

Globalization and Digitalization

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Introduction

The purpose of this paper is to discuss critically arguments about how globalization is linked with digitalization. Globalization is “the increasing integration of input, factor, and final product markets coupled with the increasing salience of multinational enterprises' cross-national value-chain networks.”¹ Digitalization is the “integration of digital technology into everyday life.”² Both have been increasing in recent decades and so it is natural to argue that there may be a causal connection.

While the literature on globalization frequently mentions the connection between digitalization and globalization, it does not address directly the question of how much global economic activity was stimulated by the rapid diffusion of information and communication technologies (ICTs) and by the declining costs associated with them. It is much less common to find in the literature on digitalization assertions that globalization was a causal factor. However, the market for digital technology is partially a function of the cost of producing and merchandizing digital products and services, and those costs could have been affected by globalization.

One conceivable causal link could be through the reduced prices of digital equipment and services made possible by liberalization of trade and investment flows. Access to cell phones and personal computers, for example, increased at impressive rates, especially after the prices of equipment and services began to fall. How much of the decline in prices was due to globalization as opposed to other factors not directly connected with globalization?

¹ Aseem Prakash and Jeffrey A. Hart, "Coping with Globalization: An Introduction," in Aseem Prakash and Jeffrey A. Hart, eds., *Coping with Globalization* (New York: Routledge, 2000), p. 2.

² <http://www.businessdictionary.com/definition/digitalization.html>.

Making the Link

The author who is generally associated with the argument that the diffusion of digital technologies have driven the current wave of globalization is Thomas L. Friedman, a journalist who besides writing popular books also pens an op-ed column in the *New York Times*. Friedman claims in *The Lexus and the Olive Tree* that he discovered globalization while covering the Arab-Israeli conflict in the 1990s. The Cold War, which was a global system based on the division of the world into two camps, had been replaced by a global system of interconnection, according to Friedman, “symbolized by a single word: the Web.”³ Later on, when asked about the book, he said, “globalization is not a choice. Basically 80% of it is driven by technology.”⁴

In *The World is Flat*, Friedman uses the term “flatness” instead of globalization but clarifies later in the book that the two are the same thing. He came to the realization that the world was flat from a discussion with Nandan Nilekani, the CEO of an Indian business process outsourcing firm called Infosys. He quotes Nilekani thusly:

“Outsourcing is just one dimension of a much more fundamental thing happening today in the world... What happened over the last [few] years is that there was a massive investment in technology, especially in the bubble era, when hundreds of millions of dollars were invested in putting broadband connectivity around the world, undersea cables, all those things... [that] created a platform where intellectual work, intellectual capital could be delivered from anywhere. It could be disaggregated, delivered, distributed, produced, and put back together again—and this gave a whole new degree of freedom to the way we do work...”⁵

Friedman goes on to argue that thanks to ICTs the world is becoming flat in the sense of a more level playing field or platform for all those who want to participate in the global economy. This means that barriers to entry have been reduced or even erased by the existence of a new technological infrastructure. Talented people in poor countries like China and India are suddenly able to compete with people in rich countries. The consequences of a flat world, in Friedman’s view, are so deep and so extensive that wealthy countries like the United States must adjust their policies and institutions to deal with them.

Elizabeth Hanson, in *The Information Revolution and World Politics*, takes a more cautious view. She argues that “the information revolution was a necessary but not

³ Thomas L. Friedman, *The Lexus and the Olive Tree: Understanding Globalization* (New York: Anchor Books, 2000), p. 8.

⁴ Marshall Bricklin, “Tom Friedman’s view of globalization,” <http://www.bricklin.com/albums/fpawlf2000/friedman.htm>.

⁵ Thomas L. Friedman, *The World is Flat: A Brief History of the 21st Century* (New York: Picador, 2007), pp. 6-7.

sufficient condition for globalization.”⁶ Instead, “...the extent of globalization and the form it has taken are the product of a conjuncture of technological, political, economic, and social forces interacting and reinforcing each other.”⁷

What could these other forces be? One argument is that the progressive construction of liberal monetary, trade, and investment regimes by the advanced industrialized nations, led by the United States, after World War II, was also (along with the spread of ICTs) a necessary cause of globalization.⁸ To put it more precisely, without the liberal regimes for international trade and investment flows embodied in the G-8, the IMF, the World Bank, the GATT and its successor, the WTO, it would have been impossible for the current form of globalization to exist. Firms would not have had the wide variety of internationalization strategies currently available to them; governments of nation-states would have been obligated, as they were in the period between the two World Wars, to enforce national laws that restricted international flows of capital, goods and services. Even a temporary and partial return to the protectionist policies of the past, therefore, could put a stop to the trend toward globalization.

Friedman’s view that globalization is primarily the result of technological change is challenged by Hanson and others. It will be helpful, therefore, to review the available evidence on the role that both technological and non-technological factors have played in enabling or facilitating globalization. We can start by looking at one area of economic globalization that is probably the most advanced: the integration of financial markets.

Financial Globalization and Digital Technology

Some scholars contend that progress toward economic globalization has been greatest in the area of financial markets. There is a good case to be made for the argument that technological change was an important driver of financial globalization. But it is also important to acknowledge that changes in national and international regulatory regimes were also major contributors to the current crisis.

The global diffusion of information technology made it possible for people around the world to trade foreign currencies, stocks, bonds, and other securities at any time of the day. The Forex system, for example, allowed individuals or firms to trade in foreign currencies on a 24-hour basis. Similar systems were developed for equity markets, bond markets, commodity futures, and derivatives. New regulations allowed the creation of electronic trading systems, which gave investors direct access to markets, thereby eliminating or reducing the role of intermediaries like the traditional stock brokerage

⁶ Elizabeth C. Hanson, *The Information Revolution and World Politics* (Lanham, Md.: Rowman & Littlefield, 2008), p. 152.

⁷ Ibid, p. 154.

⁸ Joan E. Spero and Jeffrey Hart, *The Politics of International Economic Relations*, 7th edition (Boston: Wadsworth, 2010 forthcoming).

houses.⁹

The new technology both forced and enabled banks and investment firms to create new financial services to replace revenues that had been lost as a result of reduced trading fees. Computing and communications systems also made it possible to create new, structured financial products such as securitization i.e. asset-backed securities created out of income streams from credit cards, auto loan payments, and mortgage payments and various so-called derivatives. A derivative is a contract, the value of which depends on (is “derived” from) the price of some underlying asset (e.g. a raw material like petroleum or an equity share of a corporation) or a particular reference rate such as an interest rate or stock-market index like the Dow Jones Index.¹⁰

Similar changes occurred in other countries such as Japan, Great Britain, and Mexico. As those countries replaced traditional trading floors with electronic trading systems, they realized reduced costs, increased speed of execution, and improved efficiency. Another characteristic of financial globalization was the proliferation of securities markets. Many countries that had not previously had a stock market or other kinds of markets for trading in securities established such markets for the first time in the 1990s. Other countries that already possessed such markets improved or enhanced them.

Financial institutions increasingly became truly global in operations and ownership. A new wave of mergers and acquisitions resulted in the creation of larger banks in the United States, Europe, and Japan. About 400 bank mergers occurred each year in the United States. The number of banking organizations in the United States decreased from approximately 12,300 in 1980 to approximately 7,100 in 1998. The percentage of domestic deposits held by the 100 largest organizations increased from 47 percent in 1980 to nearly 69 percent in 1997.¹¹ In the 1990s, the number and value of bank mergers and acquisitions in the major industrialized countries increased markedly. Many large banks merged to form even larger banks. As a result, concentration of ownership in the financial services industry rose substantially during this period.¹²

⁹ Terrence Hendershott, “Electronic Trading in Financial Markets,” *IT Pro* (July/August 2003): 10-14; and Dagfinn Rime, “New Electronic Trading Systems in Foreign Exchange Markets,” in Derek C. Jones, ed., *New Economy Handbook* (New York : Elsevier, 2003), ch. 21.

¹⁰ Derivatives contracts take two principle forms: futures and options. A futures contract obligates a buyer and a seller to complete a transaction at a predetermined time in the future at a price agreed upon today. An option gives a party a right to buy or sell at a specified price for a stipulated period of time. Jan Aaart Scholte, “Global Trade and Finance,” in John Baylis, Steve Smith, and Patricia Owens, eds., *The Globalization of World Politics: An Introduction to International Relations*, 4th edition (New York: Oxford University Press, 2008), 461.

¹¹ Roger W. Ferguson, Jr., *The Changing Banking Environment and Emerging Questions for Public Policy*, Federal Reserve Bank of Minneapolis, June 1998.

¹² Bank for International Settlements, Group of Ten, *Report on Consolidation in the Financial Sector* (Basel: Bank for International Settlements, January 2001).

It should be noted, however, that despite a global trend toward liberalization of financial flows, the financial services industries continue to be carefully regulated in most countries. Canada, for example, more carefully regulates its banks than the United States. France and Japan are widely acknowledged to have government agencies that intervene regularly in financial markets in pursuit of national aims.

One area in which the regimes changed simultaneously with technology was in the broad and growing acceptance of the desirability of eliminating capital controls. Capital controls were used (mainly in the past now) to reduce the rapid inflows and outflows of capital that could destabilize domestic economies.¹³ Similarly, many advanced industrial countries deregulated their financial markets to take advantage of the growth and innovation in new financial instruments like derivatives and asset-backed securities that came with deregulation and to stave off losses in business to overseas competitors.

Despite efforts to assure that banks and other financial institutions had adequate reserves to cover possible losses (led primarily by the central banks of North American and Western Europe in the Bank for International Settlements), innovation in deregulated financial markets resulted in just the opposite outcome (especially, for example, in the case of credit default swaps). The deregulated financial markets also had come to depend too much on private credit ratings agencies like Moody's and Standard and Poor's to assess the risk of complex financial instruments.

In conclusion, changes in both technology and regimes and regulations played a key role in the evolution of the financial system in recent decades.

Cultural Globalization and Digital Technology

Another area of globalization, cultural globalization, has been strongly affected by the spread of digital technologies. Because of the development of digital technologies, more and more cultural artifacts are being produced, stored, and delivered digitally. The increased speed of digital devices and innovations in computer networks and digital compression technologies make it both easier and less expensive to deliver words, music, symbols, and images (in fact, anything that can be digitized) to consumers around the world.

This began before the age of digital devices. The building of global undersea cable and satellite TV networks and the use of analog direct broadcast satellites made pay TV services like MTV and CNN available in many parts of the world. The movie industry and recording industries used LPs, audio cassettes, and VHS video tapes along with foreign box office and concert receipts to internationalize their sales. The invention first of digital playback devices like the compact disk player and the DVD player and corresponding digital recording media – CDs and DVDs – accelerated that trend. Audio content is now increasingly distributed via the Internet in the form of digital files (via

¹³ For an excellent summary of the literature on capital controls see Geoffrey R.D. Underhill and Xiaoke Zhang, "Conclusion: Towards the Good Governance of the International Financial System," in Geoffrey R.D. Underhill and Xiaoke Zhang, eds., *International Financial Governance under Stress: Global Structures versus National Imperatives* (New York: Cambridge University Press, 2003).

both legal web businesses and illegal file-sharing sites) and video is headed in the same direction.

In the last decade or two, we have witnessed a major upturn in globalization of pop culture, most but not all of it originating in Hollywood. J-pop – anime, video games, graphic novels (Manga), etc. – is becoming popular with pre-teens and teens around the world. Some of this is due to pre-digital distribution forms, but more and more of it is being distributed digitally.

The regime changes that made this possible went beyond the liberalization of the trade and investment regimes to include the wider acceptance of intellectual property rights modeled after those in advance industrialized nations and particularly the United States. There are many remaining barriers to trade in the markets for cultural goods, many of which are based in the costs of translating cultural content across language and cultural barriers. Still it quite likely that the combination of technological and regime changes contributed to cultural globalization as well as to a revival of some local cultures that had difficulty thriving in the age of analog communications networks.

Global Production Networks

One response by American and European firms to the increased competitiveness of East Asian firms has been the creation of *global production networks*. A production network is “the nexus of interconnected functions and operations through which goods and services are produced and distributed.”¹⁴ What makes a production network global is the complexity and geographic extent of the network.¹⁵

The success of Japanese firms in innovating new production technologies in the 1980s, such as just-in-time production in the auto industry and advanced automation in the electronics industry, led to an effort elsewhere to harness information technology to go Japan one better. This occurred not just in the United States and Western Europe but also in lower-income East Asian countries like Korea and Taiwan wanting to compete effectively with Japan. U.S. and European firms partnered with East Asian firms to become more globally competitive. Later on, China and India entered the picture – China focusing on manufacturing by attracting global firms with low-cost labor, through investments in advanced production technologies, and by offering access to large domestic markets; India concentrating on selling the services of inexpensive but skilled and semi-skilled workers to foreign firms via the “business process outsourcing” markets.

The most dramatic example of the construction of global production networks was that of the semiconductor industry. A global division of labor emerged in the 1990s between

¹⁴ “Global Production Networks,” University of Manchester, School of Environment and Development, <http://www.sed.manchester.ac.uk/geography/research/gpn/>.

¹⁵ See also Dieter Ernst, “The New Mobility of Knowledge: Digital Information Systems and Global Flagship Networks,” in Robert Latham and Saskia Sassen, eds., *Digital Formations: IT and New Architectures in the Global Realm* (Princeton, N.J.: Princeton University Press, 2005); Borrus and Zysman;

firms that designed and firms that manufactured circuits.¹⁶ In order for so-called “design houses” that specialized in circuit design to succeed, there had to be “foundries” – firms that specialized in circuit manufacturing on a contractual basis.

Foundries arose first in Taiwan, as key firms in that country decided that their best strategy for becoming internationally competitive in the industry was to focus on perfecting the process technology and let others do the designs. These firms were founded or run by Taiwanese nationals who had been trained in the United States or who had worked for U.S. semiconductor firms previously. The Taiwanese firms that adopted this strategy did not do so until it was clear that their earlier strategy of doing both design and manufacturing would not succeed. The Koreans, who entered the markets at about the same time, mostly avoided the foundry strategy.¹⁷

Global revenues in the industry were over \$260 billion in 2006. Two U.S. firms were among the top ten firms in terms of revenues in 2006: Intel and AMD. Intel was the top money earner, accounting for over 12 percent of world revenues, while Samsung of Korea was second. Intel’s and AMD’s U.S. operations, especially their R&D operations, were crucial to the overall success of the two firms, but both had invested in foreign fabrication facilities in order to service foreign markets in Europe and Asia.

In short, the rise of Japanese firms as competitors primarily to U.S. firms in semiconductors led to a response on the part of U.S. firms that effectively globalized the industry. While control over the most valuable underlying technologies remains closely held by U.S. and Japanese firms, Korean and Taiwanese firms have become key technological players in the industry, not just in production but also increasingly in product technology as well, and assembly and packaging operations in many lower-wage countries are a necessary adjunct to the strategies adopted by the primary competitors.

This vigorous global competition in semiconductors has been a key factor in reducing the prices of information technology equipment and services worldwide, thus accelerating the globalization that depends on digitalization. Evidence of this can be seen in the way that firms in Asia, North America, and Western Europe manage their global production networks. As in the past they continue to rely on snail mail, telephony, telegraphy, faxes, and face-to-face communications via frequent air travel of executives and engineers. But to reduce costs they increasingly rely on email, digital video conferencing and telephony, and a variety of web-based systems to manage the intense communications

¹⁶ An earlier division of labor had developed between companies that manufactured chips and their contractors in lower-wage countries who put the chips into chip housings or packages. See Jeffrey T. Macher, David C. Mowery, and Alberto di Minin, “Globalization of Innovation in the Semiconductor Industry,” revised version of a paper presented at a conference on The Globalization of Innovation held at the National Academies, Washington, D.C., April 21, 2006.

¹⁷ On the emergence of foundries, see Annalee Saxenian and Jinn-Yuh Hsu, “The Silicon Valley-Hsinchu Connection: Technical Communities and Industrial Upgrading,” *Industrial and Corporate Change*, 10 (2001), 893-920; and Dieter Ernst “Complexity and Internationalization of Innovation: Why is Chip Design Moving to Asia?” *International Journal of Innovation Management*, 9 (March 2005), 47-73.

necessary for coordinating such far-flung business networks.

One key question for research is whether and to what extent the globalizing practices of the semiconductor industry have influenced those of other industries. Much of the rest of the electronics complex seems to have been similarly globalized, but heavier manufacturing industries such as iron and steel, motor vehicles, and heavy machinery are less likely to adopt the far-flung approach because of the continuing importance of transportation costs. It does not make sense, for example, to create global foundries for autos as happened for semiconductors. Nevertheless, the division of labor within industries between component producers and final assemblers and across countries has been changing rapidly and some of that change has been driven by the decreasing costs of communication made possible by the diffusion of ICTs.

The Rise of Big-Box Retailers

A big-box retailer is a large chain store that sells items in larger than normal quantities. Examples include Wal-Mart, Kmart, Target, Carrefour (France), and Big Bazaar (India). The revenue growth of these retail stores has been much faster in recent decades than that of smaller stores, and there is some speculation that such growth has been both the result of globalization and an accelerator of the same.

Digital technology contributed to it primarily through the deployment of systems that track products through the entire chain from producers to final customers by scanning barcodes when the products come off the assembly line, are shipped to retailers, and are purchased at registers. All big-box retailers employ sophisticated software systems to keep track of customer demand for a large number and variety of products and to make sure that automated restocking orders accurately reflect sales at individual stores.

Because big-box retailers focus on high-volume products and offer these products to consumers at low prices, they gain bargaining power with producers, who need orders from big-box retailers to remain profitable. The retailers use this bargaining power to insist upon cost savings that they can pass along to consumers, and some, like Wal-Mart, push producers to relocate production to low-cost (generally low-wage) locations as part of their overall cost-reduction efforts. Thus, the relationship between big-box retailers and producers of consumer goods may have accelerated the globalization of production of high-volume consumer goods via the relocation of labor-intensive activities to low-wage countries. Wal-Mart alone currently accounts for 15 percent of total U.S. imports from China.¹⁸

¹⁸ Emek Basker, "The Causes and Consequences of Wal-Mart's Growth," *Journal of Economic Perspectives*, 21(2007), 177–198; Emek Basker and Pham Hoang Van, "Wal-Mart as Catalyst to U.S.-China Trade," April 2008, unpublished paper, University of Missouri; and Richard Vedder and Wendell Cox, *The Wal-Mart Revolution: How Big Box Stores Benefit Consumers, Workers and the Economy* (Washington, D.C.: AEI Press, 2007). For a critical treatment, see Stacy Mitchell, *Big-Box Swindle: The True Cost of Mega-Retailers and the Fight for America's Independent Businesses* (Boston: Beacon Press, 2007).

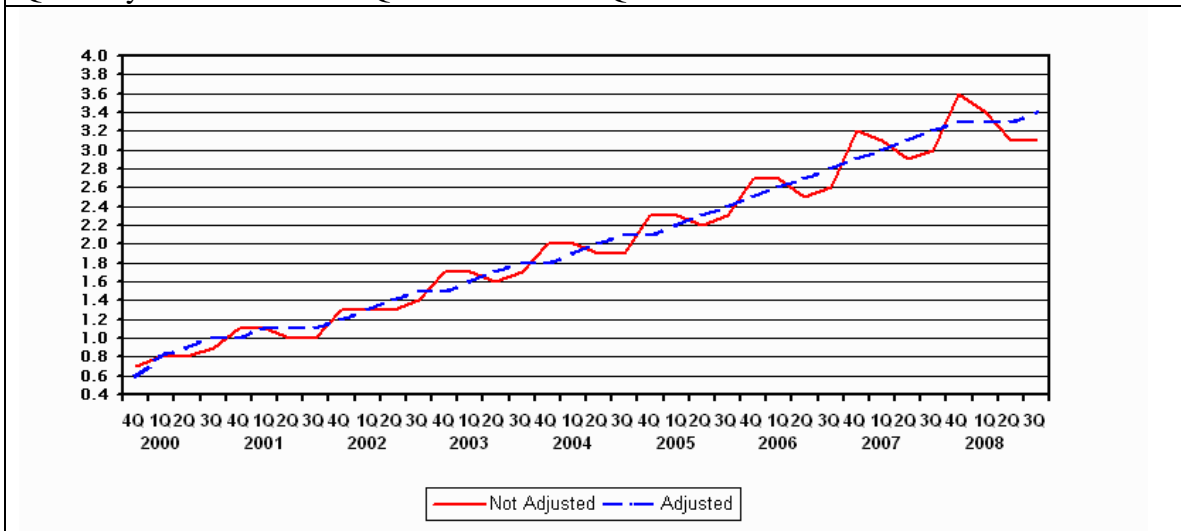
One of the types of goods carried by big-box retailers are consumer electronics products like TVs, video game consoles, and MP3 players. The production of these goods was already extensively globalized, but there is evidence that the big-box retailers exerted pressure on their suppliers to move to lower-cost locations, especially to China, in assembling the items they carry.

It must be said that this strategy would not have been available to the big-box retailers if there had not been a liberal trade regimes in place and if the governments of countries with plentiful low-wage workers had not encouraged the relocation of labor-intensive processes inside their borders. The shift in development strategies, particularly in East Asia, to encourage export-oriented business investment is a major part of the explanation of the success of the big-box retailers.

E-Commerce

Another way that digital technology has affected globalization is through the rise of electronic commerce (e-commerce). E-commerce is business conducted electronically and particularly via digital communications networks like the Internet. E-commerce is often separated business-to-consumer (B2C) and business-to-business (B2B) forms, mainly because B2B advanced more rapidly initially than B2C. With the success of B2C merchants like Amazon, many so-called bricks-and-mortar retailers supplemented their physical stores with virtual ones. Among bookstores, this happened particularly quickly with chains like Borders and Barnes and Noble playing catch up with Amazon. Now all the big-box retailers, department stores, and many specialty stores offer web sales alongside other retail channels. The mail-order business with its glossy printed catalogs has also migrated to the web. Auction sites like eBay have transformed the marketplace for small businesses and collectors. It is possible for individuals and small firms overhead to sell into global markets using these channels.

Figure 1. Estimated Quarterly U.S. Retail E-commerce Sales as a Percent of Total Quarterly Retail Sales: 4th Quarter 1999–3rd Quarter 2008



Source: U.S. Census Bureau, *Quarterly Retail E-Commerce Sales: 3rd Quarter 2008*, <http://www.census.gov/mrts/www/data/html/08Q3.html>.

Figure 1 shows that B2C e-commerce has grown more rapidly in the United States than the growth of the rest of retail sales. By the 3rd Quarter of 2008, e-commerce accounted for roughly 4 percent of all retail sales. E-commerce in Western Europe has not advanced as rapidly as in the United States (see Table 1), even though some Western European countries have higher rates of access to both dial-up and broadband services.

Table 1. E-commerce in Nine European Countries, 2003-4

country	ecommerce as % of total retail sales	country	% online window shopping	country	% of internet users buying online
Sweden	0.68	Finland	28	Sweden	27
UK	0.37	Netherlands	28	Norway	26
Netherlands	0.34	Sweden	23	UK	22
Germany	0.30	Norway	22	Germany	21
Belgium	0.16	Spain	16	Netherlands	18
France	0.14	France	14	Finland	16
Italy	0.09	Germany	14	France	8
Spain	0.06	Italy	14	Spain	8
Portugal	0.06	UK	13	Italy	7

Source: E-Commerce Statistics: Europe, <http://www.ecommerce-digest.com/ecommerce-prospects-europe.html>.

While e-commerce can potentially move freely across national boundaries, barriers to international e-commerce are still formidable. Physical items purchased electronically from foreign vendors are subject to relatively expensive mailing costs and to the collection of import duties at ports of entry. There may be local sales or VAT taxes on the items. Not all the problems of assessing and collecting these taxes internationally have been worked out yet.

Some items that are offered for sale electronically in one country may be illegal in the country of the purchaser. The sale of Nazi paraphernalia on Yahoo's French web site, for example, was illegal under French laws and Yahoo was told to take down all such items from its web sites.

In short, only modest gains in the globalization of retail trade have occurred via the rise of e-commerce, although slightly less modest in the case of B2B as opposed to B2C e-commerce. Changes in technology, international regimes, and domestic policies may be required to move more retail trade into cyberspace. For the meantime, the big-box "bricks and mortar" stores continue to dominate the retail scene.

Bridging the Global Digital Divide

One of the long-term issues association with globalization and digitalization as the degree to which digitalization helps or hinders efforts to reduce global economic inequality. There are those who argue that digitalization either preserves or accentuates pre-existing inequalities in income and wealth. Thomas Friedman, among others, argues that digitalization creates a more even playing field and by doing so has at least the potential to reduce pre-existing inequalities. The same arguments occur regarding the impact of globalization on inequality. Can the two be unpacked? Is it possible that one has an equalizing effect, while the other does not?

Global income is distributed quite unequally, and that inequality may be increasing. Absolute gaps in per capita income between the high-income countries and others increased markedly between 1980 and 2006, continuing the postwar trend.¹⁹ During the five years from 2001 to 2006, average growth rates were 6.1 percent in the low-income countries, 5.6 percent in the middle-income countries, and 2.2 percent in the high-income countries. Average annual growth in nominal GDP between 1991 and 2000 was 4.6 percent in the low-income countries, 3.8 percent in the middle-income countries, and 2.5 percent in the high-income countries. While economic growth rates were higher on the average in the South than in the North during the past four decades, high population growth rates kept per capita income growth rates modest for most of the South's people, with the notable exception of a small number of very fast-growing developing countries. It is a hopeful sign, of course, that the two largest low-income countries—China and India—have experienced rapid growth in recent decades.²⁰

There are a variety of ways to measure the amount of inequality within and across nations. One commonly used measure is the GINI coefficient of inequality. The GINI coefficient measures the degree of variance from perfect equality, by determining the area between the Lorenz curve of distribution and the diagonal which represents perfect equality. The GINI coefficient ranges from zero (perfect equality) to one (perfect inequality). Economists have attempted to measure global income inequality over relatively long periods of time. These efforts have yielded consistent findings that inequality increased steadily between 1820 and 1970, but began to decrease from 1970 on.²¹ The GINI coefficient for global income inequality ranges between .5 and .65 for the period between 1820 and 1998 and recently has stabilized around .6, while the GINI coefficient for domestic income inequality tends to range between .3 and .4 for most

¹⁹ The growing gap in incomes in the last 40 years is a continuation of the growing inequality between North and South that began, according to Paul Bairoch, in the 1700s. See Paul Bairoch, "International Industrialization Levels from 1750 to 1980," *Journal of European Economic History* 2 (1982): 268-333.

²⁰ Branko Milanovic, *Worlds Apart: Measuring International and Global Equality* (Princeton, N.J.: Princeton University Press, 2005), see p. 2 especially.

²¹ François Bourguignon and Christian Morrison, "Inequality Among World Citizens: 1980-1992," *American Economic Review*, 92 (September 2002): 727-744; and Xavier Sala-i-Martin, "The World Distribution of Income," NBER Working Paper 8933, May 2002. Milanovic offers a somewhat skeptical view of these findings.

countries.²² In short, the empirical evidence on income inequality fails to support the view of some critics that the intensification of globalization after 1989 has resulted in increased global and domestic inequality. Rather it indicates that there has been a major decline in the number of people living on less than a dollar a day and in other indicators of “absolute poverty.”²³

Thus, the aggregate data on income inequality seems to indicate that digitalization has not accentuated pre-existing inequalities. To the extent that globalization has made it possible for China and India to grow faster in recent decades through outsourcing, one can even argue that globalization has reduced both global inequality and the digital divide. In 2008, for example, CIA data indicated that China had more Internet users than both the European Union and the United States. Although per capita use is still lower in developing countries than in developed countries, in some large developing countries like China that gap is growing smaller.

Table 2. Internet Users by Country, Rank Ordered, 2005-2008

Rank	Country	Internet users	Date of Information
1	World	1,018,057,389	2005
2	China	253,000,000	2008
3	European Union	247,000,000	2006
4	United States	223,000,000	2008
5	Japan	88,110,000	2007
6	India	80,000,000	2007
7	Brazil	50,000,000	2007
8	Germany	42,500,000	2007
9	United Kingdom	40,200,000	2007
10	South Korea	35,590,000	2007
11	Italy	32,000,000	2007
12	France	31,295,000	2007
13	Russia	30,000,000	2007
14	Canada	28,000,000	2007
15	Iran	23,000,000	2007
16	Mexico	22,812,000	2007

Source: CIA *World Factbook* 2008, <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2153rank.html>.

Conclusions

The available evidence indicates that globalization in some specific areas – especially finance – was facilitated by the spread of ICTs. Similarly, in some industrial sectors, such as microelectronics, globalization of production facilitated the spread of ICTs by

²² *World Development Report 2006* (Washington, D.C.: World Bank, 2006), p. 7.

²³ *The Millennium Development Goals Report 2007* (New York: United Nations, 2007), p. 4.

reducing costs and prices of computer and telecommunications equipment. The spread of ICTs made the construction and management of far-flung global production networks cheaper and easier. Thus, the causation goes in both directions. The same can be said in the case of the rise of the big-box retailers. The evidence in all three areas suggests that technological change alone cannot explain the acceleration of globalization in recent years. One has to include other factors such as change in international economic regimes and domestic economic strategies.

Thus, Friedman is wrong and Hanson is right, but we cannot state with any degree of precision how much technological change mattered relative to other factors. One open question is the extent to which the increased volatility in global financial markets in recent years may result in a rebellion against liberal economic regimes and in support of more regulated domestic markets. Another open question is whether the downward trajectory of ICT prices that the world has enjoyed in the past three decades will continue, especially if there is a turn away from financial globalization. Finally, some industries are less subject to the pressures for globalization than others, and governments continue to create barriers to the free flow of factors of production, especially labor, so the world is still far from the “flat platform” of equal economic opportunity heralded by Friedman.