

Remarks on Public Sector Spectrum Policy

Jason Furman
Chairman, Council of Economic Advisers

Brookings Institution
Washington, DC
September 23, 2014

As prepared for delivery

I want to thank Brookings, and in particular Adele Morris, for organizing this important discussion. I thought it might be helpful if I started out by providing some of the broader economic context that explains why we should care about broadband and spectrum.

The most fundamental reason for why governments should do their utmost to promote innovation is a concept called Total Factor Productivity, or TFP. TFP refers to the amount of economic output that is derived from the combination of a given amount of capital and labor. TFP can be the closest thing in economics to a “free lunch” because when TFP increases, a country experiences higher levels of output even when both the returns to and the amount used of capital and labor remain constant.

Historically, TFP growth rates have inhabited many different ranges. TFP grew at more than 2 percent annually from 1948 to 1973, but fell to a mere 0.5 percent from 1973 to 1987, before recovering to about 1 percent in the nearly thirty years since.

There has been significant concern about the stagnation of real wages and the slowdown in real incomes in recent decades. In part these trends are due to the rise in inequality. But in part they have also been due to this slowdown in TFP growth relative to its post-war highs. To give a sense of the magnitudes involved in this slowdown, if TFP had persisted in growing at pre-1973 rates up through to the present—and if these gains were shared equally—incomes would be 69 percent higher for everyone. And if such an elevated standard of living were a reality, perhaps we would worry a bit less about income inequality than we do today.

It turns out that a key driver of TFP growth trends is the level of innovation in an economy—both in terms of new technologies and new markets. Of late, the advent of widespread access to increasingly fast wired and wireless broadband networks, combined with improvements in computing and especially in mobile devices, has contributed to our TFP growth.

Digital communications technology has a particularly large impact on TFP growth because it is what some economists call a General Purpose or “platform” technology, meaning that improvements in communication technologies stimulate innovation across a wide variety of other sectors. Studies abound that attempt to size this effect precisely, but to name just one, a German study found that access to broadband increases the likelihood that a firm will introduce a new innovation by about 40 percentage points. These innovations—in fields ranging from

healthcare to education, from public safety to business, and from manufacturing to journalism—lead to increased demand for communications capacity, in turn creating further incentives for yet more innovation in communication. This virtuous cycle naturally creates increasing demand for bandwidth. The fact that increasing demand for this crucial resource is straining the current supply testifies to just how essential spectrum is.

Sound spectrum policies help promote an environment in which the virtuous cycle of innovation in networking and applications can continue to flourish. Indeed, the continued primacy of the United States in this Internet economy—a place we have occupied in no small part due to the health of our wireless and wired broadband infrastructure—depends on our ability to get spectrum policy right. The United States currently leads the world in 4G wireless internet availability, with nearly half of the global subscriber base residing in the United States, but such a future is uncertain if we do not improve access to and management of the spectrum.

Fortunately, there is a set of four policies we can pursue, not just to avoid a “spectrum crunch” but also to ensure that this country is doing everything it can to support broadband infrastructure for the purposes of sustaining and accelerating economic growth:

One spectrum policy to consider involves reallocating some portions of public sector-held spectrum to its most socially valuable use. We of course do not want to disrupt critical defense and public safety operations. However, we must take notice of underutilized ranges of spectrum that were set aside for government use at a time when there was no need to be disciplined in our allocation of spectrum or to use spectrum-efficient technologies. In the language of resource economics, spectrum has gone from being a non-rival, non-excludable, un-priced good to one that is rivalrous and is thus very much in need of at least some degree of excludability, regulation, or shared stewardship so that it can remain uncongested and be put to its most efficient use. That is why last year the President directed agencies to augment their spectrum reports by including an assessment of their actual use of the bands assigned to them, thereby assisting in the process of identifying those bands that would be good candidates for commercial use.

When looked at in a certain way, this idea is simply the latest iteration of a successful—and deeply American—approach to technological innovation that has been around for a long time, since World War II. It is called dual-use technology: technology that can be harnessed for both military and civilian purposes. The benefits of this approach are all around us, and comprise many of the trappings of what we consider to be modern life. To name just a few: GPS, duct tape, microwave ovens, even the internet itself grew out of efforts that began for military purposes, initially funded by the government, and initially used by the government, but eventually yielding benefits for all.

So with spectrum we would again be following in the footsteps of this model—one with a storied legacy that shows us that success in innovation often hinges upon the cooperation of the public and private sectors in the service of broader societal goals.

Similarly, a second idea to consider alongside reallocating public spectrum is to work in concert with FCC and Congress to implement voluntary incentive auctions whereby

spectrum-strapped wireless companies can purchase those spectrum ranges that are valued the least by the broadcasting companies that hold them due to their light (and thus inefficient) use. We in the economics profession know that properly designed auctions provide a tremendous mechanism for matching a scarce resource with the users who value it most. As such, not only do auctions raise revenue for the original users of the spectrum, auctions also ensure that the resulting prices make the transaction a win for buyers and taxpayers alike.

A third notion—that of spectrum sharing—provides yet another way to squeeze as many growth-inducing benefits out of the spectrum as we can. Under this concept, we can still efficiently allocate even those ranges of spectrum over which a public or private entity does not wish to cede complete control but which would otherwise remain vastly underutilized.

While spectrum has long been “shared” among different kinds of users—over frequency, over space, and over time—recent advances in communications technology promise dramatic increases in the intensity and dynamism of sharing. Indeed, it is now possible to envision a future in which all of our communications devices will be able to autonomously negotiate shared use of common spectrum, based upon a pre-agreed, rules-based priority ordering. Such an achievement would be a real boon for innovation across all sectors—again in the spirit of communications being a General Purpose Technology.

It is nevertheless important to acknowledge that our present tools for sharing spectrum, be it via manual or autonomous technologies, do not yet eliminate the possibility of rivalry or the value of market mechanisms for allocating this scarce resource. In the context of shared spectrum, where new technology may enable multiple tiers of users to coexist in a band, we should certainly consider innovations in the design of property rights and market mechanisms that could help arbitrate those rights under conditions of local scarcity. For example, we might consider auctioning spectrum usage priority or spectrum time rather than fully exclusive licenses. On the other hand, as technological innovation relaxes the constraints imposed by congestion and scarcity, we should keep in mind that there is no economic rationale for auctioning off exclusive rights to a resource that can be freely shared without degrading its quality. In my opinion, all of this speaks to the need to view spectrum sharing not only through the lens of technological innovation, but through the lens of economic innovation as well.

Fourth, and finally, we need to be looking more into the possibilities for unlicensed spectrum so that we can enable more devices to be used in fixed locations within very small radii—such as those we use for WiFi and garage door openers. One criticism of this policy that is worth acknowledging is the notion that unlicensed spectrum would amount to a lost opportunity for potential government revenue. But that position fails to take into account the broader tax base that would result from the productivity gains and corresponding economic growth that are likely to attend the broadened availability of unlicensed spectrum. And to reiterate an important point from the discussion of spectrum sharing just a moment ago—basic economics suggests that the efficient price for any truly non-rivalrous resource is zero.

It is also worth emphasizing that these four approaches can and should be undertaken simultaneously—what I have called an “All-of-the-Above” approach to spectrum. They are compatible with each other, and all four of them are necessary in order to realize the President’s

ambitious goal of adding 500 MHz of spectrum for mobile broadband over the next decade, nearly doubling its current allocation.

I would like to conclude by underscoring how much the President personally cares about the management of spectrum—prudent spectrum policy is a key element of job creation, wage growth, and improvements in living standards. One measure of this interest is that last year the President established a Spectrum Policy Team within the Executive Office of the President. And the next person you will hear from is the leading force in that Spectrum Policy Team, Tom Power. But first I would be happy to take one or two questions.