

Pegasus



A newsletter for the Caux Round Table Network
looking at business above the clutter and confetti

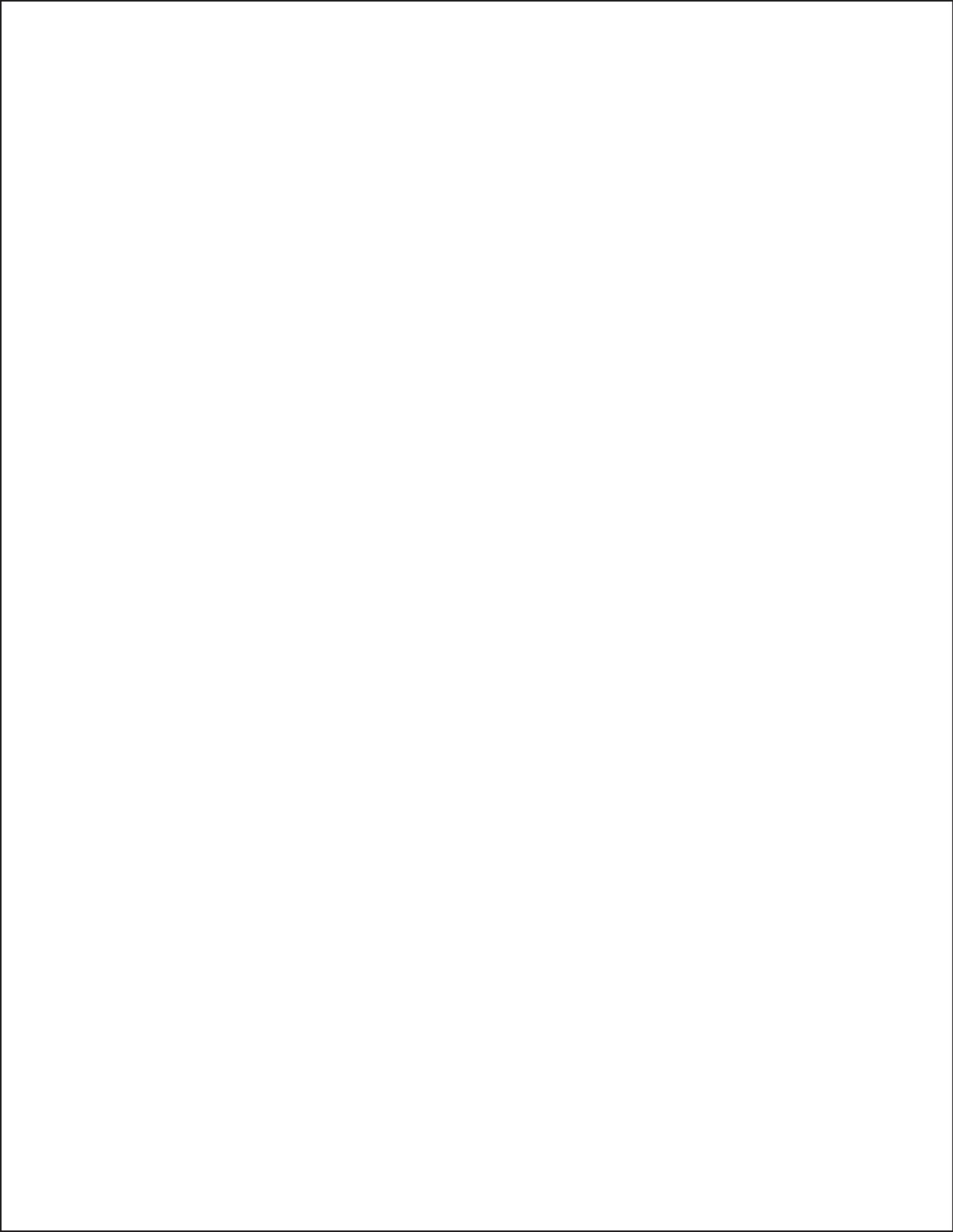
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Moral Capitalism At Work

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January 2013
Volume 3, Issue 1



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INTRODUCTION

Responsibility looks to the future while standing in the present. The past is behind us, containing lessons to be learned, certainly, but providing no opportunity for retrospective interference in the course of events.

Similarly, ethics is about the future: what will happen upon our taking this or that action? What ripples will our little stone, thrown perhaps carelessly into the pond, create? How far will they go? Should we care one way or the other?

From the perspective, therefore, of corporate social responsibility in a global context and of good governance, what does our future hold? What should we do today to make tomorrow better and our peoples wiser?

This issue of Pegasus brings to you summaries of two thoughtful reports on our futures. These reports, described in more detail below, speak of trends, specifics being so very less predictable. But even these trends are guestimates as the reports acknowledge.

The relevance of such reflections is more to open our minds today to the possibilities of tomorrow

rather than to equip us with highly effective guidelines and successful responses. The ethical person, it has long been thought, is not a calculation machine but a resourceful thinker who considers implications and possibilities before they happen. The ethical person is a seeker of truth in the world and needs to be aware and alert to what the world might become.

Stephen B. Young
Global Executive Director

INTRODUCTION TO **TRENDS**

STEPHEN B. YOUNG
GLOBAL EXECUTIVE
DIRECTOR

Both Karl Marx and Joseph Schumpeter famously argued that capitalism is the great driver of the human future. But is that still true? What about fierce religious beliefs and ethnic ambitions? What about political ambitions? What does our future hold and who will shape it for weal or woe?

We present below excerpts from two recent reports projecting our global futures. One was sponsored by the Bertelsmann Foundation of Germany and the other by the National Intelligence Center of the United States Government. Both reports are available in full through the internet.

There is considerable overlap in the projections made by the two reports. They both agree that our future will turn on responses to:

- diffusion of power away from the United States
- clashes and conflicts
- demography – aging populations and migration

- consumption of energy/climate change
- governance of the global order, both political and economic
- rise of individuals as primary actors with the weakening of state structures

Whether or not Marx and Schumpeter were essentially right, capitalism will shape our collective responses to these changes. Capitalism will fund governments and NGOs, making possible activities and setting limits on the resources that can be devoted to such initiatives and intersecting advocacy activities. How responsible will capitalism be in addressing public goods and avoiding public bads as our future comes upon us? That is where CSR standards and visions must play a role to tilt the playing field of economic activity in constructive directions for the benefit of all. Capitalism will shape economic interests working for collaboration or inducing competition and conflict. Capitalism and market forces will have much to say about efficiency of energy consumption and reduction of global warming through the use in scale of new technologies.

But, just as important, these future conditions will shape the possibilities of capitalism, both globally and in local communities and for individual firms, workers, and consumers.

In reviewing the projections, I was struck by a dramatic and intellectually costly omission: there was not consideration given to values and beliefs, to religions and ideologies, as drivers of behaviors, both good behaviors and bad behaviors. If we want to intervene to increase the odds of having certain outcomes, would it not make sense to focus attention and effort on the values and beliefs that would support such courses of action? The human person is not a machine. The non-mechanical dimensions of spirit, soul, love, hate and jealousy drive human outcomes. They always have and they always will.

Finally, I was disappointed that the projections only implicitly and not directly considered the evolving crisis of the entitlement state.

The two reports also were silent on the greatest issue of all: leadership. For humanity change is not destiny; character is destiny. How we respond to change makes all the difference between sustainability and collapse, between excellence and mediocrity, between solving problems and just muddling through.

What is our vision of leadership? How will we recruit, educate, empower and reward leaders? What values will set their ambitions and restrain them from excess and stupidity, encourage them to take risks, but confirm them in wise stewardship of their powers?

GLOBAL TRENDS 2030: ALTERNATIVE WORLDS

A PUBLICATION OF THE NATIONAL
INTELLIGENCE COUNCIL

DECEMBER 2012

NIC 2012-001
ISBN 978-1-929667-21-5

TO VIEW ELECTRONIC VERSION:
WWW.DNI.GOV/NIC/GLOBALTRENDS

MEGATRENDS AND RELATED TECTONIC SHIFTS

Megatrend 1: Individual Empowerment



Individual empowerment will accelerate substantially during the next 15-20 years owing to poverty reduction and a huge growth of the global middle class, greater educational attainment, and better health care. The growth of the global middle class constitutes a tectonic shift. For the first time, a majority of the world's population will not be impoverished, and the middle classes will be the most important social

and economic sector in the vast majority of countries around the world.

Megatrend 2: Diffusion of Power

The diffusion of power among countries will have a dramatic impact by 2030. Asia will have surpassed North America and Europe combined in terms of global power, based upon GDP, population size, military spending, and technological investment. China alone will probably have the largest economy, surpassing that of the United States a few years before 2030. In a tectonic shift, the health of the global economy increasingly will be linked to how well the developing world does—more so than the traditional West.

Megatrend 3: Demographic Patterns

We believe that in the world of 2030—a world in which a growing global population will have reached somewhere close to 8.3 billion people (up from 7.1 billion in 2012)—four



demographic trends will fundamentally shape, although not necessarily determine, most countries' economic and political conditions and relations among countries. These trends are: aging—a tectonic shift for both for the West and increasingly most developing countries; a still significant, but shrinking, number of youthful societies and states; migration, which will increasingly be a cross-border issue; and growing urbanization—another tectonic shift, which will spur economic growth but could put new strains on food and water.

Megatrend 4: Growing Food, Water, and Energy Nexus

Demand for food, water, and energy will grow by approximately 35, 40, and 50 percent respectively owing to an increase in the global population and the consumption patterns of an expanding middle class. Climate change will worsen the outlook for the availability of these critical resources.

GAME-CHANGERS

Game-Changer 1: The Crisis-Prone Global Economy

The international economy almost certainly will continue to be characterized by various regional and national economies moving at significantly different speeds—a pattern reinforced by the 2008 global financial crisis. The contrasting speeds across different regional economies are exacerbating global imbalances and straining governments and the international system. The key question is whether the divergences and increased volatility will result in a global breakdown and collapse or whether the development of multiple growth centers will lead to resiliency. The absence of a clear hegemonic economic power could add to the volatility.

Game-Changer 2: The Governance Gap

During the next 15-20 years, as power becomes even more diffuse than today, a growing

number of diverse state and non-state actors, as well as subnational actors, such as cities, will play important governance roles. The increasing number of players needed to solve major transnational challenges—and their discordant values—will complicate decision-making. The lack of consensus between and among established and emerging powers suggests that multilateral governance to 2030 will be limited at best. The chronic deficit probably will reinforce the trend toward fragmentation.

Game-Changer 3: Potential for Increased Conflict

Historical trends during the past two decades show fewer major armed conflicts and, where conflicts remain, fewer civilian and military casualties than in previous decades. Maturing age structures in many developing countries point to continuing declines in intrastate conflict. We believe the disincentives will remain strong against great power conflict; too much would be at stake. Nevertheless, we need to be cautious about the prospects for further declines in the number and intensity of intrastate conflicts, and interstate conflict remains a possibility. Intrastate conflicts have gradually increased in countries with a mature overall population that contains a politically dissonant, youthful ethnic minority. Three different baskets of risks could conspire to increase the chances of an outbreak of interstate conflict: changing calculations of key players—particularly China, India, and Russia; increasing contention over resource issues; and a wider spectrum of more accessible instruments of war.

Game-Changer 4: Wider Scope of Regional Instability

Regional dynamics in several different theaters during the next couple decades will have the potential to spill over and create global insecurity. The Middle East and South Asia are the two regions most likely to trigger broader instability.

Game-Changer 5: The Impact of New Technologies

Four technology arenas will shape global economic, social, and military developments, as well as the world community's actions pertaining to the environment, by 2030. Information technology is entering the big data era. Process power and data storage are becoming almost free; networks and the cloud will provide global access and pervasive services; social media and cyber security will be large new markets.

New manufacturing and automation technologies such as additive manufacturing (3D printing) and robotics have the potential to change work patterns in both the developing and developed worlds.

Breakthroughs, especially for technologies pertaining to the security of vital resources—will be necessary to meet the food, water, and energy needs of the world's population. Key technologies likely to be at the forefront of maintaining such resources in the next 15-20 years will include genetically modified crops, precision agriculture, water irrigation techniques, solar energy, advanced bio-based fuels, and enhanced oil and natural gas extraction via fracturing.

Last but not least, new health technologies will continue to extend the average age of populations around the world, by ameliorating debilitating physical and mental conditions and improving overall wellbeing. The greatest gains in healthy longevity are likely to occur in those countries with developing economies as the size of their middle class populations swell.

Game-Changer 6: The Role of the United States

How the United States' international role evolves during the next 15-20 years—a big uncertainty—and whether the US will be able to work with new partners to reinvent the

international system will be among the most important variables in the future shape of the global order. Although the United States' (and the West's) relative decline vis-à-vis the rising states is inevitable, its future role in the international system is much harder to project. The degree to which the US continues to dominate the international system could vary widely.

POTENTIAL BLACK SWANS THAT WOULD CAUSE THE GREATEST DISRUPTIVE IMPACT

Severe Pandemic

No one can predict which pathogen will be the next to start spreading to humans, or when or where such a development will occur. An easily transmissible novel respiratory pathogen that kills or incapacitates more than one percent of its victims is among the most disruptive events possible. Such an outbreak could result in millions of people suffering and dying in every corner of the world in less than six months.

Much More Rapid Climate Change

Dramatic and unforeseen changes already are occurring at a faster rate than expected. Most scientists are not confident of being able to predict such events. Rapid changes in precipitation patterns—such as monsoons in India and the rest of Asia—could sharply disrupt that region's ability to feed its population.

Euro/EU Collapse

An unruly Greek exit from the euro zone could cause eight times the collateral damage as the Lehman Brothers bankruptcy, provoking a broader crisis regarding the EU's future.

A Democratic or Collapsed China

China is slated to pass the threshold of US\$15,000 per capita purchasing power parity (PPP) in the next five years or so—a level that is often a trigger for democratization. Chinese “soft” power could be dramatically boosted, setting off a wave of democratic movements. Alternatively, many experts believe a democratic China could also become more nationalistic. An economically collapsed China would trigger political unrest and shock the global economy.

A Reformed Iran

A more liberal regime could come under growing public pressure to end the international sanctions and negotiate an end to Iran's isolation. An Iran that dropped its nuclear weapons aspirations and became focused on economic modernization would bolster the chances for a more stable Middle East.

Nuclear War or WMD/Cyber Attack

Nuclear powers such as Russia and Pakistan and potential aspirants such as Iran and North Korea see nuclear weapons as compensation for other political and security weaknesses, heightening the risk of their use. The chance of non-state actors conducting a cyber attack—or using WMD— also is increasing.

Solar Geomagnetic Storms

Solar geomagnetic storms could knock out satellites, the electric grid, and many sensitive electronic devices. The recurrence intervals of crippling solar geomagnetic storms, which are less than a century, now pose a substantial threat because of the world's dependence on electricity.

US Disengagement

A collapse or sudden retreat of US power probably would result in an extended period

of global anarchy; no leading power would be likely to replace the United States as guarantor of the international order.

ALTERNATIVE WORLDS

The present recalls past transition points—such as 1815, 1919, 1945, and 1989—when the path forward was not clear-cut and the world faced the possibility of different global futures. We have more than enough information to suggest that however rapid change has been over the past couple decades, the rate of change will accelerate in the future. Accordingly, we have created four scenarios that represent distinct pathways for the world out to 2030: *Stalled Engines*, *Fusion*, *Genie Out-of-the-Bottle*, and *Non-state World*.

As in previous volumes, we have fictionalized the scenario narratives to encourage all of us to think more creatively about the future. We have intentionally built in discontinuities, which will have a huge impact in inflecting otherwise straight linear projections of known trends. We hope that a better understanding of the dynamics, potential inflection points, and possible surprises will better equip decision makers to avoid the traps and enhance possible opportunities for positive developments.

Stalled Engines

Stalled Engines—a scenario in which the risk of interstate conflict rises owing to a new “great game” in Asia—was chosen as one of the bookends, illustrating the most plausible “worst case.” Arguably, darker scenarios are imaginable, including a complete breakdown and reversal of globalization due potentially to a large-scale conflict on the order of a World War I or World War II, but such outcomes do not seem probable. Major powers might be drawn into conflict, but we do not see any such tensions or bilateral conflict igniting a full-scale conflagration. More likely, peripheral powers would step in to try to stop a conflict.

Indeed, as we have stressed, major powers are conscious of the likely economic and political damage to engaging in any major conflict. Moreover, unlike in the interwar period, completely undoing economic interdependence or globalization would seem to be harder in this more advanced technological age with ubiquitous connections. *Stalled Engines* is nevertheless a bleak future. Drivers behind such an outcome would be a US and Europe that turn inward, no longer interested in sustaining their global leadership. Under this scenario, the euro zone unravels quickly, causing Europe to be mired in recession. The US energy revolution fails to materialize, dimming prospects for an economic recovery. In the modeling that McKinsey Company did for us for this scenario, global economic growth falters and all players do relatively poorly.

Fusion

Fusion is the other bookend, describing what we see as the most plausible “best case.” This is a world in which the specter of a spreading conflict in South Asia triggers efforts by the US, Europe, and China to intervene and impose a ceasefire. China, the US, and Europe find other issues to collaborate on, leading to a major positive change in their bilateral relations, and more broadly leading to worldwide cooperation to deal with global challenges. This scenario relies on political leadership, with each side overruling its more cautious domestic constituencies to forge a partnership. Over time, trust is also built up as China begins a process of political reform, bolstered by the increasing role it is playing in the international system. With the growing collaboration among the major powers, global multilateral institutions are reformed and made more inclusive. In this scenario, all boats rise substantially. Emerging economies continue to grow faster, but GDP growth in advanced economies also picks up. The global economy nearly doubles in real terms by 2030 to \$132 trillion in today’s dollars. The American Dream returns with per capita incomes rising \$10,000 in ten years.

Chinese per capita income also expands rapidly, ensuring that China avoids the middle-income trap. Technological innovation—rooted in expanded exchanges and joint international efforts—is critical to the world staying ahead of the rising financial and resource constraints that would accompany a rapid boost in prosperity.

Gini Out-of-the-Bottle

This is a world of extremes. Within many countries, inequalities dominate—leading to increasing political and social tensions. Between countries, there are clear-cut winners and losers. For example, countries in the euro zone core that are globally competitive do well, while others on the periphery are forced to leave the EU. The EU single market barely functions. The US remains the preeminent power as it gains energy independence. Without completely disengaging, the US no longer tries to play “global policeman” on every security threat. Many of the energy producers suffer from declining energy prices, failing to diversify their economies in time, and are threatened by internal conflicts. Cities in China’s coastal zone continue to thrive, but inequalities increase and split the Party. Social discontent spikes as middle-class expectations are not met except for the very “well-connected.” The central government in Beijing, which has a difficult time governing, falls back on stirring nationalistic fervor. In this scenario, economic performance in emerging and advanced economies leads to non-stellar global growth, far below that in our *Fusion* scenario, but not as bad as in *Stalled Engines*. The lack of societal cohesion domestically is mirrored at the international level. Major powers are at odds; the potential for conflicts rises. More countries fail, fueled in part by the dearth of international cooperation on assistance and development. In sum, the world is reasonably wealthy, but it is less secure as the dark side of globalization poses an increasing challenge in domestic and international politics.

Non-state World

In this world, non-state actors—nongovernmental organizations (NGOs), multinational businesses, academic institutions, and wealthy individuals—as well as subnational units (megacities, for example), flourish and take the lead in confronting global challenges. An increasing global public opinion consensus among elites and many of the growing middle classes on major global challenges—poverty, the environment, anti-corruption, rule-of-law, and peace—form the base of their support. The nation-state does not disappear, but countries increasingly organize and orchestrate “hybrid” coalitions of state and non-state actors that shift depending on the issue. Authoritarian regimes find it hardest to operate in this world, preoccupied with asserting political primacy at home and respect in an increasingly “fully democratized” world. Even democratic countries, which are wedded to the notion of sovereignty and independence, find it difficult to operate successfully in this complex and diverse world. Smaller, more agile countries in which elites are also more integrated are apt to do better than larger countries that lack social or political cohesion. Formal governance institutions that do not adapt to the more diverse and widespread distribution of power are also less likely to be successful. Multinational businesses, IT communications firms, international scientists, NGOs, and others that are used to cooperating across borders and as part of networks thrive in this hyper-globalized world where expertise, influence, and agility count for more than “weight” or “position.” This is nevertheless a “patchwork” and very uneven world. Some global problems get solved because networks manage to coalesce, and some cooperation occurs across state and non-state divides. In other cases, non-state actors might try to deal with a challenge, but they are stymied because of opposition from major powers. Security threats pose an increasing challenge: access to lethal and disruptive technologies expands, enabling individuals and small groups to

perpetuate violence and disruption on a large scale. Economically, global growth does slightly better than in the *Genie Out-of-the-Bottle* scenario because more cooperation occurs on major global challenges in this world. The world is also more stable and socially cohesive.

MEGATRENDS IN GLOBAL INTERACTION

BY THE BERTELSMANN
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Ever since the ancient Greeks consulted the oracle at Delphi for portents of what was to come, humans have sought to know the future. The future is the place, after all, to which we all aspire to emigrate. We have a natural interest in what we hope will be our home. The future, in its precise details, is unknowable. Prediction is an art – and an uncertain, erratic, unreliable one at that – not a science. But the world of the decades to come is not completely opaque. While we cannot know everything about that world, we can be reasonably confident about some things. We cannot know what will happen, but we can have a good idea of what can happen, what may happen and even what is more likely than not actually to happen.

Michael Mandelbaum

1. DEMOGRAPHICS AND MIGRATION

Jack A. Goldstone

The first half of the 21st century will be truly historic in terms of global population trends. The dominant trends of the last 50 or even 200 years will be reversed and, in some respects, such as population aging and urbanization, we will see conditions that have never existed in human history. This paper discusses six major trends in global population that will likely pose significant challenges to global peace and prosperity in the coming decades. These are:

- (1) a marked slowdown or even reversal of growth in the advanced industrialized nations;
- (2) a concentration of large, youthful populations on the move in an “arc of instability” reaching from southern Africa through the Middle East as well as South and Southeast Asia;
- (3) the rapid aging of societies in Europe,

North America and East Asia;
(4) increased migration flows, both voluntary and involuntary, within and across national boundaries, with ever-larger migration from developing to developed countries;

(5) increasing urbanization, especially in China, India and Africa; and

(6) the concentration of near-term population growth in regions with relatively poor populations, fragile or ineffective governments, and especially high vulnerability to climate change.

2. GLOBAL SECURITY

Benjamin Wittes

In other words, the broad strategic challenge for global security will not simply be controlling biological terrorism or cyber attacks, which we ought to understand as comparatively well-developed case studies of a larger set of technological challenges. Rather, it will be defining a relationship between the state and individuals with respect to the use and development of such dramatically empowering new technologies that permits the state to protect security while simultaneously insisting that it does so without becoming oppressive. This challenge clearly poses a major governance question – one without an obvious answer or even an obvious conceptual approach. It seems intuitive that states cannot regard billions of people around the world as potential strategic threats without having that fact fundamentally alter the nature of how those states and individuals interact. Yet the state's initial security instinct here would probably be as ineffective as it would be injurious to human liberty. Whatever the right answer is here, it's certainly not a police state.

But if we take that as a given, we are left with vexing questions: Is there an answer? Are we sitting ducks just waiting for one of those people



with nuclear weapons in his or her pocket to take them out and destroy the world? Or are there plausible ways to manage the risks of these new categories of technology while reaping their many benefits – and, if so, what might those look like?

. . . . [I]ntellectual strategies for thinking about this governance problem . . . will almost certainly cut in directions bending current ideological assumptions of both the left and the right. For example, governments' need to understand how bad actors are using these technologies will likely militate against strong forms of privacy protections with respect to their use – both individual privacy protections and corporate privacy and trade-secret protections.

Since these technologies developed in the public literature and the relevant materials are all readily available (unlike in the nuclear context, where highly enriched uranium and plutonium are still difficult to come by), the cat really is out

of the bag. And, paradoxically, that means that transparency – even radical transparency – in the use and handling of dangerous technologies may offer greater protection against misuse than a more classical non-proliferation approach.

More fundamentally, the diffusion of these technologies will almost certainly precipitate a reduction or erosion of the state's monopoly over security policy. That is, it will distribute responsibility for security to thousands of private-sector actors and potentially millions or billions of individuals whom the technology empowers every bit as much as it does would-be terrorists and criminals. In the cyber context, for example, the communications infrastructure over which attacks will take place is overwhelmingly privately owned and operated. Similarly, in the biotech arena, the best defense against biohazards, whether man-made or naturally occurring, is good public health infrastructure and more of the same basic research that makes biological attacks possible.

The Decline of State and the Rise of Personal Warfare

The 20th century saw both a dramatic rise in state-to-state warfare and an equally dramatic decline in it. The two world wars of the first half of the century gave way to remarkable big-power peace in the second half. This peace had several interlocking causes. There was nuclear deterrence, which prevented the Cold War from ever becoming hot. Later, there was the American security umbrella and globalization, which made the major powers so dependent on one another as to create an exceedingly powerful disincentive to let disagreements and tensions come to blows. It is a remarkable fact – and one probably unprecedented in human history – that a dominant world power (the United States) is today confronting a rising power (China) and that war between them is

simply not on the list of options for either party. The latter, after all, holds a trillion dollars of the former's debt, and the former provides the principal market for the latter's manufacturing-based economy. Likewise, even if that were not the case, each side has enough nuclear weapons to keep the other's mind crystal clear. Instead, modern warfare falls into four basic categories: regional conflicts, intrastate conflicts, proxy fights between major powers that will not engage in direct combat, and dramatically asymmetrical wars, such as those between the United States and Iraq or between Russia and Georgia.

Yet this trend has not by any means implied an end to warfare, for it has taken place alongside another trend that has pushed in the opposite direction: the increasing ability of non-state groups to wage war in a strategically significant fashion. Non-state actors are, of course, nothing new. In American history, they date back to, well, the American Revolutionary War – and quickly thereafter to Shays' Rebellion and the Whiskey Rebellion. Movie buffs will not forget Spartacus, either. The Palestinian cause has been entirely composed of non-state groupings for decades, and the Israeli cause for the first half of the 20th century was as well. Indeed, non-state actors have been a feature of the politics of global security for as long as anyone can remember.

The Bioterrorism Threat

The life sciences present perhaps the prototypical case of this type of technological development, realistically threatening to put the power of a WMD attack in the hands of, if not the average person, certainly many above-average people with relatively inexpensive equipment and basic training in genetic engineering. Biological weapons are unique among weapons of mass destruction in that, like nuclear weapons, they have the capacity to inflict truly catastrophic damage, yet, like

chemical weapons, they are comparatively inexpensive and easy to produce.

The Cyber Threat

The threat of cyber terrorism – and the vulnerability of the world’s network infrastructure, more generally – similarly illustrates the growing capacity of small groups to become players in international relations and global security issues. As is the case with biotechnology, the information technology underlying today’s computer and communications networks is inherently a dual-use technology. Military IT depends largely on commercial IT developed in the private sector. According to one estimate, 95 percent of the U.S. military’s information transfers occur on civilian networks. Likewise, the expertise needed to launch cyber attacks is widely distributed throughout the world. A cyber attack could aim at a nation’s military operations or seek to disrupt its social and economic activity. Such an attack could come from a rival nation (presumably on a smaller scale) or from the laptops of members of criminal gangs, politically motivated hacking groups or simply disaffected individuals. And, as with the anthrax attacks, identifying the

perpetrator involves both time and, ultimately, significant doubt.

The Current State of Governance

It rather understates the matter to say that current governance of both the cyber- and bio- threat arenas is hopelessly inadequate to the task of preventing the disasters one might reasonably anticipate.

3. BIODIVERSITY AND CLIMATE CHANGE

Wolfgang Cramer, Katrin Vohland

For the broader public, “global megatrends” bring to mind economic globalization, population growth and the Internet’s effect on global communication patterns. Climate change, at least since the influential Stern Report (Stern et al. 2007), has also become a megatrend of concern. In stark contrast to these, biodiversity is considered by many to be a kind of “soft topic.” Yet the global loss of species, ecosystem functions and ecosystem services challenges human life in several



important ways. Numerous people are directly dependent on local ecosystems and their functions in order to eat and drink as well as to find shelter and materials for their survival. Even where the immediate value of biodiversity is not readily apparent, it often contains option values for the future by potentially providing genetic resources and regulating environmental functions.

Biodiversity loss constitutes a global megatrend both with respect to the massive changes it brings and with respect to the potential impact of this trend on humanity. One recent study has argued that, of all recognized “planetary boundaries” for human life on Earth, we may already have exceeded a major boundary when it comes to biodiversity. There are now numerous indicators suggesting a dramatic and unprecedented decline in biodiversity. For example, the Living Planet Index of the World Wildlife Fund (WWF) reports a decreasing number of species in marine, freshwater and terrestrial habitats. The recent Global Biodiversity Outlook 3, as well as substantial underlying technical papers prepared by the secretariat of the Convention for Biological Diversity, have summarized both the decline and the grim scenarios for future development of biodiversity worldwide (CBD 2010).

Climate Change: Current Conditions and Trends

Observations of recent temperature increase, on the global scale, are undisputable. It is also well-established that this temperature increase is due to an increase in human-induced greenhouse gases (GHGs), making, for example, “average Northern Hemisphere temperatures during the second half of the 20th century . . . very likely higher than during any other 50-year period in the last 500 years”. Fossil-energy use and cement production are the dominant sources of GHGs, but land use changes (mainly deforestation) and agriculture also contribute a

significant part (approximately one-fifth).

Atmospheric temperatures have increased the most at high northern latitudes. Ocean temperatures have also increased, and the resulting thermal expansion has given way to rising sea levels. Glaciers are in retreat worldwide, contributing to rising sea levels, but also making mountain ecoregions among the most sensitive with regard to climate change. Increasing GHG concentrations modify the energy balance of the atmosphere and generally enhance the hydrological cycle. This causes significant changes in precipitation around the globe and higher frequency of extremes, including floods and droughts. Likewise, monsoon systems appear to have become less predictable.

Biome-Level Biodiversity Risks

Several biomes are now directly threatened due to climate change. Warm-water coral reefs and the subarctic ice-edge ecosystem probably face the highest climate-caused risks, as discussed earlier.

Coral reefs number among the most endangered ecosystems. A mix of sedimentation, global warming, rising sea levels and ocean acidification causes large-scale diebacks of coral reefs. Tropical coral-reef bleaching may reach a tipping point when sea surface temperatures rise by more than 2 degrees Celsius and/or when atmospheric CO₂ concentration reaches more than 480 ppm. The loss of coral reefs inevitably triggers further detrimental impacts on other inhabitants, such as birds and mammals.

In the *Arctic Ocean*, summers could be entirely ice-free in 20 to 30 years, a condition that may not have existed during the last 800,000 years. Many species and communities have evolved a range of specific adaptive features for the Arctic environment. The loss of ice platforms reduces

the suitable habitat of ice-obligate species for feeding, resting and breeding. Increasing weather extremes might exhaust the animals, and disease vectors might enhance their population while pathogens might more easily survive. Less ice and more productive waters in open areas of the central Arctic, combined with less biomass in coastal and shelf areas, might lead to shifts from more specialized species (e.g., narwhals, walrus and polar bears) to less specialized invasive species (e.g., bearded seals and baleen whales).

The *boreal zone* at high northern latitudes has been shown to respond closely to climate variability and change. While the expansion of trees might already be transforming the southern tundra into taiga conditions, the situation at the southern “trailing” edge is less clear. Models indicate a shift from needle-leaved trees to broad-leaved trees (which are traditionally seen further south), but the nature of the transition depends on water availability, disturbances (e.g., forest fires and insect outbreaks) and human land use, including forestry. Generally, boreal forests have the potential for dramatic changes, which can be triggered by insects and fire.

For tropical forests, a picture of future climate risks is beginning to emerge despite scenario uncertainty and the massive effects of deforestation. While it is still unclear whether drought will become a serious threat during the 21st century in Amazonia, the risk is considered non-negligible. In parts of the Amazon, especially the northeast, precipitation regimes might shift and turn tropical rainforests into more open types of forests. Tropical dry forests receive much less attention, although they belong to the most endangered ecosystems globally. Climate change will likely have a discernible impact on them in addition to the expected land-use changes.

Savannah and natural grassland ecosystems are characterized by a mixture of grasses and woody plants in varying combinations. Most

savannahs are intensely grazed and shaped by fire. Changing precipitation patterns impact the timing, frequency and intensity of fires, thereby profoundly altering plant composition. Experiments and modeling studies have demonstrated that rising temperatures and increased atmospheric CO₂ concentrations shift the relative competitive strength of C₃ and C₄ grasses, herbs and nitrogen-fixing plants. On the other hand, the fertilizing effect of CO₂ is expected to outweigh the effect of rising temperatures, and it might actually enhance the resilience of savannahs to climate change. However, this might also decrease grazing quality, either by physiological effects or because grasses are replaced by trees in a process closely interlinked to grazing.

4. ENERGY AND NATURAL RESOURCES

Stephen P. A. Brown, Joel Darmstadter

Throughout the 20th and early 21st centuries, economic and population growth have driven the use of energy and natural resources. Today, these resources are being consumed at an ever-increasing rate, setting up a collision course in economic development. The recent emergence of industrializing countries such as Brazil, China and India has significantly altered global growth and consumption, which only increases the pressure on resources, particularly energy. These trends have renewed concern about resource scarcity, rising prices and environmental degradation.

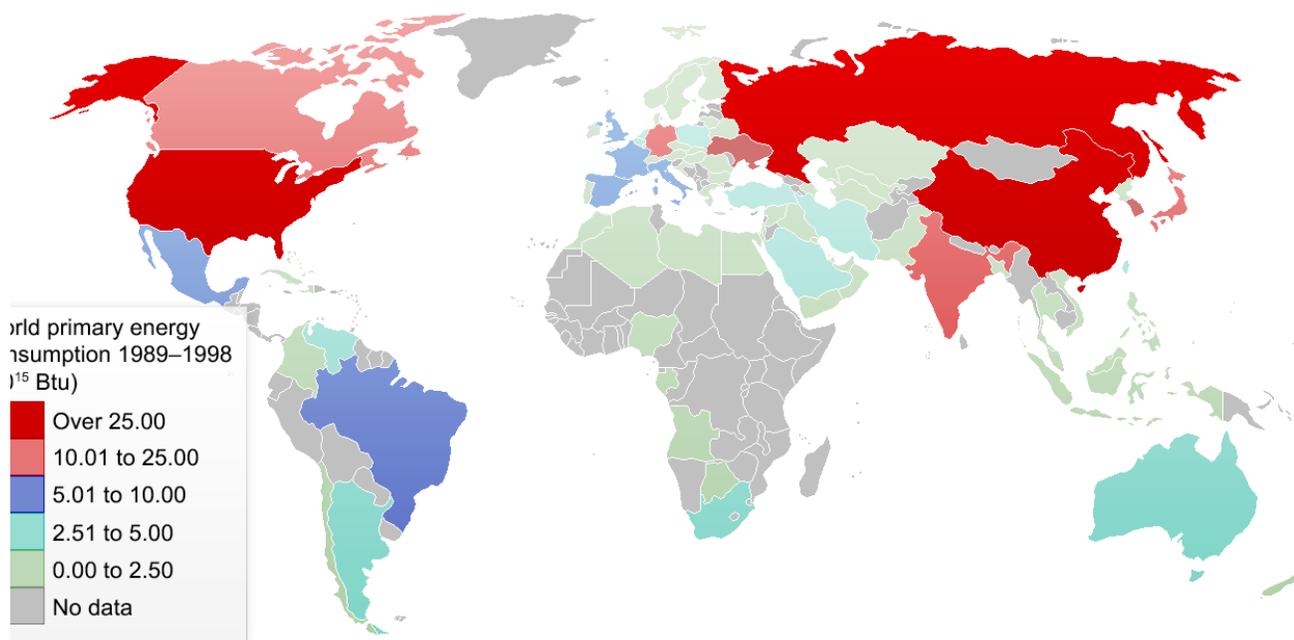
Our success in responding to climate change and shifting to a sustainable development path depends in large part on whether we can decouple energy consumption from economic growth. As long as economic growth depends on consuming ever-greater quantities of nonrenewable resources, the social costs are expected to rise to unprecedented heights.

2010–2030: A Decisive Time

The probable course of development in natural-resource use between now and 2030 is already pretty well determined. Economic growth, resource consumption and environmental degradation will continue to be strongly correlated until technologies and policies

economic loss. That knowledge will reshape policy in the latter part of the century. Developing countries will need to leapfrog developed countries in utilizing sustainable energy sources rather than the traditional fossil-fuel infrastructure.

. . . . [With] our major focus on energy, we take a largely global market perspective. It goes without saying that public-policy initiatives,



evolve. While change is possible in this time frame, it will likely be modest and gradual.

Even so, the potential for the next two decades to shape the implications of these trends far beyond 2030 is remarkable. Policies implemented in the early part of the century will have much more leverage in shaping the future because they will have time to accumulate momentum.

2030–2050: Technology Jumps Ahead

By 2050, we should develop a better sense of the extent to which anthropogenic greenhouse gases contribute to global warming and

environmental constraints, technological developments and fundamental scientific breakthroughs all have important effects – at times, decisive ones – on future trends in energy and natural resources. But it is arguably factors such as income, price and cost – and their interaction with forces of supply and demand – that set the track that natural resources will follow over the remainder of this century.

5. ECONOMIC GLOBALIZATION

Scott Barrett

The world's economic system consists of different markets: markets in goods,

services and labor linked through trade; markets for capital, to spread risks and fund investment, linked by financial integration; and markets for innovation linked by a system of intellectual property rights. If we take a broader definition, economic globalization can encompass standards, knowledge, human migration, infectious diseases and greenhouse gas emissions. In these last cases especially, markets may be missing or grossly imperfect, but their international consequences are still relevant to human well-being. Moreover, these imperfect markets are integrally connected to the more conventional ones. For both reasons, they should be incorporated in our analysis.

In this paper, I develop a perspective on economic globalization – explaining what it is, why it can threaten and also enhance progress in human development, and how it evolves over time. I shall not make predictions but, rather, provide a framework for thinking about globalization's future.

Consequences for Growth and Well-Being

It is difficult to know whether, on balance, the consequences of globalization are positive or negative for human well-being. As countries have become more interconnected, key measures of well-being have certainly improved overall. The standard of living has increased, life expectancy has improved and infant mortality has fallen. But is globalization responsible for these changes?

Growth in per capita income (the material standard of living) may have little if anything to do with globalization. To isolate the effect of globalization, all the other factors affecting growth must be controlled. It is also essential to choose suitable indicators of globalization. Overall, the evidence shows that greater “openness” tends to be good for growth, if openness is defined as including not only trade liberalization, but also stable exchange rates,

prudent macroeconomic policies and public institutions that are immune to corruption. Likewise, as Baldwin (2004) has written, “some policies regarded as causing static economic distortions may be appropriate at certain times and under various circumstances.”

The case that financial globalization specifically is good for growth is also mixed, if not weak. As Prasad et al. (2003) explain, “a systematic examination of the evidence suggests that it is difficult to establish a robust causal relationship between the degree of financial integration and output growth performance” (for a recent critique, see Rodrik and Subramanian 2009).

Growth is also a poor measure of human well-being. For example, there is evidence in some countries that growth has been accompanied by worsening environmental conditions that can negatively impact well-being (Dasgupta 2001). Theory tells us that liberalization of trade policies is good for human welfare, provided that all other policies are optimal. If other policies are not optimal, however, greater openness may not improve welfare (Copeland and Taylor 2003). Whether trade liberalization improves overall well-being depends in part on whether complementary policies offer assistance to the people who lose from liberalization.

Impacts of Domestic Policies

To underscore an earlier point, whether a country gains or loses from globalization depends not only on our international institutions, but also on the country's own domestic institutions. As noted by Prasad et al. (2003), whether a country can gain from globalization depends on its having “robust legal and supervisory frameworks, low levels of corruption, a high degree of transparency and good corporate governance.” Differences in domestic governance therefore explain the variable effects of the most recent financial crisis.

A Multilateral World

Only two decades ago, the global balance of power changed abruptly. For decades, it was bipolar, dominated by the United States and the Soviet Union. Suddenly, after the 1991 collapse of the Soviet Union, it was unipolar. In the last decade, the influence of the world's only superpower has waned. International support for American foreign policy is weak, such as for the invasion and occupation of Iraq. The United States has also failed to act on other issues for which broad international support was overwhelming (such as when the U.S. failed to ratify the Kyoto Protocol to address climate change). Particularly after September 11, 2001, the values of the United States diverged from those of its closest allies (and values within the United States also diverged). The recent global economic crisis was set off in part by the crisis in the U.S. economic system (especially the housing bubble).

Today, there are many more major economic powers than there were two decades ago, and they will need to cooperate to restore prosperity. They will also need to cooperate to address the world's other great challenges, such as climate change and nuclear proliferation. China is now an economic colossus. It grew by integrating with the rest of the world, and the rest of the world cannot extricate itself from the recession without China's cooperation.

India is another important player. So is Russia, whose economic fortunes have reversed thanks to higher oil prices (the latter due partly to the growth of China). Brazil is now the world's eighth-largest economy. The need to replace the G-7 with the G-8 (Russia was added in 1997) and then, after only two years, to form the G-20, is an expression of this incredible transformation.

Human Interaction and the Global "Public Good"

Globalization is also increasing the scale of human interaction. An interesting question is whether globalization promotes parochialism (identity based on national groups) or cosmopolitanism (identity based on shared humanity). A recent experiment involving more than 1,000 individuals from six countries sheds light on this question (Buchan et al. 2009). People from different countries were asked to play a public goods game, with a distinction made between provision of a local public good that would benefit the individual's own (local) community and a global public good that would benefit people everywhere. The experiment showed that people from countries that rank high in terms of globalization were more likely to contribute to the global public good. People who have social connections with people in other countries were also more likely to contribute to the global public good. This is a welcome result since, as mentioned previously, greater international cooperation is required to ensure that globalization increases human well-being.

6. GLOBAL GOVERNANCE

Bruce D. Jones, with Andrew Hart

The idea that there is a megatrend toward global governance should not be taken as uncontested. Indeed, the first term of the Bush administration saw the rise to policy dominance of a school of thought that explicitly rejected the notion that U.S. power was in any way fettered by a terrain of global norms, laws or institutions. But just as Irving Kristol once described neoconservatives as "liberals who've been mugged by reality," so the neat power projection of neoconservatism was mauled by the messy realities of Iraq and Afghanistan.

It is no coincidence that President Bush was replaced by the most globally minded president in contemporary U.S. history.

Other forces – Chinese nationalism, American isolationism, Islamist rejections of modernity, anti-immigrant sentiment in Europe – will challenge again. And contemporary globalization is unstable; this decade alone has already experienced four severe shocks to the international system: the 9/11 terrorist attacks, the second Iraq war, the oil and food price spike, and the global financial crisis. But, for now, the steady accumulation of arrangements for global governance (or, perhaps more accurately, the management and governance of globalization) looks set to continue.

The First and Central Trend Is the Shift in the Balance of Power

Before looking to trends, a brief look at the evolving nature of U.S. hegemony is warranted. For we currently live with global institutional arrangements that were forged in the 1940s under conditions of emergent U.S. hegemony and then substantially adapted in the 1990s under conditions of U.S. hyper-hegemony. After the attacks of 9/11 and the rapid U.S. military action in Afghanistan, pundits in the U.S. and elsewhere began discussions not just of hegemony, but also of empire. This changed after the first phase of the Iraq war.

In terms of global governance, the U.S. decisions on Iraq produced three things: a deliberate pushback against U.S. dominance within global institutions; a drain on the United



States' economy and military capacity; and an erosion of its standing within international politics. In short, it produced the perfect conditions for the emerging powers to begin asserting their interests – which they did, as discussed below. The entire episode was redolent of the predictions that Paul Kennedy had made in the late 1980s about “hegemonic overstretch” (Kennedy 1987). If this course of events had not coincided with a relative decline in the U.S. share of the global economy, perhaps it would not have had any major impact on global governance. But it did. Whereas between 1989 and 1999 the U.S. share of the global economy actually grew by 4 percent, between 2000 and 2009, it declined by 6 percent, making its current share of global GDP slightly lower than its 1989 share of 26 percent.

The Increased Role of the Emerging Powers within Global Governance

The relative change in U.S. hegemony relates directly to a second trend, namely, the increased role of the emerging powers in global governance. This has been articulated in two different, arguably competing, ways: through the creation of informal mechanisms for cooperation, and through the greater expression of emerging nations' power within formal institutions. Meanwhile, the adaptation or reform of formal governance mechanisms has lagged.

Rising Salience of Transnational Threats

Even the most powerful of the major powers cannot ignore the reality that the transnational nature of some contemporary threats calls for broader, more inclusive strategies. The litany of transnational threats (or undersupply

of global public goods, to use the economics term) is by now familiar. It includes: the proliferation of nuclear, biological, chemical or radiological weapons; transnational terrorism and organized crime; the spread of infectious disease; regionalized “internal” conflicts; energy security and scarcity; poverty, insofar as it is a catalyst for other threats or a barrier to their management; and – most dramatic of the list – climate change.

Challenges to Sovereignty

If lack of effective sovereignty is a major threat to the global order, is sovereignty the answer? Likewise, if sovereignty itself has been the primary mode of regulation of interstate politics and cooperation, is it a sufficient answer to globalized politics and globalized security?

The Responsibility to Protect

Another challenge to sovereignty comes from European and African states in the U.N. that have (loosely) banded together to argue for the concept of the “responsibility to protect.” As noted above, that concept is built into the African Union's Peace and Security Charter and is now a frequent part of European (and, to a lesser degree, American) rhetoric.

Four scenarios for the next 20 years:

A - Restoration of American Hegemony

B - The G-2

An alternative scenario sees China continuing to consolidate economically and manage its political transition. If so, we could see the emergence of the U.S.-China relationship as the central pole of global governance

C - G-20 Collaboration, or Multipolar Competition

What makes the G-2 scenario unlikely are three factors: Japan and the EU (when taken collectively) do constitute similarly scaled actors in the global economy; the United States has no evident interest in allowing one of its emerging peer competitors to have an equal role in the management of global order; and Chinese officials argue vociferously (and convincingly, partially because of the domestic constraints noted above) that they do not want the role. In the near term, the most likely scenario for global order and governance is that power concentrates in the hands of the G-20 and similar major-power forums, and that decisions at the political level taken in those forums are then moved into more formal, and often more inclusive, institutionalized forums for broader deliberation and action.

D - Multipolar Competition

That last case has some points of similarity with a fourth scenario, which is multipolar competition and contestation. For although the major and rising powers share interests on issues such as proliferation and terrorism, and are forced to sink or swim together on issues such as climate, economics and infectious disease, they have starkly divergent interests when it comes to scarce resources, such as energy and food. Might this divergence drive predatory policies and zero-sum competition between the major economies in the search for the fuel to drive economic growth? One possibility is that these issues are simply left to zero-sum competition driven by major states.

The 50-Year View

At one extreme, the 20- to 50-year horizon holds an increased process of highly atomized, even individualized, destructive violence. Before the advent of nuclear weapons, no state

or group had the capacity to threaten mankind; but now a handful of states do have that capacity. As proliferation barriers erode and terrorism grows in sophistication, an additional number of states, and perhaps a handful of sophisticated subnational organizations, will wield that same power. Terrorism looks likely to spread as a tactic, given that its targets to date have only learned to overreact, thereby giving unintentional encouragement to the perpetrators of such attacks. These attacks are also bleeding the West. A comparison of the monies spent by al-Qaeda on its attacks in New York, London and Madrid versus the cost of the global security response is simultaneously shocking and sobering. But, biological security poses the greatest risk in this regard. As biological tools develop, we will reach a point at which the power to threaten humanity rests with individuals. How institutions for global governance will cope with that situation is as yet profoundly unclear.

At another extreme, the 20- to 50-year horizon holds the prospect of progressively articulated sovereign responsibilities and ever more sophisticated management of global processes. Sovereign states could develop the political savvy and bureaucratic tools to participate meaningfully in global negotiations that have both strength and depth. Global institutions and organizations could develop richer frameworks for interstate cooperation and stronger secretariats for independent implementation. At the regional level, this could go deeper in some regions – especially in Europe and Africa, and perhaps in Latin America – with pooled or shared sovereignty becoming more common. Regional and global institutions could develop a more serious capacity to help states with weak sovereignty develop or share that sovereignty, integrating development, defense and diplomatic tools to do so – or, more credibly, building entirely new purpose-fit tools.

