resources and poor efficiency can lead to a downgrading of the country's credit rating, as has happened in the case of Greece. Countries with good resources but poor efficiency, such as Russia, run the danger of jeopardising their strong initial position by remaining inefficient.

Fig. 1: Sustainability matrix of countries



Source: Sarasin

Sustainability rating method

The world is likely to experience shortages in many natural resources in the mid to long term. However, their availability is a crucial component in determining people's quality of life. The endowment of resources and the use of efficient production processes will in future – more than ever before – determine which countries will be successful in their "quest for happiness".

Natural resources…

Natural resources are now being used up far more intensively as the global population continues to boom and living standards rise. Some of these resources are not renewable, and their availability is therefore limited. This applies especially to fossil fuels. Even resources that are renewable are being pushed to the limits in cases where their rate of consumption exceeds the speed at which they can be replenished. Important examples here include water, soil and biomass. Taken as a whole, these resources provide the foundation for commercial production (Fig. 2). Their availability therefore has an enormous impact on future production capacities.

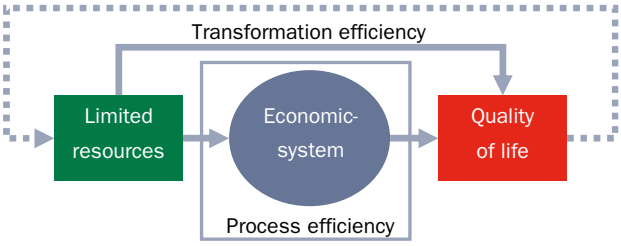
… combined with capital goods and human resources…

Capital goods and human resources are two other critical input factors. The former include, for example, buildings, machines and the physical infrastructure. The latter cover the various forms of human capital (know-how, labour, institutions, etc.). Financial resources are a complementary input factor, although essentially they only serve as a conduit for channelling all the other input factors. Capital goods and human resources offer a certain amount of flexibility in situations where natural resources are in short supply, although they cannot replace them in full.

… are transformed into quality of life

All commercial activity is pursued with the same end goal in mind: to improve the quality of life. Apart from material wealth, quality of life is influenced by a number of other factors such as education, health and well-being. As well as improving the quality of life, commercial production also results in the proliferation of capital goods and human resources. At the same time, however, it actually depletes natural resources. From a sustainability viewpoint, therefore, what is required is the most prudent and efficient use of natural resources possible. This can be encouraged and achieved by making sure the right framework is in place in areas such as the structure of the economy, sovereign governance and social conditions.

Fig. 2: Model of economic activity

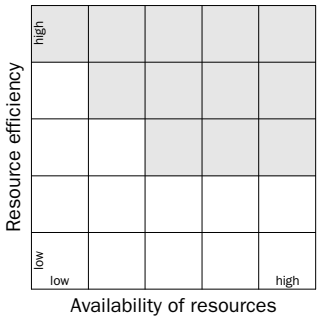


Source: Sarasin

Sustainability matrix of countries

In our sustainability matrix (Fig. 3), the sustainability rating of countries is plotted across two dimensions. On the horizontal axis we measure the availability of resources. Apart from current availability, important risk factors in the future are also taken into consideration, such as demographics and climate change. The vertical axis shows how efficiently resources are transformed into quality of life, as well as the efficiency of a country's economic, political and social processes.[1]

Fig. 3: Sustainability matrix of countries



Source: Sarasin

[1] For the list of indicators used, see Appendix.

Availability of resources

The availability of resources has an enormous impact on future production capacities. Nature, with its very diverse offering of goods and services, plays a crucial role here. Consideration also needs to be given to social and economic input factors which act as a complement (and also as a substitute, to a limited extent) to natural resources. In short, resources form the basis of every type of commercial activity.

Ecological Footprint

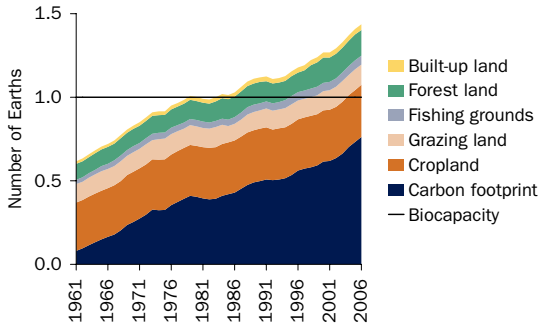
The concept of the Ecological Footprint allows us to estimate human demand on global ecosystems. The method developed by the Global Footprint Network measures how much land and water area a human population requires to produce the ecological resources it consumes and to absorb the CO_2 emissions resulting from energy generation, using prevailing technology. The Ecological Footprint has six components:

- Cropland
- Grazing land
- Fishing grounds
- Forest land
- Built-up land
- Carbon footprint.

This contrasts with biocapacity, which is a measure of nature's ability to renew resources and absorb the wastes produced by energy generation. The different components are converted into a general measure, the “global hectare”, taking into account their biological productivity. This not only makes it possible to add up the different areas involved, but also to compare the Ecological Footprint with biocapacity.

The world's Ecological Footprint exceeds its total biocapacity. This means that resources are being used up at a faster rate than they are being replenished. Besides consuming the planet’s ecological interest, humanity is also drawing down the planet’s ecological principal. This has been the case since the 1980s – mainly because of the sharp increase in the carbon footprint (Fig. 4). In 2006 the planet’s total Ecological Footprint was roughly 40% higher than its biocapacity. To put it another way, civilisation actually requires 1.4 planets in order to maintain its current standard of living in the long run.

Fig. 4: Global Ecological Footprint and biocapacity



Source: Global Footprint Network

Ecological surplus and deficit

In order to compare individual countries, we examine the Ecological Footprint and the biocapacity per person. The former depends mainly on the production structure and the level of consumption. The latter depends on the one hand on the average productivity of the land and water areas, and on the population density on the other hand. If a country's biocapacity exceeds its Ecological Footprint, it has an ecological surplus. Conversely, a country whose biocapacity is less than its Ecological Footprint suffers from an ecological deficit.

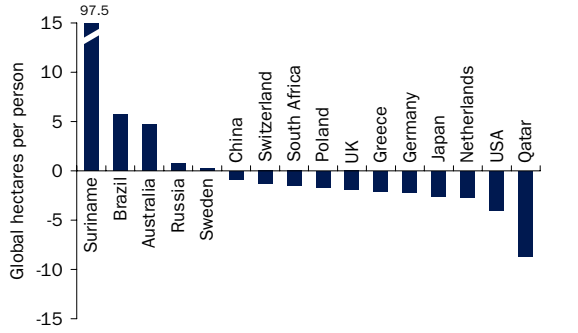
The Ecological Footprint can be calculated both for domestic production (i.e. for all the goods and services produced within the country), and for domestic consumption (i.e. for all goods and services consumed within the country). In the case of imports, it is assumed that the environmental burden is also imported, according to the principle of “the polluter pays”.

In many countries, the Ecological Footprint of consumption and production lie close together. Major discrepancies only exist where there is a strong focus on commodities or services in production. The production footprint of countries rich in commodities tends to be

higher than the consumption footprint. They export raw materials with significant environmental impacts. Conversely, in countries with a highly developed services sector, the Ecological Footprint of consumption often tends to be higher than the Ecological Footprint of production. They are net importers of environmental impacts.

At this point our analysis focuses on the ecological surplus and deficit of production, as we are interested in the local resource situation in specific countries (Fig. 5).

Fig. 5: Ecological surplus or deficit of production (2005)



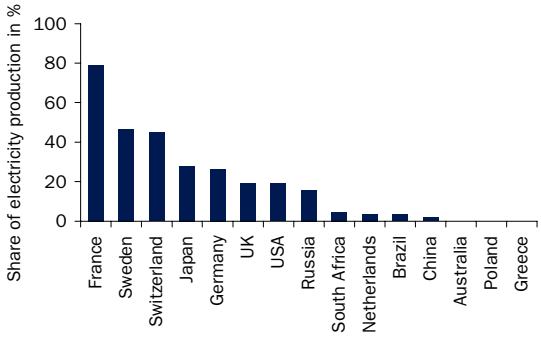
Source: Global Footprint Network

Additions to the Ecological Footprint

Electricity generation in nuclear power plants is not taken into consideration when calculating the Ecological Footprint. Although the use of nuclear power is more or less free of emissions, it is neither risk-free nor resource-neutral. On the one hand both the operation of nuclear power plants and the storage of radioactive waste carry risks that should not be underestimated. On the other hand, uranium is a raw material that cannot be renewed and whose availability is therefore finite. Because of this, we add the use of nuclear power to the Ecological Footprint (Fig. 6).

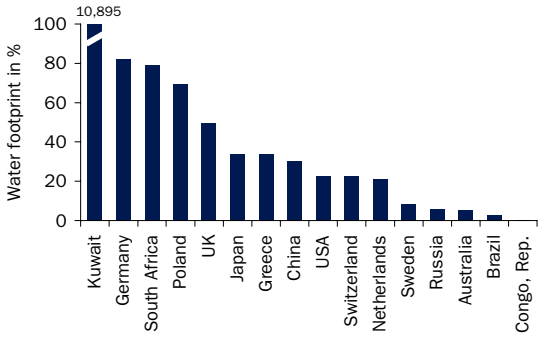
The use and availability of water is likewise not covered sufficiently by the Ecological Footprint, and for this reason we provide separate ratings for these factors. The measure calculated by the Water Footprint Network reflects the total amount of water used directly and indirectly during the consumption of goods and services. Agriculture is the world's biggest consumer of water, with a quota of more than 80%. Eating habits, climatic conditions and farming methods therefore have the biggest impact on a country's water footprint. If the water footprint is in turn compared with the renewable water resources, it is possible to estimate the long-term risk of water shortage (Fig. 7).

Fig. 6: Electricity generation in nuclear power plants (2006)



Source: World Bank

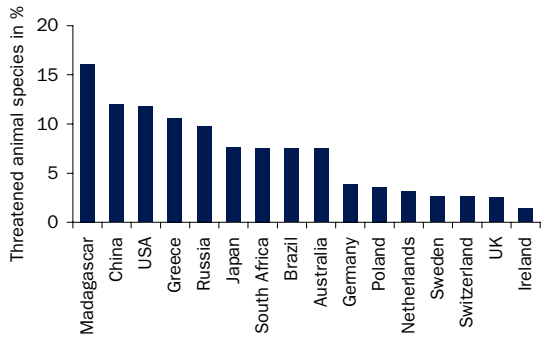
Fig. 7: Water footprint as a percentage of renewable water resources (1997-2001)



Source: Water Footprint Network

The other addition that needs to be made to the Ecological Footprint is the aspect of biodiversity. This refers to the enormous diversity of all the Earth's organisms and ecosystems which provide the basis of life on our planet and are therefore crucial for the long-term prosperity of the human race. The proportion of animal species under threat of extinction shows the current situation in the individual countries (Fig. 8). The proportion of protected nature reserves as a percentage of total land and sea area is also a useful measure of the forward-looking measures being taken by individual countries.

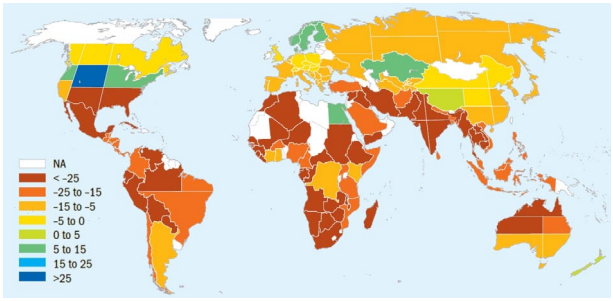
Fig. 8: Percentage of animal species under threat* (2007)



Source: World Resources Institute, Sarasin

* Amphibians, fish, reptiles, mammals and birds

Fig. 9: Changes in agricultural productivity*



Source: William R. Cline, Center for Global Development

* in percent, up to the end of the century, excluding CO_2 fertilisation[2]

Climate change and resource availability

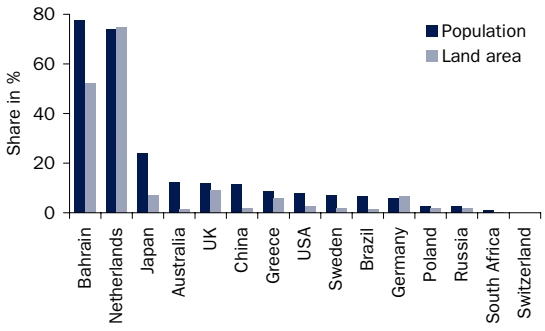
The future availability of resources in a country is heavily influenced by climate change. An analysis of weather records since the middle of the 19th century confirms the steady rise in the average air and water temperatures, the melting of glaciers and ice caps, and rising sea levels. Over the same period the concentration of greenhouse gases in the atmosphere has risen sharply, chiefly as a result of burning fossil fuels. Despite the enormous complexity of the global climate system, it seems very probable that the changes described above are mainly due to human activity. This trend will most likely continue in future, especially if nothing is done to reduce greenhouse gas emissions.

Agriculture is one of the sectors most heavily affected by climate change. Not just temperature changes, but also variations in water availability have an enormous impact on the growth of plants. While productivity is likely to decrease by the end of this century in regions where temperatures are already high, it may actually increase in countries which are further away from the equator (Fig. 9).

There is ample evidence to suggest that extreme weather events, such as storms, flooding, heat waves, etc., are becoming more destructive and more frequent due to global warming. As a result, there is likely to be an increase in fatalities and financial losses. Regions which are already affected by extreme weather events will probably be most at risk.

An additional risk factor is that the areas most at risk of extreme weather events are often located in coastal regions. They are therefore also exposed to the dangers of rising sea levels. Figure 10 shows the percentage of the population and the land area located in low elevation coastal zones (LECZ, less than 10 m above sea level).

Fig. 10: Population and land area in low elevation coastal zones (2000)



Source: CIESIN, Columbia University

[2] If CO_2 concentrations are elevated, C3 plants, such as wheat, rice and soy, tend to have a higher rate of photosynthesis, in other words they grow more quickly. This effect is less pronounced in the case of C4 plants (e.g. sugarcane, maize). But scientists are currently unable to agree on the precise dimensions of CO_2 fertilisation.

Human resources

Apart from environmental resources, the productive and regenerative power of society plays an important role in creating quality of life. After all, our civilisation would not exist without the knowledge, ability and volition of humans. These three characteristics are heavily influenced by the age of every single person, although there is no uniform pattern of development. The availability of human resources therefore depends for the most part on the age structure of a society.

The best way to examine the age distribution of a specific population is by means of an "age pyramid". The ideal structure is the beehive shape (the optimum line in Fig. 11 and 12), where the total population remains constant over time. The precondition for this is a birth rate of 2.1 children per female and a high mortality rate at an advanced age.

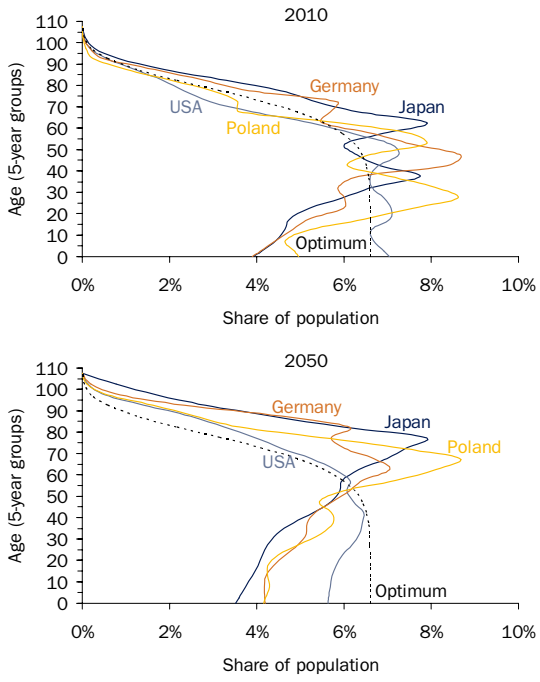
There are basically two potential deviations from the ideal structure:

- The combination of an unusually low birth rate and a low mortality rate can lead to a population where over-ageing becomes a problem due to lack of rejuvenation. The main problem presented by this trend is that it jeopardises the social contract by which people in work subsidise the rest of society. A decreasing number of young people have to provide financial support to a growing number of senior citizens. This is particularly true of many mature economies (Fig. 11).

- High birth rates combined with a comparatively low life expectancy usually result in a pyramid shape. With growing age, the proportion of the individual generations steadily decreases. Even though this structure may seem appealing when it comes to pension provision, it is not sustainable in the long run if natural resources are limited. Short to long-term challenges, such as education, youth unemployment and criminality, should not be underestimated either. Many developing countries exhibit this type of age structure (Fig. 12).

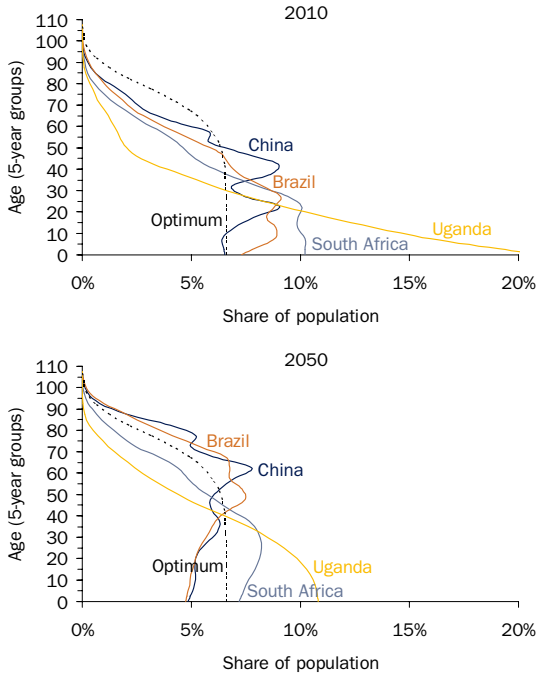
Because of this, our rating takes into account the extent to which a country's population deviates from the optimum age structure.

Fig. 11: Population age distribution in mature economies (2010 and 2050)



Source: United Nations, Sarasin

Fig. 12: Population age distribution in emerging economies (2010 and 2050)



Source: United Nations, Sarasin

Financial resources

Financial resources essentially have no productive force and as a result do not strictly qualify as resources. Their actual value lies in the fact that they represent a claim on real resources, goods and services. And where there is a claim, there is also a debt.

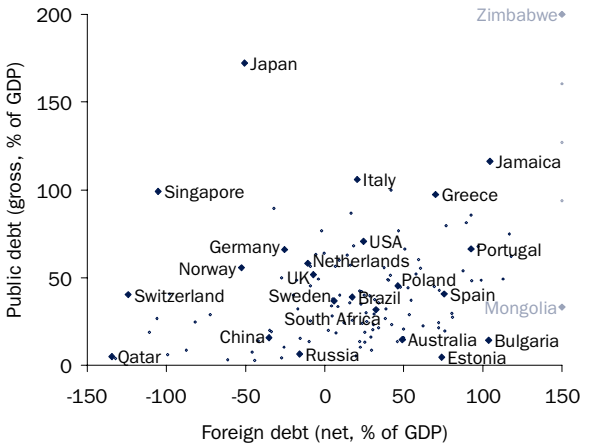
The government debts therefore represent (indirect) creditor claims on real resources and the goods and services produced from them. The debts have arisen because the state has lived beyond its means in the past. But now it has agreed to live "below its means" in future, so that it can service its interest and repay capital. In this way the government has assigned part of the future (real) resources and production to third parties. This means it will have fewer resources available for its own use in future.

A similar story applies to the entire national economy (i.e. the public and private sector combined). A country that consumes more than it produces is living beyond its means. It has to plug the production gap with imports, which means racking up foreign debt. To service its debt, future generations therefore have to live "below their means", i.e. produce more than they consume. The room to manoeuvre in future is restricted by a lower amount of resources at their own free disposal.

Figure 13 shows individual countries' public debt and foreign debt as a percentage of gross domestic product (GDP). While the foreign debt gives the balance between debit and credit (net view), the public debt is a gross figure for reasons of data availability. Countries with low levels of public and foreign debt have more room for manoeuvre in future because more resources remain at their own free disposal. This includes countries such as Switzerland, Qatar, Norway and China. By contrast, countries with high levels of public and foreign debt are most restricted in their ability to act going forward. This is the case with Greece, Portugal and Jamaica, for example.

Our rating takes into account the relative level of public debt and net foreign debt as the basis for a country's economic flexibility as determined by historical factors.

Fig. 13: Public debt vs. foreign debt[3] (2008)



Source: IMF, OECD, CIA, Sarasin

[3] The light-coloured countries lie outside the mapping area and are only shown for orientation purposes.

Resource efficiency

The ultimate goal of every form of commercial activity is to improve the quality of life. This is influenced not only by material wealth, but also by a number of other factors such as education, health and well-being. To ensure a good quality of life in the long run, we need to use our limited resources as prudently as possible and put conditions in place that encourage efficiency not just in our economic structure and governance, but also in the social domain as a whole.

Transformation and process efficiency

We use two sets of indicators to measure the efficiency in transforming resources into quality of life. First of all, we make a concise comparison of inputs (resources) and outputs (quality of life) to determine transformation efficiency. Secondly, we analyse the efficiency of the economic, political and social processes.

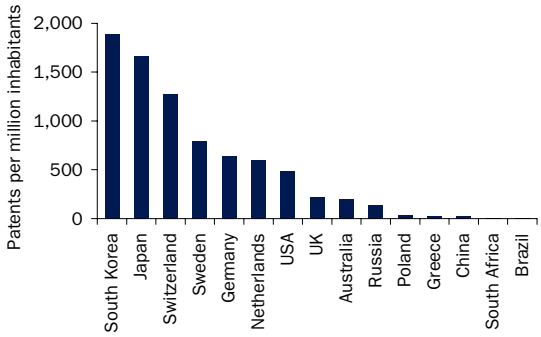
Quality of life

In order to assess the transformation efficiency, we first have to measure the quality of life achieved, and then we have to contrast it with the resources consumed to achieve it. For a long time the gross domestic product was considered to be the most appropriate benchmark of prosperity and quality of life. In recent years, however, its ubiquity has come increasingly under fire because of two major shortcomings. Firstly, the GDP figure also includes items that make only a minor or even a negative contribution towards prosperity. The costs resulting from a car accident, for example, actually inflate GDP. Secondly, certain products and services not traded on a market, such as housework and some leisure activities, do not count. Nevertheless, GDP is a useful barometer of wealth, as long as these shortcomings are made good.

One alternative is the Human Development Index (HDI) produced by the United Nations. This not only takes into account GDP, but also school enrolment ratios, adult literacy rates and life expectancy. Although the HDI is a step in the right direction, it has its drawbacks as well. Above all, it has a relatively strong bias towards basic needs. While it is a very effective grading system for developing and newly industrialised countries, it provides very little differentiation between the mature economies. We therefore expand the HDI system to include a number of other indicators:

- Education is not limited purely to school attendance and literacy levels. These simply form the foundation for subsequent levels of education up to research and development at universities and corporations. The indicator we use for measuring the end result of the entire education system is the number of patents granted per head of population (Fig. 14).

Fig. 14: No. of patents granted per million inhabitants (average for the years 2005-2007)

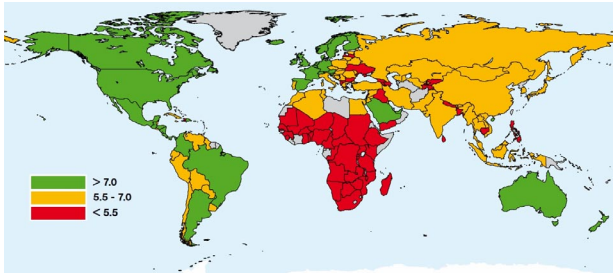


Source: World Intellectual Property Organization

- Long life expectancy is fundamentally a very positive indicator. It shows that a country's healthcare system, hygiene and nutrition are good. But aside from these rather objective, technical aspects it's also important to give consideration to the subjective quality of life thus far, and the expected quality of life in future. One of the goals the independent think-tank “the new economics foundation” (nef) has set itself is to come up with a system for measuring individual life satisfaction (Fig. 15). To do so, nef has carried out various global surveys where respondents were asked to rate their life satisfaction on a numeric scale (usually 0 – 10). Despite the apparent simplicity of the question, the findings of the survey proved to be quite meaningful. For example, the an-

swers correlate with the size and strength of the social networks, the family status, and the general health and employment situation of the respondent.

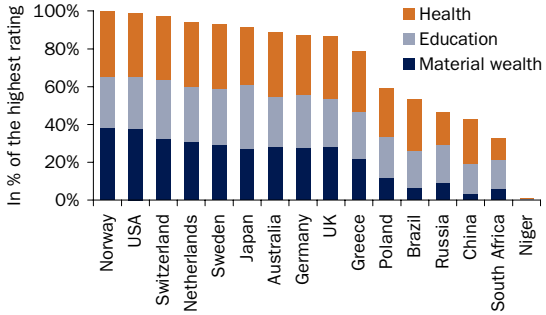
Fig. 15: Life satisfaction (2005)



Source: the new economics foundation

- In the area of health, we also assess data on child mortality. The main reasons for deaths in the period between birth and the age of five are acute shortcomings in the healthcare system and malnutrition. We also incorporate data on suicide rates, which provide a better picture of the more extreme situations in a society's mental health.

Fig. 16: Components of quality of life (2006)



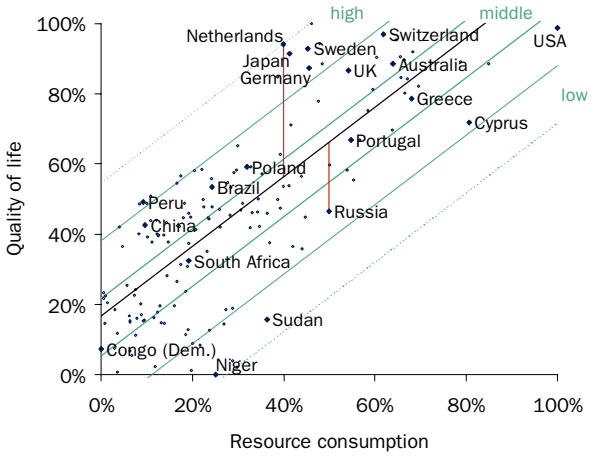
Source: Sarasin

The indicators described above make it possible to assess the quality of life in specific populations. At the same time it must be remembered that the indicators used do not necessarily represent the only correct combination. They simply provide a broad assessment of the factors that contribute towards a decent quality of life, including some orientation towards prosperity as well. It should also be noted that the indicators used here only provide an insight into the average quality of life. Disparities in a society are evaluated separately under process efficiency. Figure 16 illustrates the (average) quality of life in selected countries broken down into three components: material wealth, education and health.

Transformation efficiency

To create quality of life, certain resources have to be consumed, such as energy, land and water. By comparing the inputs and outputs, we can measure the efficiency of transformation (Fig. 17). Here we use the Ecological Footprint as the most important input factor, but supplement it with nuclear energy production and the water footprint. The quality of life – as described above – represents the output.

Fig. 17: Transformation efficiency (2006)



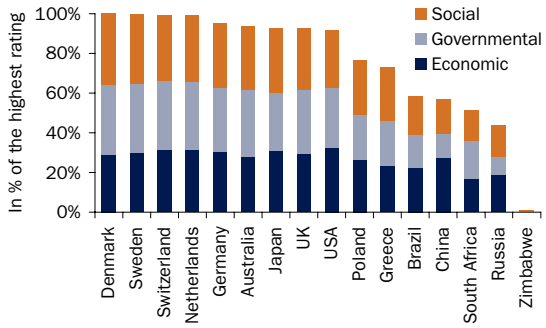
Source: Sarasin

A nation can be classed as efficient if it manages to achieve a given quality of life in return fur the lowest resource consumption (as far left as possible on the chart) or if given only a specific resource consumption it manages to offer the highest quality of life (as near to the top of the chart as possible). In order to determine the average transformation of resources into the quality of life which is currently possible in the world, all the countries analysed are included in a regression model. The distance measured from the regression line subsequently represents the relative efficiency of the individual countries (marked in red in Fig. 17).

Process efficiency

The efficiency with which resources are transformed into quality of life is significantly enhanced by the efficiency of processes in commerce and society. This is determined by the quality of the framework conditions in areas such as the economic structure, sovereign governance and social conditions (Fig. 18).

Fig. 18: Process efficiency (2007)



Source: Sarasin

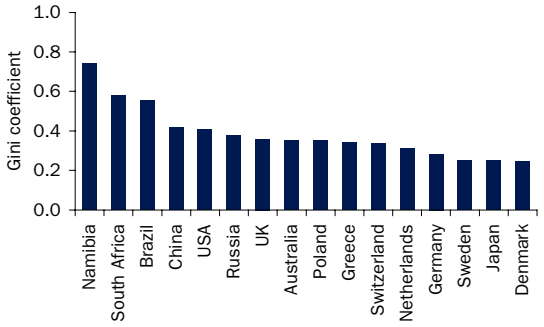
The bigger national economies tend to have a more broadly diversified sector structure. In addition, their exports are concentrated less on individual goods and services.[4] On balance they are more shock resistant, which is also reflected in less volatile GDP figures. This also applies to a certain extent to members of integrated economic areas such as the European Union. Furthermore, an adequate savings ratio enables the necessary investments to be made in the country's infrastructure, public institutions and education system. These improve national competitiveness[5] and generate self-sustaining economic growth. By contrast, a low – or in some cases even a negative – savings ratio and production that relies heavily on the extraction of raw materials does not offer a sustainable economic model in the long term.[6] Furthermore, an independent central bank whose sole task is to control inflation can also provide additional economic stability.

Good state governance also plays an important role. Efficient processes in political decision-making and implementation make a significant contribution to the long-term development of a society. Using the "Worldwide Governance Indicators" calculated by the World Bank, it is possible to asses the quality of state governance in individual countries. The indicators examined can be classed into the following groups:

- Voice and accountability
- Political stability and absence of violence
- Government effectiveness
- Regulatory quality
- Rule of law
- Control of corruption.

Ultimately the social framework should provide stability, peace and justice. High unemployment rates, major differences in income (Fig. 19), sexual discrimination and the abuse of human rights all carry potential for conflict that should be taken very seriously. The inequalities in society can express themselves in violent demonstrations and high crime rates. At the same time, strained relations with neighbours and intensive arms programs jeopardise external peace. The potential consequences range from international terrorism to acts of war.[7]

Fig. 19: Income distribution[8] (last available year)



Source: World Bank

[4] We measure export concentration with the help of statistics provided by the United Nations Conference on Trade and Development (UNCTAD).

[5] To measure competitiveness, we use the Global Competitiveness Index published by the Global Economic Forum.

[6] We make reference to the "adjusted net savings ratio" calculated by the World Bank. Compared with the standard calculation, spending on education is on the one hand taken into account as an investment. On the other, the depletion of renewable resources (esp. fuels and raw materials) is treated as disinvestments.

[7] To assess the internal and external conflict potential we use, among other things, the Global Peace Index produced by Australia's Institute for Economics & Peace.

[8] A Gini coefficient of 0 means totally equal distribution (i.e. everyone has the same income), while a value of 1 stands for totally unequal distribution (i.e. extreme wealth and extreme poverty).

Sustainability ratings

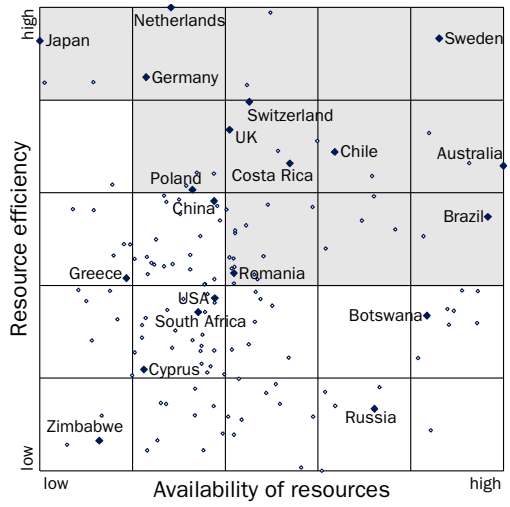
From a sustainability perspective, preference should be given to sovereign bonds issued by countries with ample reserves of natural resources and a high level of efficiency in producing quality of life. In addition to many affluent countries in northwestern Europe, this category includes a number of countries with medium-sized incomes and only average credit standings. Because sustainability issues will continue to gain material importance, the creditworthiness of these countries is likely to stabilise or even improve over the long term.

Sustainability matrix

A comparison of resource availability and efficiency enables individual countries to be plotted on a sustainability matrix (Fig. 20). The shaded area indicates which government bonds are eligible for inclusion in Sarasin's sustainability funds. They must have at least average sustainability efficiency, although this rating must be higher if their resource availability is poor. This allows for the fact that the only way to get around a shortage of resources in the long term is to use them far more efficiently.

Countries with good resource availability include Sweden, Australia and Brazil. Countries low in resources but with a high level of efficiency include Japan, the Netherlands and Germany. Among the list of inefficient countries are Greece, the USA and, most prominently, Russia.

Fig. 20: Sustainability matrix of countries

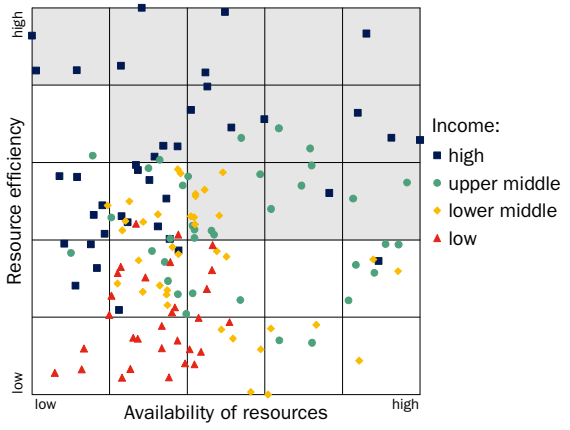


Source: Sarasin

Sustainability by income group

Among countries with high income levels there appears to be a "two-class society" (Fig. 21). Despite varying availability of resources, some of these countries have excellent scores when it comes to efficiency, especially northwest Europe, Scandinavia and Japan. The rest only manage to achieve average efficiency and in most cases only have comparatively poor resource availability. Many countries in southern and eastern Europe belong in this category. There is a broad spread among the group of countries with an upper middle level of income. It is mainly Latin American countries which feature in the shaded area of the sustainability matrix. The group with lower middle and low incomes mainly include Asian and African countries. Their resource availability is weak to average and their efficiency tends to be rather low.

Fig. 21: Sustainability by income group



Source: World Bank, Sarasin

Sustainability and credit risk

By issuing sovereign bonds, governments undertake to accept an immediate payment from investors today, in return for making interest payments and a final capital repayment at some point in the future. Their ability to meet the promised payments depends to a large extent on a sustainable tax base, which needs to be present mainly

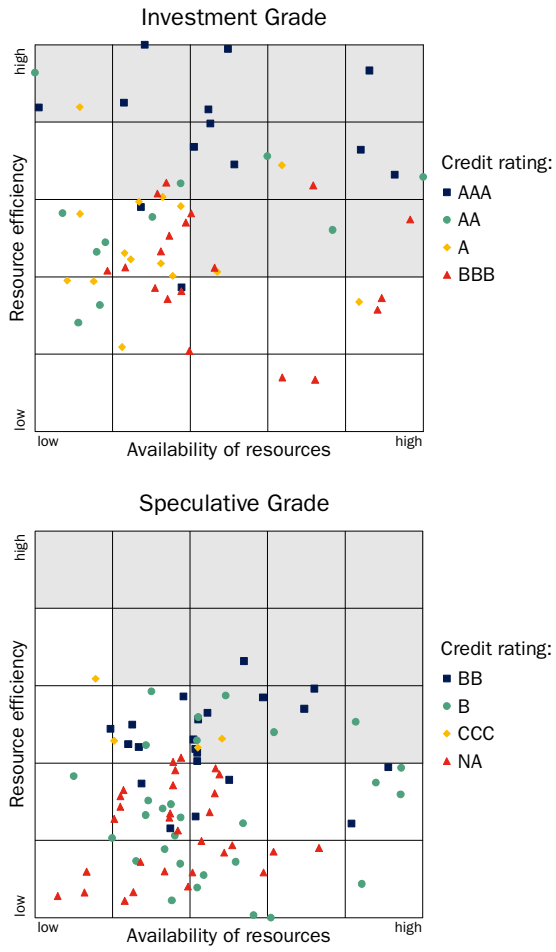
in the form of future goods and services. This is in turn dependent upon its resource availability and the efficiency with which it transforms these resources not only into goods and services, but quality of life. A nation's ability to meet future payment obligations – in other words its credit standing – is therefore closely connected to its productive capacity over the long term.

In Figure 22, the position of the countries in the matrix is marked in relation to their current credit rating.[9] Issuers with a low default risk belong in the "Investment Grade" category. The "Speculative Grade" bonds include issuers who are more likely to default on their payments. Particular attention should be paid to countries whose credit ratings deviate significantly from their sustainability ratings. If the more long-term sustainability themes increasingly materialise and move into the public spotlight, the individual credit ratings for the more sustainable issuers could be upgraded, while those of less sustainable issuers might be downgraded.

Countries with limited natural resources, such as Japan and the Netherlands, already manage to achieve a strong economic performance through their success in transformation and process efficiency. If environmental costs are internalised more extensively in future (through CO_2 trading, for example), these countries are well equipped to adapt their economies as necessary. This will allow them to preserve the tax base needed to service their public debt and to stabilise their credit standing.

Other countries low in resources but with less efficiency could however see their creditworthiness crumble, as happened with Greece, for example. The United States also needs to step up its sustainability initiatives if it wants to keep its triple-A rating in the long run. The "land of unlimited opportunities" has a solid availability of resources at present. But its consistently high consumption of resources, soaring debt levels and growing social inequality could turn it into a land of limited opportunities.

Fig. 22: Sustainability by credit rating



Source: Moody's, Standard & Poor's, Fitch, Sarasin

In terms of future prospects, the countries with the most positive credit ratings are those with plenty of natural resources and average to high efficiency scores. These include especially the Scandinavian and Latin American countries. The earthquake-stricken Chile also belongs in this group and therefore has a good chance of getting back on its feet after this external shock. Not only does the Andes state score well in terms of good resource availability and efficiency, but its excellent governance is also often held up as a model for other developing countries.

By contrast, some countries with ample resources but poor efficiency, such as Russia, run the danger of wasting their natural head start through inefficiency. Despite a high rate of consumption of natural resources, the world's biggest country only offers a modest quality of

[9] The ratings used apply to long-term bonds denominated in foreign currencies and reflect the current lowest assessment of the rating agencies Moody's, Standard & Poor's and Fitch.

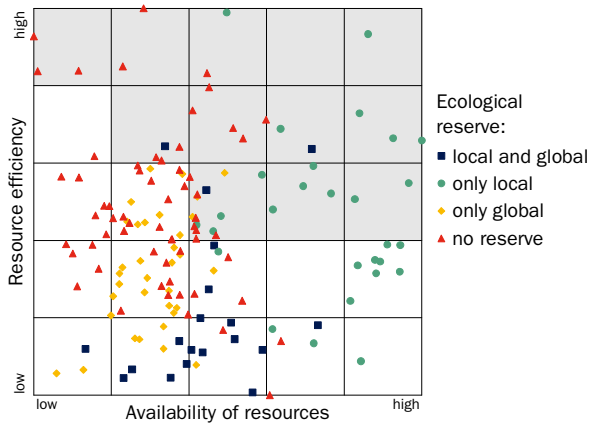
life. Both the material standard of living and the level of healthcare are consistently low. Furthermore, Russia is positioned in the bottom third of the rankings when it comes to quality of governance. The situation is not helped by social tensions in civil society and diplomatic conflicts with neighbouring countries.

Absolute sustainability

So far our research has focused on assessing the relative sustainability of individual countries. This has involved analysing the interplay between environmental, economic and social factors and then producing rankings. While from a sustainability perspective it is impossible to define any clear minimum limits for the economic and social dimensions, this is conceivably possible for the environmental dimension. The basic principle is that a population should make sure "it never harvests more wood than what regrows".

When assessing absolute sustainability, the aim is to check whether the Ecological Footprint of individual countries is covered by local or average global biocapacity (Fig. 23). It is important to remember here that the Ecological Footprint makes no claim for completeness. Even so, the existence of an ecological reserve is an important prerequisite for absolute sustainability. Since this criterion has a major impact on our assessment of availability, countries with an ecological reserve tend to be positioned in the right half of the matrix. If they also lie in the shaded area, they are very close to absolute sustainability. Countries with an ecological deficit are further removed from absolute sustainability. In most cases this is down to a large carbon footprint. One of the biggest challenges for these countries will therefore be to encourage the move away from the burning of fossil fuels to the use of renewable energies. In doing so, the efficient "eco-deficit" countries in the shaded area will have the best prospects.

Fig. 23: Absolute sustainability



Source: Global Footprint Network, Sarasin

List of indicators

Availability of resources (Horizontal axis)

Environment

- Ecological Footprint and biocapacity
- Electricity generation in nuclear power plants
- Water footprint and scarcity
- Biodiversity
- Climate change effects on:
  - Agriculture
  - Extreme weather events
  - Sea level

Economy and society

- Demography and age structure
- Tangible and intangible capital
- Public debt
- Foreign debt

Resource efficiency (Vertical axis)

Transformation efficiency

- Quality of life – Material wealth:
  - Gross domestic product by purchasing power parity
- Quality of life – Education:
  - School enrolment ratio
  - Literacy rate
  - Patents granted
- Quality of life – Health:
  - Child mortality
  - Life expectancy
  - Life satisfaction
  - Suicide rate
- Resource consumption:
  - Ecological Footprint
  - Electricity generation in nuclear power plants
  - Water footprint

Process efficiency

- Economy:
  - Size and volatility of gross domestic product
  - Export concentration by products
  - Competitiveness
  - Adjusted savings
  - Inflation
- Governance:
  - Voice and accountability
  - Political stability and absence of violence
  - Government effectiveness
  - Regulatory quality
  - Rule of law
  - Control of corruption
- Social conditions:
  - Unemployment
  - Income distribution
  - Gender equality
  - Human rights
  - Peace and security

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The author wishes to thank Dr. Michaela Collins for some very informative discussions.

Basel, March 2010

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