REFLECTIONS ON DISRUPTION: ECONOMIC GOVERNANCE

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I am grateful for the opportunity to discuss economic issues in this volume in honor of Sid Drell. Sid's office at the Hoover Institution was just down the hall from mine, and I recall many discussions with him about government policy and economics.

One discussion I recall particularly well. Sid had just read about the so-called Taylor Rule, an equation designed to help the Federal Reserve and other central banks set the interest rate. He found this new "technology" of central banking interesting and asked if I could stop by his office to talk about it, which I did.

I began by writing the equation on the board in his office: 1.5 times one variable, plus 0.5 times another, plus 1. Sid, a physicist who knew much more than me about physical laws and equations, said it couldn't be: "You just can't have a '1' like that. That's not how the world works, John. Maybe an e or a π, or the speed of light as mathematical constants to work with, but not just a '1.'" So, we had a long discussion about where the "1" came from. He was right, of course. It is not a constant of nature, and as it turns out, central banks have been tweaking it recently, trying to improve the equation.

It is, of course, important to examine technological change, as many people here have been doing, and to list the potential problems and to

develop remedies to deal with the problems. Indeed, I am struck by the enormous dangers and the worrisome global threats to peace and prosperity from technological changes that have been highlighted here. I am also impressed with the creative thinking about how to look for solutions and what the role of government should be in finding ways to counter these dangers.

Benefits as Well as Costs

But in these remarks, I want to focus more on the benefits of technological change. We should be careful, when we look at "solutions" or even "tweaks" aimed at reducing the dangers from various technological changes, that we don't accidentally kill or stymie something that is extraordinarily beneficial.

Technological advances are beneficial because they can improve people's lives. As an economist I would emphasize that such changes make people more productive. Productivity, by definition, measures the amount of goods or services that can be produced per worker-hour. Technological change increases productivity, and when productivity increases, people are better off—their incomes rise, prices fall, and more goods and services are available. That's the fundamental nature of progress, which in the past fifteen years has been responsible for bringing more than one billion people out of poverty around the world, according to the World Bank. And we hope there are many more to come.

The progress is largely due to increased productivity and the spread of technology. People in both rural and urban areas—farmers, truck drivers, laborers, small producers, shop owners—are using new tools such as cell phones, smartphones, and the internet, and they are learning innovative ways to apply these techniques. It's an incredibly powerful way to reduce poverty and make people's lives better. So, while it's very important to point out the dangers and threats and to find ways to cut them off, I'm concerned that if we implement the wrong policies, we may end up losing the very things that power productivity growth in the future.

Policies make a difference. Looking around the world, you can see good economic performance in some countries and bad economic performance in other countries, and there are changes in countries over time. Many of these differences in performance are due to differences in national economic policies; policies that encourage markets and offer predictable incentives help boost productivity. We should communicate more about what works well. It's not hurting us when more countries do better.

In fact, many people around the world are still very poor. They're not going to get out of poverty unless there's more capital flowing around the world, embodying the technologies such as those we have been talking about at this conference. Capital is naturally a coward: it doesn't want to go places where it's dangerous. It wants to go where it's safe, and where the policies are clear, and the rule of law prevents expropriation. The more that we can have policies like that, the more there'll be the 3D printers, automation, and other technologies from which people can benefit.

Productivity growth is now very low in the United States. It's hard to measure, but that is what the data show. Productivity growth was higher a decade ago. It's gone up and down over the years, and it is down now. So, I think there's a grave danger that we mistakenly stomp out the technology that is going to raise productivity and make people's lives better than in the past. If we forget that, we may introduce controls or regulations that go in the wrong direction, and then we're worse off.

One danger, often pointed out, is that advanced technology will eliminate jobs, with driverless trucks being a prime example. However, when people talk about these issues—and this is a problem in all areas of economics—they tend to pay a lot of attention to the short run and forget about the long run. It used to be that this country had over 50 percent of the workforce involved in agriculture. Over the years amazing technologies came, and now it's only 2 percent producing the same or even more food—a huge increase in productivity. Yet the unemployment rate is no higher now than it was then. So where did all the jobs go? They went to other areas—manufacturing, telecommunications,

health care—and they grew in number. Over time it's a huge benefit, though in the shorter run there may be painful adjustment costs especially for people whose job is replaced, say by a tractor, and for this reason we need a good safety net.

The same thing is happening now with other technologies, including new forms of artificial intelligence, and it is likely to continue happening going forward. The good news is that the resulting productivity growth will raise incomes; it will thereby reverse the slow growth of recent years in the United States and other advanced countries and continue relatively high growth in many other parts of the world. Sometimes the beneficial effects are broad-based, and sometimes they are narrowly focused on a few sectors. In the latter case, you don't want to stifle something that's improving people's lives just because it's not universal—you may even be able to find ways to offset the cost by broadening the gains.

It's easy to miss the advantages of technology because they become so routine. Take a hearing aid. It's a simple function, and it may not be as sophisticated as some forms of artificial intelligence. But technological advances in hearing aids can completely change people's ability to function. I wouldn't have been able to become a professor without this technology.

A particularly difficult problem is that technological change often brings inherent costs along with the benefits. Consider Charlie Hill's example in his thoughtful presentation later in this volume. He notes that new communication and social media technologies make it possible for all the "crazy uncles in the attics" to get together and cause mass craziness. That's true, and that is a cost that must be considered. But what about the sane uncles and the other people who can now communicate and collaborate more easily with one another? Today I can easily do research and write papers with economists all over the world, such as my collaborator Volker Wieland in Germany; they do not have to be Stanford colleagues. And the same is true for other areas of human endeavor. We shouldn't get too distracted from broader progress by the edge cases, however meaningful they may be. And there may be ways to both keep the benefits and cut the costs.

Looking for Strategies That Keep the Benefits and Reduce the Harm

One important area of governance where technological change can bring both benefit and harm is the global financial system. I now serve on the Eminent Persons Group on Global Financial Governance, which the Group of 20 countries (G20) recently established. It consists mainly of former finance ministers, central bank governors, and other government finance officials. The purpose of the group is to think about how the international monetary and financial system, including the international financial institutions like the World Bank and the International Monetary Fund (IMF), can be reformed. We are supposed to report back to the G20 countries in a year with recommendations and suggestions.

Early on we found that it is important to establish the goals we are after: what are we trying to achieve? That setting such goals is important may sound obvious, but it's a key issue for this book on governance and worth mentioning here. The first goal is strong economic growth that brings people out of poverty and reduces the income distribution gap globally. The second goal is avoiding crises and recessions, so we don't have terrible events such as the global financial crisis of 2007–9. And the third goal is to mitigate the deleterious international impacts of technology such as cyberattacks and global financial contagion—the sorts of issues being discussed here in this book.

Once you have these goals you can think about a strategy for global financial governance that achieves the goals. Advances in technology enable instantaneous capital and information flows and make the problem more difficult. All over the world, people see the impact on stock or bond prices of a change in monetary or fiscal policy in the United States, Japan, or Europe. Thus, there may be a trade-off between the goals: more open capital markets might be good for growth but may raise issues about cyberattacks. And efforts to control interchanges on social media may help prevent attacks but can also limit the benefits of the spread of technology. Any good strategy needs to be aware of the trade-offs and try to deal with them.

When we were colleagues at the Hoover Institution, Defense Secretary James Mattis would often say, "We live in a strategy-free world," with respect to national security and geopolitics. I think he coined the term "strategy-free." In my view, we also live in a strategy-free world with respect to geoeconomic issues.

It's possible to create a less strategy-free world in global economics and deal with the trade-offs between goals. To do so, one first needs to look for situations or areas where there can be a common strategic approach, where each nation is basically thinking about governing its own interests, but where that is also conducive to good governance globally. For example, in the past five or so years there have been many unconventional monetary policy actions taken by the central banks of the United States, Japan, and Europe. These policies affected exchange rates, with the dollar depreciating at first, then the yen, and then the euro. The movements are huge, and they affect people's decisions about foreign investment and about exports and imports. Some argue that the effects on exchange rates are so large that policy-makers at the international financial institutions should limit the flow of capital—sometimes called "capital flow management."

But if each country, if each central bank, said what its own monetary strategy was for its own country, and it was a clear strategy, it would help create global stability and reduce that exchange rate volatility quite a bit. It's not just the quality of the strategy itself that is valuable, but also the very statement of what the strategy is in the first place. Then people operating in financial markets, including policy-makers in other countries, could observe this and say, "Well, that's their strategy. Here's our strategy. Here's our method for adjusting interest rates," or whatever the policy instrument should be. You're trying to just understand what the others are doing. This strategy would limit the harm from excessive exchange rate volatility without choking off beneficial capital flows.

New financial technologies can help. One potentially attractive element of blockchain technology, for example, is that it gives ways to make payments between people or between firms that are independent

of government actions. Central banks and governments are examining blockchain technology to see if they can use it themselves. This technology may lead to better policy. We're not there yet, but you could imagine large potential benefits.

People sometimes worry about financial technology upending the financial order, perhaps driving out the US dollar. But the dollar, viewed in a historical context, is amazingly resistant to changes like this—whether it's in competition with the euro, China's RMB, or even bitcoin over time. And I think that will continue, even if the technology changes, if the United States stays with good economic policy.

Government versus Private Remedies

I experienced four different stints in the federal government over the years, so I know it is sometimes hard to get things done. The private sector has advantages in many respects—flexible salaries, the ability to fire people, more incentives. Plus, people in government don't always have the training in the newest technologies. So there may be limits to what the government can do to design the types of strategies I am suggesting here. Often, well-intentioned regulations impede improvement, keeping new products from coming into play. This suggests looking for private remedies where possible.

In addition, there are innovative ways to use technology, like artificial intelligence, to make government regulations more flexible—a more efficient way to get the same result. Of course, it would be dangerous, especially if the stakes are big, to just apply an algorithm to the private sector without considering robustness. You need to bring in judgment from knowledge of history, of international relations, and the nature of human conflict alongside that.

Considering policy responses to technology change, some have argued for a universal basic income to address labor force disruptions from technology. But I do not think we want a society where work isn't valued. People should feel that they are contributing, and they need to participate to be part of the social fabric.

Others have said we should tax the robots as a solution. But a robot is a machine, a tool, a piece of capital. Taxing that is simply taxing something that can improve people's lives. As I've already mentioned, US productivity is already quite low, reflected in our low overall economic growth rate, and it's largely because people are not investing enough in capital, or in the right places, to improve it. If you are going to go down the route of taxing robots to try to slow down the problem, there is less of a chance that people will take on the task of really fixing the core things that need to be fixed.

Education and Technological Change

I also want to touch on education, a topic that various authors have raised. Education could benefit tremendously from technology. But we need to introduce organizational changes in the education system and use incentives, perhaps making better use of the financial resources we already have dedicated toward our educational system. This is an area that could benefit from artificial intelligence and technology more broadly. Many teachers and professors are using the same techniques they have been using in teaching for many years. But technology enables a student in a poor region without access to good schools or colleges to take courses online from the best teachers in the world.

I have an online version of the introductory economics course I teach at Stanford. It's a very rewarding experience when tens of thousands are following your course around the world. An interesting thing I noticed in teaching the course this past summer was that there were people over one hundred years old taking the course online. I had thought that the audience consisted mainly of college students, but the *average* age was over thirty-five.

I inquired about other online courses offered by Stanford, and I found a similar age distribution in these other courses. This is not, of course, a bad thing. It suggests that online courses can be of great benefit without being disruptive. Recognizing that people are going to be moving in and out of the labor force after their formal education, it suggests a way to

maximize benefits and minimize the costs of the introduction of new potentially disruptive technologies. I hope that the education system is flexible and adapts to this new mode of learning.

More generally, the key is to make the economy more flexible. You cannot rely solely on command and control. It's hard to know what the technology is going to be ten to twelve years from now, so in terms of skills to teach people to anticipate change, it's hard to just point to STEM or the humanities. People need to learn how to be flexible. And for people to be flexible, policy should be flexible.

The financial technology industry, for example, suffers from the possibility of being overregulated, such that its benefits are snuffed out, and that's a danger. But there's some sympathy from people at traditional financial firms who feel there's already too much regulation in the industry. So, this could be a place where there is some convergence of views between "fin tech" people, say in Silicon Valley, and other more traditional financial people around the country. It is an example of a way to get things done in the face of technical change.

Conclusion

To end on somewhat of a light note, I'll share one simple story about the benefits and harms of technological change and what to do about it. The story is due to Bruno Bettelheim and is told in his book *The Informed Heart: Autonomy in a Mass Age*. It illustrates how you can learn to live with technological change over time and overcome unexpected bumps along the way.

The story goes back to the time when automatic dishwashers were invented. A husband and wife buy a new dishwasher, and suddenly they find their marriage is falling apart. They go to a counselor who asks them if anything at home has changed. "Well," replies the couple, "we bought a new dishwasher." "Did you used to talk to each other while you hand-washed the dishes every night?" "Yeah, we did!" they answer. "And what about now?" "Well, no, now we just put the dishes in and press the button."

So, the counselor suggests to the couple a simple solution. Sit down and make an extra effort to talk while the dishwasher is running. It is an obvious strategy, but they try it, and it works.

The lesson: sometimes it's not easy to anticipate or even understand the costs of a technological advance and how it can change your life. But by putting an emphasis on finding a strategy to adapt we can eliminate, or at least minimize, the harms of the technology while taking advantage of the benefits.