

The Post-Scarcity World of 2050-2075

by Stephen Aguilar-Millan, Ann Feeney, Amy Oberg, and Elizabeth Rudd

EXECUTIVE SUMMARY

We are all quite familiar with the concept of peak oil—the notion that oil is a finite resource and that we are soon coming to the peak in its historical production. It also is the case that the production of a number of other key resources will peak in the same time frame. This convergence of peaking production is likely to lead to an age of scarcity. And yet that age of scarcity is unlikely to herald the end of the world. So what lies beyond scarcity?

The purpose of this paper is to examine what the post-scarcity age may look like. We examine the issue from the perspective of the post-scarcity company, post-scarcity society, post-scarcity geopolitics, and the post-scarcity financial system. While the work is highly speculative, there are sufficient common threads between the present and the future that we can usefully start to consider the main outlines of what a distant future might look like. It is only through a conversation about the deep future that we can improve life for future generations.

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The deployment of long-range forecasts is an activity that is, in itself, hazardous in nature. There is a distinct possibility that the future may not unfold quite as originally anticipated. Our speculations about how we move into the future could be wrong. There may be unforeseen events that blow us off our path as we progress forward. However, just because it is difficult to engage in thinking for the long term does not mean that we ought not to try.

There are many human activities that do require us to think about how the world will develop beyond our immediate horizon. For example, if we are to plan a road, or to lay out the foundations for a city, the decisions that we make today will have an impact far into the future. Much of the beauty of ancient cities lies in how they were planned at inception. When we engage in this type of activity we have a responsibility to future generations to give some consideration as to

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how our decisions may impact upon them. One could argue that many of the problems of the twenty-first century result from a neglect of the future in the nineteenth and twentieth centuries.

It is with this in mind that we approach the issue of the “post-scarcity world.” We take the view that the world between 2010 and 2050 is one that is likely to be characterized by scarcities. A scarcity of credit, a scarcity of food, a scarcity of energy, a scarcity of water, and a scarcity of mineral resources. We shall touch upon the nature of these scarcities, their causes, and their cures in the next section. However, that is not the main emphasis of this piece.

Our main emphasis lies upon what comes after the period of scarcity. In developing our thinking about this issue, we have found it useful to develop a view from four perspectives—the post-scarcity company, post-scarcity society, post-scarcity geopolitics, and the post-scarcity financial system. Together, they provide a view of what the world may look like between 2050 and 2075. It will not be a world without scarcity, but one that has learned to cope with constricted resources.

FROM SCARCITY TO POST-SCARCITY: 2010–2050

A study of the history of the world will show that it fluctuates through periods of relative scarcity and of relative abundance. The period from 1975 to 2005 was one of relative abundance. The global economy was built upon relatively cheap and readily available energy, the global financial system was built upon cheap and relatively available credit. The predominant ethos of the era was one of a diminishing role of the state in both society and the economy. This era of abundance came to an end during the period from 2005 to 2010, culminating with recession to mark the transition from a world of abundance to a world of scarcity.

One consequence of the era of abundance was the expansion of credit in the Western economies to unsustainable levels. The developed economies eagerly consumed goods produced by the newly de-

veloping economies. This gave rise to large trade imbalances between the two sets of economies. The trade surpluses of the newly developing economies were recycled as loans to the developed economies, which were then spent on purchasing the goods produced by the newly developing economies. As a consequence of this, interest rates in the developed economies were lower than they otherwise would have been, giving rise to speculative asset bubbles in both the property markets and the global stock markets. By 2007, the bubbles started to burst, with the result that banks stopped lending to each other, and the flow of credit simply dried up. The credit crunch was upon us.

One consequence of the credit crunch was that two key elements of the modern economy—credit and business confidence—had become very scarce. In order to keep the financial system working, governments responded by bailing out their respective national banks, generally by taking an equity stake in the banks. Some banks were nationalized outright, while some banks were only partially nationalized. Either way, the banking system across the world had become subject to greater state intervention and supervision. A result of this was the banking reserve requirements becoming much more stringently imposed, restricting credit even further.

The second decade of the twenty-first century will be dominated by the working out of the credit crunch. Business finance will be, generally speaking, not as freely available as it had been in the previous decade. This will result in growth rates in the OECD nations being lower than they otherwise would have been. This will come to have quite an effect upon the world economy.

According to the UN population estimates, the global population in 2000 was about 6 billion. By 2025, the population will be about 8 billion, growing again to about 9 billion by 2050. As the global financial system starts to stabilize at a new level of normalcy by about 2020, the impact of a growing global population and a stagnant global economy will start to be felt across the world.

In simple terms, we could say that the potential demand for most

things will increase by at least a third. However, this rather understates the case. It is likely that there will be rising expectations to accommodate as well. For example, in the case of food, there is likely to be an increase in the number of mouths to feed by a third. On top of that, the demand for improved diets is not likely to abate, giving rise to further demand for foodstuffs. Rising aspirations are not likely to be restricted to diet alone. Across the globe, people will want access to better housing, better education, and better health care. They will want to share in material prosperity—a TV, a car, a better life for their children.

These rising aspirations are likely to trigger the second aspect of the age of scarcity—“Peak Just About Everything.” We are all accustomed to the concept of “peak oil”—the point at which historical global production of oil will peak and thereafter diminish. There are many forecasts of peak oil, from about 2015 to 2040. From our perspective, the important point is that peak oil will occur at some point during the age of scarcity.

This coincides with a period when many of the minerals that are essential to the working of the global economy, as it is configured today, will also peak. For example, antimony (essential to the production of semiconductors) will peak between 2020 and 2040. Tantalum (essential to the production of capacitors and resistors) will peak between 2025 and 2035. Zinc (an important metal in the production of batteries) will peak between 2025 and 2035. And so the list could go on. The point is that our current lifestyles are likely to become ever more unsustainable in the third and fourth decades of this century.

This defines the age of scarcity. Growing demand pressures that originate from a rising global population—which has increasing aspirations for life—will combine with a situation where the resources necessary to satisfy that demand are heading toward the point of exhaustion. The result will be a period in which resource scarcity could become quite acute.

A period of resource scarcity is likely to manifest itself as a pe-

riod of increasing and volatile prices. However, once the trend toward increasing prices becomes established, the price mechanism will stimulate new technologies to address resource efficiency. The technology of resource usage—getting more out from putting less in—is likely to be the defining technology of the age of scarcity. Whether it is getting more miles per gallon from motor cars, more food per acre from arable land, or reducing the mineral content of electronic components, the price mechanism is likely to focus our attention on achieving a more sustainable economy. The aftereffects of the credit crunch are likely to inhibit this feature until the third decade of the century, but once the process starts, we could see developments occurring well into the middle of the century.

Where would we be then? It is likely that the global economy would be much greener than it is today. Although peak production in many resources is likely to have been reached, the point of resource exhaustion could be considerably delayed through the development of the technology of resource efficiency. After a period of scarcity, aspirations of living standards may well be reduced from their present levels. Some nations may respond to scarcity by taking protectionist measures, in which case the levels of global trade would be much lower than they are today. If so, then the period following the age of scarcity may well be one when aspirations start to rise again and world trade starts to increase again. The process of globalization—inhibited in the age of scarcity—would start to accelerate again. The best place to start to examine this process is through the post-scarcity company.

THE POST-SCARCITY COMPANY

As we enter into the post-scarcity world, we will also be entering a time of significant challenge to the traditional capitalist business models, concepts, and assumptions that have developed over the past 200 years. The assumption of scarcity is fundamental to traditional business. Business theories, models, and operations are all

premised on the idea that scarcity (either perceived or real) enables businesses to charge a price for the goods and services they provide. In traditional models, this is how businesses generate revenue.

In the post-scarcity world, technological advances will facilitate decreasing costs until conceivably almost everything is “free” to the consumer. Scarcity will no longer exist in this world, and, without scarcity, the concept of charging a price to consumers as a means of generating revenue will be unworkable. The post-scarcity world will put tremendous pressure on current business models, potentially rendering them irrelevant and obsolete in the future. If traditional businesses do not adapt to this emerging “free” world, many of the strong, traditional organizations of the early twenty-first century will cease to exist over the next 50 years.

Lack of scarcity and “free” are difficult, counterintuitive concepts to grasp, and for many in business easy to deny. But the evolution toward lack of scarcity and “free” is, in fact, already under way, thanks primarily to technologies (such as computers and the Internet) that have enabled and driven the growth of digitization over the last 20 years.

The ability to digitize, or “convert atoms to bits,” is increasingly removing scarcity from the business equation. While traditional scarcity theory posits that, when one item is used, there is *one less item available* (thus increasing scarcity), in the digital world when one item is used (copied, connected to another) there is at least *one more item available* (thus decreasing scarcity). The logic is completely reversed but explains exactly how digitization is removing scarcity and driving to “free.” As Michael Masnick, president and CEO of TechDirt says, “In digital goods, scarcity doesn’t exist.”

We see this post-scarcity evolution in a variety of businesses and industries that are being driven toward (and struggling with) “free” products. For example, a wide variety and volume of news and information is now free; the *Wall Street Journal*, Wikipedia, and Craigslist are all free online news and information sources. Literature and books

can be downloaded free from authors such as Doctorow and King. Open-source software from Linux is free; VOIP-calling via Skype can be had for free; Yahoo e-mail with unlimited storage is free; games such as those from Perfect World are free; services such as photo sharing are free from Flickr; and music downloads are free, often from the artists themselves. News, information, literature, communications, services, recreation, music, and more—already available for free.

In some respects, “free” as part of the business equation is not a radical idea. Gillette provides a classic business case study in “free.” In 1901–1903, Gillette began giving away free razors in order to develop a market for disposable blades. Today, wireless companies are following the Gillette example, giving away essentially free phone hardware to sell service plans. This type of “free,” however, is not really about providing free products; it’s about cross-subsidies and shifting costs from one product to another. In the post-scarcity world, shifting will be irrelevant because the actual cost of the products will fall potentially to nothing; “free” will really mean free, at least for the majority.

There is considerable debate among economists, technologists, and businesspeople over whether or not any product can ever really be “free.” Those arguing in support of the idea reference historical precedents that show continued deflationary economics and decreasing costs as the result of technological advancements. Digitization (along with other technological advancements, such as nanotechnology, molecular manufacturing, robotics, and artificial intelligence), they argue, will continue to increase efficiencies in resourcing, production, transportation, and overall operations that will drive away costs in the future. Evidence is already available, they say, in decreasing costs of clothing, furniture, fast food, and of course, computer hardware. Basing their estimates on Moore’s law, technological advancements will drive the cost of a laptop computer to \$10, and within 20 years to only \$1. Essentially, within 20 years, laptops could be

free.

On the other side of the argument are those who believe nothing is ever entirely “free.” The first version of anything, whether a laptop or digitized song, will always have a cost. They argue that ideas, materials, innovation, and time are all necessary to produce the first of anything, and that these are costs to creators. Since these inputs and resources can never be eliminated (or nothing would ever be produced) costs can never be fully eliminated. “Free” is a misnomer; only “at cost” is possible.

For now, the “free” versus “at cost” debate still rages; however, there is evidence that the transition to “free” as business model is already being made, and made successfully. Companies such as Google, eBay, Amazon, and Craigslist are all making money from “free.” Alternatively, the Recording Industry of Association of America (RIAA), a trade group that supposedly represents the recording industry in the United States, is the poster child for refusing to make the transition and rabidly fighting to hang onto the current scarcity-inducing business model. The RIAA is losing, however: losing members, losing potential revenue, losing credibility, and losing prestige.

Some organizations are blending the “free” post-scarcity and current scarcity-controlling business models. During a time of transition, such as the one businesses are currently in, this intermediary phase is typical. Some organizations are developing business models based upon the “one percent rule,” in which 1% of the users pay for the product but the majority use it for free. An example would be online gaming, where 1% of the users pay for a premium version, while the majority plays the basic version for free. The cost associated with developing and offering the game is picked up by the premium players.

Another intermediary model is the three-party system. In this model, a third party pays to participate in an exchange that is created by two other parties. An example would be paid advertising on a free e-mail site. The advertiser would pay to have targeted access to the

e-mail participants, but use of the site would be free to the initial parties.

The answer to making money in the “free” post-scarcity world for businesses is to adapt, and to do so quickly, whether employing an entirely “free” or a blended business model.

We currently live in a world of both scarcity and post-scarcity. It is a confusing and somewhat counterintuitive mix of old and new philosophies, assumptions, business models, and economics. But there is evidence that the transition to a post-scarcity world is moving forward. As we continue to move forward, businesses will have to undergo dramatic changes in their business models to survive and thrive in the future. As Chris Anderson, author of the upcoming book *Free: The Future of a Radical Price*, says, “The new business model is one where companies grow rich by charging their customers nothing at all.” Confusing? Yes. Impossible? No.

In many respects, one could argue that the post-scarcity company is merely a reflection of the society it serves, and we turn next to that.

POST-SCARCITY SOCIETY

What impacts might the age of scarcity have on society, and what might living in 2075, the post-scarcity world, involve? In imagining the long-term future, it is helpful to consider aspects of present-day society and imagine what is likely to continue and where discontinuities or shifts might occur as we pass through the age of scarcity.

Population will be one of the variables likely to impact both the duration and the eventual exit from the age of scarcity. At current projections, global population will most likely peak at 9 billion in 2050. As resources are strained, this will impact both the continued population growth and also the manner in which the population lives and works. The global population has been growing exponentially for some time, and we could reasonably expect this to continue. However, several forces may disrupt current growth projections.

Historically, there have been periods when large numbers of the global population have been reduced due to war, disease, famine, or natural disasters. In the next 75 years, such an episode is likely to occur.

The world has several military hot spots, and weapons able to eliminate large portions of the population are more prevalent than in the past. Rogue states or non-state actors such as terrorist organizations may develop these capabilities over the coming decades. Resource shortages may lead to heightened tensions, isolationism by countries, and increasing incidents of violence. In order to reduce the possibility of such incidents, we may see the rise of supranational governance and regulation and continued efforts to resolve conflicts through diplomacy and negotiation.

The outbreak of disease is also a threat. A global pandemic, which, due to global travel, may spread more rapidly than any outbreak in history, could eliminate large numbers of the population. How widespread, and how great the population loss, will be dependent on the ability to curtail the global outbreak and find a cure or vaccination quickly. Inequities in access to health care mean pre-modern nations are likely to sustain a greater proportion of population loss than more-developed nations.

Famine has the greater impact in pre-modern nations. Post-modern nations may be able to rely on their supranational relationships to assist them through the tough times. Modern nations may have better resources to manage or avoid food scarcity, but pre-modern nations are heavily dependent on aid from other nations. If globalization and access to finance becomes more difficult, coupled with resource shortages within their own countries, aid may decrease to the pre-modern nations, which will increase the duration and severity of famines.

Weather patterns are cyclical. As well, there is a growing body of evidence in the early decades of the century indicating global warming. The severity and occurrence of natural disasters is increasing. If this continues, we are likely to have larger numbers of people dis-

placed, and the death toll is likely to increase.

In the early decades of the century, birthrates are much higher in modern and pre-modern countries. Economic development—especially in terms of the advancement of women through access to education, to micro-finance, and to birth control—contributes to reductions in birthrates in pre-modern countries. If pre-modern countries can successfully advance economically, this is likely to contribute to reduced population growth.

Population will also impact where and how we live. People have lived in some type of dwelling for most of time, usually with family members. People will continue to live together in dwellings, but what will be the location, form, and ownership of those dwellings? The percentage of the global population living in urban areas is expected to increase from 48% in 2003 to 61% by 2030. The UN estimates that most of these urban dwellers will be in developing countries, living in cities in low-lying coastal areas at high risk from flooding due to global warming, making them vulnerable to natural disasters.

As resources become scarce, housing prices are likely to rise, making home ownership less affordable; this may impact living arrangements, meaning more people living together in smaller spaces. This in turn could lead to increased crime rates for theft and violence. This may give rise to the countertrend of a return to villages. Villages afford more space and the ability to attain greater self-sufficiency for essentials like food, water, and power.

Individual home ownership is common in many countries. Apartments or condominiums are also often individually owned, or sometimes the whole building is owned by a corporation. As global finance and credit markets become tighter, and resource shortages drive up the cost of housing, we may see more people leasing for longer periods of time and more housing owned by larger corporation and retirement funds. Rents are also likely to increase, so more people will likely share a household, thus reversing the growing trend of one-to-two-person households.

The materials we use to build and the sources of energy we use to heat and power our homes will likely change. Material shortages may drive innovation in recycled building materials and longer-lasting materials. Wind and solar may become more common sources of power. Rooftop, hydroponic, and vertical gardening could enable residential space to be used for food production, as a shortage of soil and arable land make it harder to feed the world's growing population.

It is difficult to conceive of a society without some form of individual ownership. A world in which all goods, services, and accommodation are provided by the government or by corporations seems unlikely. However, it is possible to conceive of one in which what individuals own, and how goods are consumed, changes due to both the availability of resources and also the materials used.

Cradle-to-cradle manufacturing, a closed-cycle manufacturing process where nothing is wasted, may become more commonplace. Planned obsolescence in manufactured goods may become a thing of the past. Leasing of goods, where the manufacturer is responsible for repair and/or replacement and recycling of the item, may become more common. Innovation efforts are likely to focus on these types of efforts as resource availability begins to peak, yet demand continues to increase.

While many fantasize about reduced workweeks and more leisure time, for the foreseeable future people will continue to work outside the home to earn an income. Where changes may occur is in the nature and quantity of the work.

Statistics indicate that, as many countries develop economically, working hours increase. Resource shortages may mean this will eventually begin to show more balance. As the focus turns to efficiency and resource reuse, people are likely to buy less, which means less is produced, although it may be at a higher cost.

Population growth means more adults available to work. This may lead to the elimination of child labor. Access to education for women as well as children may also assist in reducing the number of

children working outside the home.

Advances in health care and improvements in life span and the quality of life may assist people to remain in the workforce longer; this will be especially beneficial for post-modern countries, where the birthrate typically declines as the country advances economically.

Greater numbers of people may enter or remain in the workforce. Reduced working hours may be mandated, in order to create more jobs. More people might work part time. Greater self-reliance may mean more need for time outside of work to spend growing food and tending to other essential activities. The time and activities performed at work are likely to change.

Leisure activities are also likely to shift, with more physical activities being more local and distance interactions done virtually through the use of technology. The cost and resources available to enable global leisure travel are likely to experience shortages in the age of scarcity. By 2075, perhaps new technologies to enable low-cost, low-impact travel may be developed. The desire to do so, however, is more a question of geopolitics, an issue to which we shall now turn.

POST-SCARCITY GEOPOLITICS

The most-plausible scenario of the development of a post-scarcity society would be driven by advances in nanotechnology or other extensions of materials sciences. So, based on the current infrastructure, the breakthrough developments would most likely take place in Western Europe, the United States, Japan, or South Korea, although China or India, or even one of the oil-wealthy Gulf nations, cannot entirely be ruled out. It would be tempting to follow all these possible scenarios, but for the scope of this paper, we will focus on the assumption that the post-scarcity future begins in the developed, Westernized world.

By the time we build a post-scarcity capacity enough to build a post-scarcity economy, there will still be widespread poverty in many nations, particularly those that were still developing at the time of

“peak everything” and many that reverted to developing-nation status under the hardships of climate change, scarcity of potable water, wars, and environmental degradation. Whether led by a spirit of philanthropy, capitalism, or enlightened self-interest, it seems likely that the originating nations would ensure that other nations would receive at least some of the benefits fairly soon.

Much geopolitical conflict derives from scarcity or perceived scarcity of land, water, energy sources, mineral wealth, or other physical objects, ones which would be greatly alleviated by a post-scarcity economy. Eliminating or reducing these causes for conflict would be a great step toward international peace. However, it would not create total peace, largely because the capacity to mount deadly attacks would increase at the same time that some reasons for conflict will remain or might even worsen.

Some scholars posit that all historical conflict has been driven by competition over resources, and that even wars ostensibly over ideologies were truly about scarcity. Political or ideological dominance were ways to an end, rather than the end itself. Certainly for many wars, such as the Crusades and World War II, their arguments are at least plausible. However, conflicts that might have started over scarcity may still capture hearts, minds, and resources by the enticing trappings of politics, religion, or even simply historical grudges. If, as other scholars believe, humans are inherently a warlike species, a post-scarcity economy will enhance leaders’ ability to create war over causes that might have seemed trivial during a time when there was scarcity to worry about.

The status of the natural world is another area that could create conflict. Many arguments for environmental protection are based on the direct and indirect human benefit of natural land and species conservation. The world’s forests act to sequester carbon, clean the air, regulate the temperature, and house animals and plants of current or potential benefit to humankind. In a post-scarcity society where technology can replace all of those functions, there could well be conflict

over the appropriate use of whatever wild areas are left between those who see such areas as having intrinsic value, or possible future extrinsic value, and those who wish to use such land for other purposes.

So far, we have just looked at the questions in terms of today's nations and assumed that today's nation-states are more or less intact by the time of the post-scarcity society. However, the post-scarcity society may well make both today's states and the idea of a nation-state obsolete. On the other hand, the twentieth- and twenty-first-century creation of international groups and agencies from mutual interests rather than shared borders could replace today's states in a different way.

For example, the European Union formed, as an economic union, the European Economic Community, which itself arose from the European Coal and Steel Community. It has broadened its objectives beyond the purely economic or closely related (e.g., free movement of labor) to include social justice (e.g., its powers to legislate against discrimination), environmental policy, foreign policy, and security issues. If it were to change its charter to be one of shared values and common history, such an organization might not only include Turkey, thus adding part of Asia to its scope, but also traditional allies such as the United States. It might even transcend geography and history to become an alliance of democracies, bringing all of North America and large parts of South America, Asia, Africa, and even parts of the Middle East. Of course, the shadows of colonialism may create too great a barrier for some time, and continental alliances, rather than intercontinental, may come first.

Some alliances would be unlikely to continue. OPEC, based on commodity production, would likely disappear. The existing Non-Aligned Movement, originally formed as a response to NATO and the Warsaw Pact nations, has struggled to define itself and its purpose since the collapse of the Cold War, and even now, its membership has little in common. One remaining unifying theme has been

fair and sustainable development, but in a mature post-scarcity world, development would be moot for virtually all nations.

On the other hand, a post-scarcity society in which the means of living could be created at a micro level, or even at a household level, could make it possible for small, self-selected communities to exist either as parts of a nation-state but largely independent or as entirely autonomous of a nation-state, even as their own nation-state.

History suggests that most of these would be beneficial to their members and at worst harmless to others, but also gives us darker warnings of cults and militant groups that attacked other groups or destroyed themselves and took innocents with them. The ability of these organizations to operate with all the capacities of an autonomous nation in a post-scarcity society is a sobering thought. On the other hand, if the pursuit of these groups is control over themselves and their members and no control from an outside world, or if they can at least settle for this, we might find that post-scarcity geopolitics are in fact the road to a lasting peace.

Ultimately, the geopolitics of a post-scarcity world depends upon the interactions of humans and groups. While human nature is a constant, human ethics are not, and most of the world's history, viewed over a long time span, is what most of us would consider the growth of human ethics. For example, things considered tolerable by the majority of society, such as slavery and indiscriminate slaughter during war, are now mostly condemned, at least in principle if not always in practice, and are greatly reduced. Perhaps this is what has enabled us to survive so far—that, while our technical capacities always run ahead of our ethical development, our ethics do keep up just enough.

In order for a post-scarcity society to develop in such a way that it adds to net human freedom, justice, and well-being, we need more than ever to reinforce the principles of equality, generosity, tolerance, compassion, and mutual interdependence in what we teach and in what we model before those who will build the post-scarcity world. These values (or their lack) will shape whether the post-scarcity world

fulfills its promise or creates the seeds of the destruction of civilization. Nowhere will this be felt greater than in the post-scarcity financial system.

THE POST-SCARCITY FINANCIAL SYSTEM

A useful starting point to consider long-range futures is to examine what the future has in common with the present. Although we anticipate a future that is radically different from the present, in many ways that future will share a set of fundamentally common circumstances with the present. The present turbulence in the financial system may lead us to conclude that the long future will be very different from the present, but that may not be so. The global economy works in cycles. Just as the age of scarcity might be characterized by restricted credit conditions and a lessening of the pace of globalization, so the post-scarcity world might be characterized by loosening credit and an acceleration in the pace of globalization.

It is difficult to conceive of a barter economy. While the age of scarcity might induce greater self-sufficiency, even in the medieval era, when self-sufficiency was highly prevalent, a degree of monetization and trade within the economy was also present. It is not unreasonable for us to conclude that the post-scarcity economy will not be one of barter. This being so, the key functions of money—a unit of account, a medium of exchange, a store of wealth, a standard for deferred payment—will continue. If so, the role of finance does seem to be secure for the long future.

Of course, if money continues to exist, then there will have to be an issuer of money—an institution that will guarantee the promissory element of the currency and that will act as the lender of last resort to the financial system. In other words, there needs to be a central bank. The issue of currency is generally linked to sovereignty and government. Here, the future is less certain on two counts.

First, there is the question of where the locus of sovereignty might lie in a post-scarcity world. It is not unreasonable to expect that

the post-modern states will continue to develop over the course of the twenty-first century. These supranational entities, such as the EU, are likely to have developed a more mature financial system and will have sufficient authority to be able to issue their own currency, such as the euro. We could also expect the category of modern states, those that we now call nation-states, to still be in existence. In this case, we should continue to see national currencies. Last, there is also the case of the pre-modern state.

Zimbabwe currently provides an example of a pre-modern state, one that has failed almost completely to act as a nation-state and that has degenerated into a basic form of monetized economy. It is hard to gauge whether there are likely to be a greater or lesser number of pre-modern states in the post-scarcity world; however, we can reasonably expect that there will be some present. In these situations, the currency is exactly whatever the local economic entities will accept as currency.

There is a current debate over the degree to which digital cash will replace physical cash. Currently, in some economies, such as Japan or South Korea, physical cash has been virtually eliminated. In some economies—particularly those in the Middle East—large volumes of business transactions are still conducted in physical cash. In many respects this reflects the degree to which the local banking system has been digitized. There is no reason why this situation will not continue into the future. Digital cash is very convenient, but it leaves an audit trail that many do not wish others to follow. We could reasonably expect both physical cash and digital cash to be present in the post-scarcity financial system, but in possibly different degrees than at present.

The post-scarcity financial system is likely to reflect a mixture of supranational and national currencies, along with a number of areas where almost anything goes in terms of currency. The demand for physical cash is likely to continue—particularly in the pre-modern states, where it may act as a parallel currency to the worthless lo-

cal currency.

This leads on to the second area of uncertainty, the institutional arrangements that surround the management of the currency.

We can expect the continued operation of central banks, but the interface between the general population and the central bank, generally speaking, is quite minimal. At present, there are a raft of institutions that, under the supervision of the central bank, manage the interface between the monetary authorities and the general population.

The key institutions are the banks and the banking system, and they play an important role in the economy. The role of the bank is to act as a mediator between savers and borrowers, either in cash terms (overdraft finance, mortgage lending, corporate loans, etc.) or through financial instruments in the securities markets (stocks, shares, bonds, etc.).

There is some debate about the extent to which these institutions are likely to be corporeal or digital. At present, we have a mixture of the two. On the one hand, the digitization of the financial system has allowed it to become far more efficient and to extend its reach farther and faster than it had previously. On the other hand, the financial system is based on trust and confidence, which is created through interpersonal relationships in the corporeal world. It is not unreasonable to expect this mixed approach to continue into the post-scarcity world, although exactly where the balance between the two will lie is a matter of conjecture.

As long as we do not spend everything that we earn, and as long as some show a preference for money in the present as opposed to money in the future, there will be this saving and lending dimension to the financial system, irrespective of whether it is conducted face-to-face or online. The institutions could well be different from today's. For example, supermarkets currently act as banks to their customers; mobile-phone companies operate a digital banking facility for their customers. Are these the banking institutions of the future? It doesn't

really matter what form the banks take, as long as they fulfill the functions of a banking institution.

In the scarcity economy, financial institutions are likely to be quite regulated. We are likely to see greater supervision of the banks as institutions, even to the point of public ownership of the retail banks. The involvement of the state is likely to be extensive. The post-scarcity financial system is likely to react against this. It is reasonable to expect to see a period of deregulation and privatization as we move from the scarcity economy to the post-scarcity world. Lending is likely to become more liberal. As credit eases, economic growth will accelerate, international trade will increase, and speculation in the financial markets will increase. Eventually, the bubble will burst, but that is a tale for the phase beyond the post-scarcity world as the cycle continues.

CONCLUSION

As we write, the world is now entering into a transition phase from a period of abundance to a period of scarcity. Our concern in this piece has been to view how the world might be shaped when it emerges from that period of scarcity and into the following period of post-scarcity.

We have seen that corporate life is likely to be quite different from the present. The resumption of the process of globalization—in abeyance during the age of scarcity—is likely to see the acceleration of the process whereby the economy is digitized. Such digitization could lead to vast economies of scale on a global level. It could even assist economics—ever the dismal science of the allocation of scarce resources—to be turned on its head.

Of course, post-scarcity companies are a reflection of post-scarcity society. In many ways, the post-scarcity society will be characterized by the resumption of trends that have been evident for some time, but that are now likely to be interrupted by the age of scarcity. The development of a global middle class and concerns about the

work/life balance could well be the dominant features toward the end of this century.

As companies and society become more global in their approach, this trend is likely to result in a growing internationalism in the field of geopolitics. The age of scarcity is likely to fuel a new nationalism as nations seek to hoard and protect their resources. As we move away from this scarcity mentality, we are likely to see a greater willingness to act cooperatively in the international field.

Nowhere will this willingness be seen greater than in the field of the international financial system. The age of scarcity may place the institutions of international finance under great strain. As we move into the post-scarcity world, we can expect a greater degree of international monetary cooperation and coordination. Of course, the liberalization of the financial system will contain the seeds of its own destruction, and so the cycle will twist around again.

It is difficult, as we write, to remember that the sun rises as well as sets. Our present focus is dominated by financial crises and economic recessions, which could well give way to political turbulence and great change in the world. As futurists, we feel that we need to point out to the more general public that this is a natural undulation and that beyond the coming age of scarcity lies a post-scarcity world, where a better future lies. It is up to us to embrace that future and to work toward it coming sooner rather than later.