

A FRAMEWORK FOR ASSESSING THE IMPACT OF U.S. RESTRICTIONS ON TELECOMMUNICATION EXPORTS TO CUBA

Larry Press¹

This paper assesses the effects of the U.S. trade restrictions on our telecommunication exports to Cuba. Since there is a great deal of uncertainty about the Cuban plans and policies and U.S. policy is also in a state of flux, I will lay out a framework for discussing the issue rather than attempting specific predictions. This framework can be modified and fleshed out by future research. I will focus on Internet-based telecommunications, which are subsuming traditional telephony.

Potential U.S. exports to Cuba include:

- Personal Internet access devices
- Internet services for fees or advertising;
- Internet infrastructure;
- Internet service provision;
- Digital entertainment and other content; and
- Sensor-based Internet access devices—“the internet of things.”

Some of these markets, for example, providing Internet infrastructure and service, are more severely impacted by U.S. restrictions than others. U.S. restrictions are only one impediment to the sale of these goods and services—there are others that are out of our control:

- Cuban government fear of free information exchange;
- The import capacity of the Cuban economy;
- The absence of domestic Internet infrastructure;
- Socialist values and practices;
- Foreign competition; and
- Domestic competition from state monopolies.

I will begin with discussion of the exportable goods and services, then discuss the impediments.

POTENTIAL U.S. EXPORTS TO CUBA

Personal Internet Access Devices

The Cuban National Statistics Office reported that in 2013 there were 515,400 networked computers (Inter and intranet) and 2,923,000 network users. That works out to around 5.7 users per computer, so there is considerable demand for computers at present and that would be increased significantly if Cubans had access to a modern Internet. It should also be noted that Cubans are well educated (ranked number 2, below Chile in Latin America and the Caribbean with respect to education in the United Nations Human Development Report) and they have excellent programs in computer science and in training the general public on computer applications and technology.²

1. This paper is a revised and updated version of testimony the author presented to the U.S. International Trade Commission in June 2015.

2. Larry Press, “Will the nascent Cuban startup community thrive?,” The Internet in Cuba blog, May 21, 2015, <http://laredcubana.blogspot.com/2015/05/will-cuban-start-up-community-thrive.htm>

Anecdotally and as seen in online images, Cuban computers are generally old and obsolete due to the state of the Cuban economy and lack of access to modern Internet infrastructure.

I am not in a position to make accurate market forecasts for computers, but can give an example opportunity. Cuba plans to provide Internet connectivity to all schools at all levels during the next three years.³ There are around 30 students for each computer in labs today, and they intended to replace them with tablets. (I believe Chromebooks would be better than tablets for this application.)

The plan calls for connecting 26,650 teachers next year. A Chromebook or tablet for each might cost around \$5 million. How about the student market? In 2009–10, the most recent year for which statistics are available, there were 1,391,182 students enrolled in Cuban schools, of which 808,992 were enrolled in primary schools, 393,850 in basic secondary schools, and 188,340 in pre-university secondary schools. While it is hard to imagine the government providing a tablet or Chromebook for each student, they will provide some and, in the long run, students will bring their own devices to school.

Another example is provided by a forthcoming market research report from Nearshore America, which predicts demand for 450,000 broadband home Internet connections, which would also generate demand for personal computers. However, infrastructure upgrades would be needed to satisfy that demand since the central offices serving broadband homes would have to be upgraded and the homes would need relatively short, high quality phone lines to the central offices.

As of 2013, there were nearly 2 million mobile phone accounts in Cuba, but the vast majority of those are second generation accounts, with no possibility of Internet access. Some people do have modern smart

phones, which they use as cameras and stand-alone computers, but there will not be a sharp rise in demand for modern phones until the mobile infrastructure is upgraded.

Given the current regulations of the Obama Administration, I do not believe the trade embargo is an impediment to the sale of this sort of equipment, so removing restrictions would have relatively little impact.

Internet Services for Fees or Advertising

If they had access to them, Cubans could use personal and organizational application services like Facebook, WhatsApp, Skype, Office 365, Google Search and Drive and many others. They could also utilize infrastructure services like Amazon Web Services.

Today, U.S. companies receive virtually no revenue from application services in Cuba. This is due in part to U.S. restrictions, for example, constraints on Google's efforts to offer services in Cuba. But even if there were no U.S. restrictions, the sale of application services would be nil because of Cuban infrastructure.

The infrastructure constraint could be eased somewhat if these services were hosted inside Cuba. For example, even with their planned upgrade to slow Digital Subscriber Line (DSL) broadband, no one in Cuba will be able to stream Netflix video from the U.S.⁴ However, if Netflix were to serve Cuba from Cuban servers, some Cubans with DSL service would be able to view low-definition content. Cuba might be willing to allow U.S. companies to make datacenter investments in return for the ability to serve Cubans.

Cuba has a datacenter today and ETECSA has said it plans to create an exchange point for the networks of Infomed, the universities, the Youth Computer Clubs and the Ministry of Education.⁵ The recent

3. Larry Press, "Connecting Cuban Schools," The Internet in Cuba blog, May 14, 2015, http://laredcubana.blogspot.com/2015/05/connecting-cuban-schools_14.html

4. Larry Press, "Netflix comes to Cuba—only Fidel and Raúl can afford it for now," The Internet in Cuba blog, February 9, 2015, <http://laredcubana.blogspot.com/2015/02/netflix-comes-to-cuba-only-fidel-and.html>

5. Larry Press, "Interviews of ETECSA officials," The Internet in Cuba blog, December 30, 2014, <http://laredcubana.blogspot.com/2014/12/interviews-of-etecsa-officials.html>

broadband plan also recommends evaluating and building another Internet exchange.

Might Cuba allow the hosting of U.S. services in return for datacenter investment and expertise? A delegation from Google has visited the datacenter mentioned above and one can speculate that they might be willing to increase its capacity in return for a domestic platform for offering their services—as they state in their 10-K annual report for 2014, “in the long term as we invest heavily in our systems, data centers, real estate and facilities, and information technology infrastructure.” Netflix might be willing to do the same in exchange for hosting rights and one can imagine Amazon contributing for the right to offer to invest in return for the right to host both content and infrastructure service.

A final, related note is that these companies and others are in the market for content. One can imagine facilities like Google Production Spaces in Cuba, or Netflix and Amazon streaming Spanish language movies and videos made in Cuba.

Internet Infrastructure

While the Cuban government may one day be open to foreign competition or joint ventures or afford major investments like a comprehensive fiber backbone, they have been and will continue making short-term infrastructure investments. A few possible examples come to mind.

The recently leaked Broadband Plan⁶ implies that they are planning to upgrade their existing dial-up Internet equipment to allow for higher-speed DSL connections and hope to make DSL available in 50% of homes by 2020. Doing so will require investment in both phone lines and central office equipment. Cuba reported 3,882,424 private homes (2012) and 939,500 residential phone lines, served by 688 central offices, 616 of which were digital (2013). Before

a home can receive DSL service, the equipment in the central office serving it must be upgraded and a relatively short, high quality phone line must run between the home and its central office.

They are also increasing the number of Nauta access rooms and installing WiFi access points in them.

Cuba has a backbone network connecting the provinces to the undersea cable landing at the east end of the island today, but it would require substantial upgrading to handle fast, ubiquitous access.⁷

The Helms-Burton act prohibits the sale of this equipment while White House policy seeks to allow it.⁸ The differences may be resolved by the passage of The Cuba Digital and Telecommunications Advancement Act.⁹ This uncertainty hinders the sale of U.S. Internet infrastructure equipment to Cuba.

However, even if all uncertainty were removed, the U.S. would face significant international competition in Cuba from China, France, Vietnam and others.

Internet Service Provision

The trade restrictions and ambiguities mentioned above also apply to the offering of Internet service—wholesale or retail. Today, ETECSA is the sole ISP in Cuba, and in the short run, I would not expect them to surrender their monopoly position—an opinion shared by Kirk Laughlin, Managing Director of Outsourcing firm Nearshore Americas. However, after some time, they may open portions of the Internet service business, providing opportunity for foreign companies.

Stockholm and Kampala provide metropolitan area Internet service examples that Cuba might emulate. Stockholm has done well with competing retail ISPs using a shared metropolitan area network operated by the city. In Kampala, Google built a metropolitan backbone and Google, not the city government, is

6. Larry Press, “Cuba’s broadband connectivity plan,” The Internet in Cuba blog, June 9, 2015, <http://laredcubana.blogspot.com/2015/06/cubas-broadband-connectivity-plan.html>

7. Larry Press, “Speculation on the Cuban Internet backbone,” The Internet in Cuba blog, August 18, 2015, <http://laredcubana.blogspot.com/2015/08/speculation-on-cuban-internet-backbone.html>

8. White House, Office of the Press Secretary, “Charting a New Course on Cuba,” December 17, 2015. <https://www.whitehouse.gov/the-press-office/2014/12/17/fact-sheet-charting-new-course-cuba>

9. See <https://www.congress.gov/bill/114th-congress/senate-bill/1389/text>.

the wholesale ISP, providing infrastructure for retail Internet service providers.

O3b Networks could also enable ETECSA to quickly establish points of presence throughout the island. Their claim to provide the “global reach of satellite with the speed of a fiber optic network” may be a bit of an overstatement, but Cuba is well within their footprint and they are providing IP and LTE backhaul for ISPs and phone companies in several developing nations.

What about retail Internet service? One would expect a nation with Cuba’s level of education and income to have a much higher rate of Internet access than they do.¹⁰ Cuba’s Internet connectivity rate is lowest in Latin America and the Caribbean, but their UNDP Human Development Index and Education sub-index are second only to Chile in the region and young people are exposed to computer technology and applications at Cuba’s Youth Computer Clubs.

As mentioned above, Nearshore America estimates that there would be demand for broadband connectivity to 450,000 homes, and Cuba has set the goal of making low-speed DSL broadband technology available in 50% of Cuban homes by 2020. I expect that ETECSA will do that by itself with equipment purchased from abroad.

In the long run, to go beyond DSL, Cuba will probably need foreign investors or joint venture partners. Google has considerable experience installing fiber to the curb and premises. Since they would benefit from Cuban’s having high speed connectivity, they might be a good infrastructure partner for ETECSA as an ISP.

Home satellite technology offers another short term retail connectivity alternative. It appears that U.S. regulations now indemnify satellite connectivity providers from sanctions. Therefore, if the Cuban government were to allow U.S. satellite Internet companies to offer service in Cuba, the business could ramp

up almost immediately. As in other areas, Cuban restrictions seem to be much more likely a stumbling block than those of the U.S. (I have read a claim that when HughesNet stopped satellite service to Cuba, 30,000 illegal users were cut off.)¹¹

For the long run more costly, faster technologies like fiber to the curb or premises will be installed, but that will require foreign investment or a dramatic improvement in the Cuban economy.

U.S. mobile phone companies are also interested in providing Internet access in Cuba, but doing so would require a substantial investment as well as the blessing of both the Cuban and U.S. governments. The conventional way to finance that investment would be for Cuba to request bids from mobile Internet companies in return for a license to offer service.

Myanmar, where two providers won licenses after competitive bidding, provides a recent example of that approach. The Myanmar case is not identical to Cuba since the population is about 5 times that of Cuba and the area about 6 times larger, while Cuba is more prosperous and better educated, but they did succeed in attracting competitive bidders and are rapidly rolling out mobile infrastructure.

Again, the intent of the Cuban government is unknown and it is unclear whether a mobile carrier from the U.S. would be allowed to bid on Cuban connectivity and, if we were, we would face competition.

Digital Entertainment and Other Content

Today Cubans have easy access to affordable U.S. digital entertainment and software, which are regularly distributed on hard discs and flash drives. I have been unable to discover the source of the most popular weekly “package,” but the regularity of its comprehensive distribution has led to speculation that it may be a government project.

10. Larry Press, “The Cuban Internet in context,” The Internet in Cuba blog, December 13, 2014, <http://laredcubana.blogspot.com/2014/12/the-cuban-internet-in-context.html>

11. Larry Press, “Illegal satellite Internet service in Cuba,” The Internet in Cuba blog, November 11, 2013, <http://laredcubana.blogspot.com/2013/11/illegal-satellite-internet-service-in.htm>

This distribution is clearly in violation of U.S. copyright law, and U.S. companies will not profit from it without the intervention of the Cuban government. In the long run, distribution of these packages will be replaced by online delivery, which will be easier to control.

Sensor-based Internet Access Devices—“the Internet of Things (IoT)”

With the exception of sensors in mobile phones, the market for IoT devices is in its infancy in developed nations and I would think virtually non-existent in Cuba. Removal of U.S. restrictions would have no impact here; however, Cuba should implement IP version 6 Internet infrastructure to facilitate the IoT in the future.

IMPEDIMENTS

U.S. Restrictions

The White House has given permission to sell most of the goods and services mentioned in this report to Cubans; however, when it comes to telecommunication infrastructure equipment and service, the White House policy seems to contradict the Helms-Burton Act, which prohibits “the investment by any United States person in the domestic telecommunications network within Cuba.” A Senate bill mentioned above, The Cuba Digital and Telecommunications Advancement Act, would, if passed, reverse the telecommunication provision of the Helms-Burton Act.

Current White House policy seems to allow the sale of some goods and services to Cuba, but vendor uncertainty remains. For example, Google has been slow to make some of its services available in Cuba. I know of one case in which government officials have explicitly indemnified a would-be infrastructure provider from sanctions, but it is noteworthy that they felt the need to seek explicit guarantees for their own protection and to establish their credibility with the Cuban government. I am uncertain as to the validity of such protection under the next U.S. administration.

Cuban Government Fear of Free Information Exchange

When Cuba first connected to the Internet, there was high level debate over its future, with Raúl Castro arguing for tight control over Internet content and access. He cited Gorbachev’s “glasnost” (openness and transparency) policy as a cause of the demise of the Soviet Union and noted the role the Relcom network had played during the Soviet coup attempt of 1991. He also expressed fear of non-governmental organizations that were beginning to use the Internet. This sort of mistrust was reiterated more recently by José Ramón Machado Ventura, second secretary of the Cuban Communist Party.¹²

Today, the Cuban government realizes that many of its citizens are aware of the Internet and of its importance in other nations—they know what they are missing. This realization puts pressure on the government to liberalize access, but it is not clear how open they are willing to be with high-speed, affordable access to the international Internet.

The Cuban Economy’s Import Capacity

The Cuban economy is small and the population is only 11 million. Economic growth has picked up with the changes in U.S. policy since December 17 and that growth will accelerate as diplomatic relations are restored and the U.S. reduces trade restrictions.

The focus of this paper is exports from the U.S. to Cuba, but elimination of trade restrictions would also lead to exports from Cuba to the U.S., increasing Cuba’s import capacity and enabling it import more—a virtuous circle. There is a hungry, well-educated Internet and software community in Cuba, anxious to do business in the US and elsewhere but fulfilling these wishes is a function of the import capacity of the country increasing.

The Absence of Domestic Internet Infrastructure

As we have seen, Cuba is a “green field” with very little modern Internet infrastructure. In the short run, this creates a potential market for U.S. equipment,

12. Larry Press, “Does Cuba trust the U. S. (and Google)?,” The Internet in Cuba blog, July 16, 2015, <http://laredcubana.blogspot.com/2015/07/does-cuba-trust-us-and-google.html>

but it severely limits the potential for U.S. sales of services.

Socialist Values

Critics of the Cuban government dismiss its professed values as self-serving and hypocritical and supporters praise the achievements of the revolution. Regardless, Cuba is unique and will develop a uniquely Cuban Internet. I don't know what form it will take—will they continue surveillance and blocking of content? Will they place emphasis on cultural and educational content? Will they modulate the commercialism of the U.S. Internet? Will they tend to stay autonomous and independent of outside capital? Will they let U.S. companies select their employees? Will they broaden the scope of cooperatives and self-employed persons and reduce bureaucratic restrictions? Will they encourage the IT startup community? And so on.

No one knows the answers to these questions, but I am encouraged by Cuban blogger and Ministry of Communications employee Carlos Alberto Pérez, who says “I don't criticize to knock the system down. On the contrary, I criticize to perfect the system.” Cuban values will affect the opportunity for U.S. exports in ways I cannot predict, but we may all learn from their version of the Internet.

Foreign Competition

One hears about the difficulties of dealing with the Cuban government—bureaucracy, an unpredictable legal system and hiring through the government, but Europeans and others have been investing there for years. Cuba has recognized the importance of foreign investment and revised their laws to encourage it.

Even if U.S. restrictions were dropped, our companies will be at a disadvantage competing with those that have relationships with Cubans and are familiar with doing business in Cuba.

Cuba has worked with Vietnamese, French, Chinese and other telecommunication equipment vendors—most notably on the ALBA-1 undersea cable.¹³ They have a history of working with Chinese companies¹⁴ and looking toward the future we have the recent statement by Lina Pedraza Rodríguez, Cuban Minister of Finance and Prices, that Cuba is in “very advanced” negotiations with Chinese company Huawei¹⁵ (perhaps for upgrading Cuban central offices to provide DSL service) and the promise at a recent conference by Li Tao, deputy general manager of China's Office of Policy and Regulations of Cyberspace Management to increase ICT agreements with Cuba.¹⁶

The French mobile operator Orange reportedly has signed already some sort of contract with Cuba.¹⁷ Perhaps they will be working on the announced plan to upgrade Cuban mobile infrastructure to 3 and 4G.

Delegates from many nations have visited Cuba since December 17 and it may already be too late for U.S. companies to bid on 2015–16 infrastructure equipment purchases for DSL and WiFi. (There have been reports of sale of Huawei equipment—routers modems switches for telecommunication networks.¹⁸)

While it would appear that U.S. companies already have the permission of our government to provide personal access devices—like personal computers,

13. Larry Press, “Cuba needs domestic upgrade to utilize the ALBA cable. Will China help?” The Internet in Cuba blog, March 23, 2011, <http://laredcubana.blogspot.com/2011/03/cuba-needs-domestic-upgrade-to-utilize.html>

14. Larry Press, “Cuban Internet infrastructure—China won the first round,” The Internet in Cuba blog, September 28, 2015, <http://laredcubana.blogspot.com/2015/09/cuban-infrastructure-investment-china.html>

15. Christine Murray, “Cuba says in advanced talks with China's Huawei over telecoms,” Reuters, May 8, 2015, <http://www.reuters.com/article/2015/05/08/cuba-huawei-tech-idUSL1N0XZ1VG20150508>

16. “Li Tao: China will increase agreements with Cuba in the field of ICT,” June 8, 2015, <http://www.cubaheadlines.com/2015/06/08/p13/li-tao-china-will-increase-agreements-with-cuba-in-the-field-of-ict.html>

17. “Orange firmó un acuerdo con ETECSA para operar Internet in Cuba,” 14YMEDIO, January 21, 2015, http://www.14ymedio.com/cienciaytecnologia/Orange-acuerdo-ETECSA-Internet-Cuba_0_1711028890.html

18. Bill Gertz, “Chinese Military-Linked Telecom Firm Shipping U.S. Equipment to Cuba,” The Washington Free Beacon, September 19, 2014, <http://freebeacon.com/national-security/chinese-military-linked-telecom-firm-shipped-u-s-equipment-to-cuba/>

phones, tablets and Chromebooks—Cuba would surely consider Asian manufacturers as well as ours.

Lest this sounds too negative, it is important to note that the U.S. has some advantages over foreign competitors—our proximity to Cuba, the Cuban public’s familiarity with the U.S., and strong connections to the ex-pat community in the U.S. Try doing a Google image search for *Cuba US flag* then try *Cuba China flag* and you will see what I mean.

Domestic Competition from Government Monopolies

The conventional wisdom is that Cuba should invite foreign companies to install infrastructure and provide service—a path many developing nations have followed with marginal success. It is not certain that Cuba, with its current policies and economy, could attract foreign investment, but even if it could, it is not clear that Cuba would or should.

Cuba has experimented with privatization in the past, but subsequently bought out foreign partners. Today ETECSA is wholly owned by six Cuban financial and banking entities with government ties and controlled by the Ministry of Communications. Will ETECSA be willing to allow joint ventures or competition? More broadly, will they seek to maximize government revenue and profit or will their goal be to provide a modern, open Internet with affordable access?

The Cuban government provides a number of services that are similar to those provided privately in the U.S. and elsewhere, for example, Ofertas classified ads, Eured encyclopedia, La Tendedera social network, Reflejos blog hosting and Mi Mochila for content distribution. Cuba may try to emulate the Chinese and protect these services by discouraging or

restricting access to international competitors. China, with its massive population and relatively advanced Internet, is able to support a service like Baidu search, but Cuba cannot compete with services like Wikipedia or Google search. However, Cuban services that focus on local users and Spanish speaking users might be favored over overlapping U.S. services.

Cuba may also discriminate against U.S. and other software companies in order to protect state software producers like Albet, Datys and Desoft.

CONCLUSION

In this paper I have laid out a tentative framework for estimating the impact of U.S. trade restrictions rather than offering specific predictions because I lack good data on Cuba’s current infrastructure and plans. As Roberta Jacobson, Under Secretary of State for the Western Hemisphere has said, Cuba remains undecided on how to modernize its telecommunication infrastructure: “I do not think they have taken a decision yet—it’s a fundamental dilemma for them. They will have to decide which route to take, what kind of system, how much to do and how fast.”¹⁹

While the U.S. seems more certain of the direction we wish to move, there is no unanimity within all interested parties. Many legislators oppose the Administration’s policy shift and, while there is growing bipartisan support for normalizing relations with Cuba, we will not decide our Cuba policy for some time.

In this paper I have raised more questions than I have answered—time and further research will provide the answers.

19. “Jacobson: Cuba indecisa sobre cómo modificar telecomunicaciones,” *Martinoticias*, June 9, 2015, <http://www.martinoticias.com/content/eeuu-cuba-indecisa-sobre-como-modernizar-telecomunicaciones/96260.html>