

# **ISSUE BRIEF**

# Foreign Direct Investment, Infrastructure, and Supply Chain Resiliency:

# A New Nexus for US Industrial Strategy

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Infrastructure has taken center stage in Joe Biden's presidency for many good reasons. In 2002, the United States ranked fifth in the world in terms of infrastructure quality. By 2019, that ranking had dropped to thirteenth.<sup>1</sup> Many countries in Europe, Asia, and even the Middle East are ahead of the United States when it comes to modern infrastructure such as smart cities, high-speed rail, eco-friendly buildings, smart grids, and e-government.<sup>2</sup> Serious vulnerabilities in US infrastructure were highlighted by the February 2021 failure of the Texas power grid,<sup>3</sup> due to snow and icy conditions, and the May 2021 ransomware attack on the Colonial Pipeline.<sup>4</sup>

The same is true for nontraditional infrastructure, such as the semiconductor industry, which is as fundamental to the workings of an economy as traditional infrastructure.<sup>5</sup> The recent shortage of semiconductors was a wake-up call for the US economy as US policymakers realized around 75 percent of global semiconductor production is taking place in China and a few other economies in East Asia. Furthermore, more than 90 percent of the world's most advanced semiconductor capacity is located in one

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<sup>&</sup>quot;How to Fix America," Bloomberg, last updated May 27, 2021, https://www.bloomberg.com/ features/2021-infrastructure-across-america/

<sup>2</sup> For more on smart cities, see Smart Cities and Inclusive Growth: Building on the Outcomes of the 1st OECD Roundtable on Smart Cities and Inclusive Growth," Organisation for Economic Cooperation and Development (OECD), 2020, https://www.oecd.org/cfe/cities/OECD\_Policy\_Paper\_ Smart\_Cities\_and\_Inclusive\_Growth.pdf; and for smart grids, see US Department of Energy, Smart Grid System Report: 2018 Report to Congress, November 2018, https://www.energy.gov/sites/ prod/files/2019/02/f59/Smart%20Grid%20System%20Report%20November%202018\_1.pdf.

<sup>3</sup> Brad Plumer, "A Glimpse of America's Future: Climate Change Means Trouble for Power Grids," New York Times, June 15, 2021, https://www.nytimes.com/2021/02/16/climate/texas-power-gridfailures.html.

<sup>4</sup> David E. Sanger and Nicole Perlroth, "Pipeline Attack Yields Urgent Lessons About U.S. Cybersecurity," *The New York Times*, June 8, 2021, https://www.nytimes.com/2021/05/14/us/ politics/pipeline-hack.html.

<sup>5</sup> Gerald F. Seib, "The Really Critical Infrastructure Need: American-Made Semiconductors," Capitol Journal (column), *Wall Street Journal*, July 26, 2021, https://www.wsj.com/articles/the-really-criticalinfrastructure-need-american-made-semiconductors-11627309340.



U.S. President Joe Biden speaks about the \$1.2 trillion "Infrastructure Investment and Jobs Act" at the Shipyards in Lorain, Ohio, U.S., February 17, 2022. REUTERS/Kevin Lamarque.

place—Taiwan—whose democratic, capitalist society faces significant Chinese pressure.<sup>6 7</sup>

These and heightened supply-chain risks, e.g., in rare earth materials,<sup>8</sup> have highlighted significant vulnerabilities that impinge on the resiliency of the US economy. As a result, National Economic Council Director Brian Deese, at a June 2021 event hosted by the Atlantic Council,<sup>9</sup> highlighted the United States' need for "a new strategy[,] ... an industrial strategy for the second quarter of the twentyfirst century" that would strengthen US supply chains and promote climate resilience and equity through targeted public investment and public procurement. A 250-page White House report released that month conveys an initial review of four sectors: semiconductors, large capacity batteries, critical minerals and materials, and pharmaceuticals.<sup>10</sup>

While the role of foreign direct investment (FDI) is not explicitly discussed in the White House report and various infrastructure bills, promoting FDI both inside the United States and abroad must be an essential ingredient of this "new strategy." In other words, infrastructure spending should not only be about spending domestically on

<sup>6</sup> Antonio Varas, Raj Varadarajan, Ramiro Palma, Jimmy Goodrich, and Falan Yinug, "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," Boston Consulting Group, April 01, 2021, https://www.bcg.com/en-us/publications/2021/strengthening-the-global-semiconductor-supply-chain.

<sup>7</sup> Portions of this issue brief were previously published as a blog by the author titled "Foreign Direct Investment: A New Strategy for the United States." https:// www.atlanticcouncil.org/blogs/foreign-direct-investment-a-new-strategy-for-the-united-states/

<sup>8</sup> Samantha Subin, "The New U.S. Plan to Rival China and End Cornering of Market in Rare Earth Metals," CNBC, April 19, 2021, https://www.cnbc.com/2021/04/17/ the-new-us-plan-to-rival-chinas-dominance-in-rare-earth-metals.html.

<sup>9</sup> Brian Deese, "The Biden White House Plan for a New US Industrial Policy," Atlantic Council (event transcript), June 23, 2021, https://www.atlanticcouncil.org/ commentary/transcript/the-biden-white-house-plan-for-a-new-us-industrial-policy/.

<sup>10</sup> Brian Deese and Jake Sullivan, *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-based Growth: 100-Day Reviews under Executive Order 14017*, The White House (website), June 2021, https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf.

## Figure 1. US FDI positions (billion \$)



Source: US Department of Commerce, Bureau of Economic Analysis; author's calculations.

roads, ports, and electricity grids. Rather, it should also incentivize inbound FDI in sectors that are critical for the US economy—such as large capacity batteries, semiconductors, and smart and green infrastructure while also encouraging US FDI in sectors and countries that are of strategic importance for the United States, such as rare earth materials sourced from sub-Saharan Africa.

#### While US inbound and outbound FDI stocks have been growing over the past decade, the pace of growth has been slowing down in the past few years.

As of 2019, the total US FDI in other economies (that is, the outbound FDI position or stock) was around \$6 trillion, and foreign FDI inside the United States (US inbound FDI position or stock) stood at \$4.5 trillion (see Figure 1), making the United States the largest recipient of FDI in the world. While the US inbound FDI stock almost doubled between 2010 and 2019, the US outbound FDI stock increased by 59 percent—pointing to the fact that foreign companies have in the past decade been relatively more eager to establish and expand operations inside the United States than US companies have been in investing abroad. The draw: besides being the largest economy in the world, the United States continues to be an innovative and stable market with a favorable business climate<sup>11</sup> for foreign entities to operate in.

However, global competition for FDI is increasing, and the United States needs to adapt swiftly to the changing FDI marketplace if it wants to continue to reap the benefits of attracting increasing FDI. This is crucial because in addition to contributing to the innovative base of the United States, inbound FDI has benefited the US economy both in terms of job creation and exports promotion. For example, in 2018, US affiliates of majority foreignowned firms directly employed more than 7.95 million US workers and contributed around \$400 billion to US goods exports.<sup>12</sup> Moreover, every job created by an international firm supports three other jobs in the US economy and 15

<sup>11</sup> World Bank Group, *Economy Profile United States: Doing Business 2020*, World Bank Group, 2020, https://www.doingbusiness.org/content/dam/doingBusiness/ country/u/united-states/USA.pdf.

<sup>12</sup> SelectUSA, Foreign Direct Investment (FDI): United States, US Department of Commerce, SelectUSA (program), 2020, https://www.selectusa.gov/servlet/servlet. FileDownload?file=015t00000003D9M.

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## Figure 2. Year-on-Year Growth of US FDI Positions (%)

Source: US Department of Commerce, Bureau of Economic Analysis; author's calculations.

percent of US research and development (R&D) activity, totaling \$67 billion, and is conducted through foreign companies in the United States.<sup>13</sup>

Inbound FDI positions in the United States have been growing over the past decade, but the rate of FDI inflows has slowed down in the past five years: declining from around \$467 billion in 2015 to \$134 billion in 2020<sup>14</sup>. Likewise, the annual growth rates of the US outbound FDI positions have been lower in the 2015-2020 period (except in 2017), compared to the 2011-2014 period (Figure 2). Moreover, in 2020 and for the first time in recent history, China received more FDI than the United States did: \$163 billion, compared to \$134 billion, respectively.<sup>15</sup> While this development might be alarming, there are several reasons that could mitigate concerns, including the fact that the pandemic changed the global economy so dramatically in 2020 and pushed many trends out of equilibrium. Also, there is always the possibility that the data revision for 2020 could show a different picture. Finally, China is lagging far behind the United States in terms of inbound FDI stock: around \$1.9 trillion in China versus \$4.5 trillion in the United States. Nonetheless, the fact remains that the rate of annual FDI inflows into the US economy has been declining over the past few years—a decline of more than 71 percent between 2015 and 2020—while annual FDI

<sup>13</sup> Portions of this issue brief were previously published as a blog by the author titled "Foreign Direct Investment: A New Strategy for the United States." https:// www.atlanticcouncil.org/blogs/foreign-direct-investment-a-new-strategy-for-the-united-states/

<sup>14</sup> Paul Hannon and Eun-Young Jeong, "China Overtakes U.S. as World's Leading Destination for Foreign Direct Investment," *Wall Street Journal*, January 24, 2021, https://www.wsj.com/articles/china-overtakes-u-s-as-worlds-leading-destination-for-foreign-direct-investment-11611511200.

<sup>15</sup> Tucker Higgins, "China Surpasses U.S. as Largest Recipient of Foreign Direct Investment during COVID Pandemic," CNBC, January 24, 2021, https://www.cnbc. com/2021/01/24/china-received-more-foreign-investment-last-year-than-us-un-says.html.

## Table 1. US Inbound FDI Positions in 2010 and 2019, by Region and Selected Economies

	Total positions as of 2010 (billion \$)	Total positions as of 2019 (billion \$)	2010 Share of US FDI positions (%)	2019 Share of US FDI positions (%)	2010-2019 Growth Rate (%)
Total US inbound FDI positions	2,280	4,458			96
Canada	192	496	8.4	11.1	158
Europe	1,660	2,871	72.8	64.4	73
Latin America and Other Western Hemisphere	62	194	2.7	4.3	212
Africa	2	10	0.1	0.2	334
Middle East	17	29	0.7	0.7	73
Asia-Pacific Region	347	859	15.2	19.3	148
China	3	38	0.1	0.8	1042
Japan	255	619	11.2	13.9	143

Source: US Department of Commerce, Bureau of Economic Analysis; author's calculations.

inflows into China have grown from around \$136 billion in 2015 to \$163 billion in 2020, an increase of 20 percent. The recent slowdown in US FDI, both inbound and outbound, could be because of the previous administration's unilateral approach on many global issues, as well as its "America First" policy, which deteriorated economic and commercial ties with many countries around the world, including traditional allies of the United States such as Canada and the European Union (EU).<sup>16</sup>

Also seen in Figure 2 is the contraction of the stock of US FDI abroad in 2018. This anomaly is an interesting case of the impact of corporate tax policies on FDI. Specifically,

the US Tax Cut and Job Acts of 2017 (TCJA) shifted taxes toward a territorial tax model,<sup>17</sup> hence exempting foreign profits from taxation in the United States. This resulted in US firms repatriating more than \$776 billion in foreign profits,<sup>18</sup> five times more than the average annual repatriation amounts in previous years going back to 2006.

#### Europe has remained the largest FDI partner of the United States while US FDI in Africa has experienced a significant decline and China has been filling in the gap.

As shown in Table 1, in 2019, European firms were responsible for almost two-thirds of total FDI stock in

<sup>16</sup> Portions of this issue brief were previously published as a blog by the author titled "Foreign Direct Investment: A New Strategy for the United States." https:// www.atlanticcouncil.org/blogs/foreign-direct-investment-a-new-strategy-for-the-united-states/

<sup>17</sup> Kyle Pomerleau, "A Hybrid Approach: The Treatment of Foreign Profits under the Tax Cuts and Jobs Act," Tax Foundation, May 3, 2018, https://taxfoundation.org/ treatment-foreign-profits-tax-cuts-jobs-act/.

<sup>18</sup> Eric Morath and Theo Francis, "U.S. Companies Brought Home More Profits from Overseas," *Wall Street Journal*, June 20, 2019, https://www.wsj.com/articles/u-s-companies-transferred-more-profits-from-overseas-in-2018-than-estimated-11561044921.

# Table 2. US Outbound FDI Positions in 2010 and 2019, by Region and Selected Economies

	Total positions abroad as of 2010 (billion \$)	Total positions abroad as of 2019 (billion \$)	2010 Share of US FDI positions abroad (%)	2019 Share of US FDI positions abroad (%)	2010-2019 Growth Rate (%)
Total US outbound FDI positions	3,741	5,959			59
Canada	295	402	7.9	6.7	36
Europe	2,034	3,571	54.4	59.9	76
Latin America and Other Western Hemisphere	752	911	20.1	15.3	21
Africa	54	43	1.5	0.7	-21
Middle East	34	75	0.9	1.3	118
Asia-Pacific Region	570	955	15.2	16.0	68
China	58	116	1.6	1.9	97
Japan	113	131	3.0	2.2	16
Singapore	102	287	2.7	4.8	180

Source: US Department of Commerce, Bureau of Economic Analysis; author's calculations.

the United States, followed by Japan and Canada at 13.9 and 11.1 percent, respectively. However, it is important to note that Europe's share in the US inbound FDI stock has actually declined—from 72.8 to 64.4 percent during the 2010-2019 period—and this decline was mainly replaced by increases from Canada, Japan, and Latin America (see Table 1).

Europe also has been the most popular destination for US firms to invest in, with its share of US FDI abroad increasing from 54 to 60 percent between 2010 and 2019 (see Table 2). The Middle East has become more attractive for US companies to establish operations in, as the US FDI in this region more than doubled since 2010. However, it is mainly limited to wealthy Persian Gulf economies. Africa was the only region that experienced a decline in FDI received from the United States, with the stock declining 21 percent between 2010 and 2019. While US firms have been leaving this strategic region, Beijing's aggressive state-led industrial strategy and its support for investments abroad have encouraged Chinese firms to expand their presence in sub-Saharan Africa (SSA).<sup>19</sup> This has created serious supply-chain risks for US industries heavily dependent on earth materials and metals that are primarily sourced from SSA, including large capacity

<sup>19</sup> Amin Mohseni-Cheraghlou, "Development Finance in Sub-Saharan Africa: The Chinese Model," Atlantic Council (blog), June 10, 2021, https://www. atlanticcouncil.org/blogs/development-finance-in-sub-saharan-africa-the-chinese-model/.

batteries used in electric vehicles (EVs) and the renewable energy industries.<sup>20</sup>

It is imperative for the United States to maintain and further strengthen its current strong FDI ties with allies, such as members of the Group of Seven (G7) and other European economies. This is important for two reasons. First, to collectively address the growing supply-chain risks facing their economies in an effective manner, the United States, the EU, and, other allies need to further strengthen their economic partnerships,<sup>21</sup> and an obvious avenue to achieve this goal is to incentivize more FDI in these economies. This is especially true in highly strategic sectors such as semiconductors and critical mineral and rare earth materials, such as cobalt. Second, while the Chinese FDI in the United States and the EU is miniscule—less than 1 percent and 3 percent of the total inbound FDIs, respectively—it has grown over the past decade by more than twelve times in the case of the United States and fifty times for the EU, highlighting the eagerness of Chinese firms to establish their presence in the these markets.<sup>22</sup> Moving forward, however, there is a good possibility of declining inflows of Chinese FDI in the United States and the EU, as they are increasing scrutiny of Chinese investments in their economies, and a growing number of Chinese companies face higher risks of delisting from the US and EU exchanges, and rejection of getting listed in the first place.<sup>23</sup> As a result, the United States, the EU, and other allies should plan to fill the vacuum created by the declining Chinese FDI on both sides of the Atlantic.

# The United States is facing increasing competition in the global FDI marketplace, and its aging and vulnerable infrastructure is not up to the task.

For decades, the United States was the main destination for foreign firms' investments. Its rank as the largest economy in the world and its large and wealthy consumer market, culture of diversity and innovation, and access to deep capital markets and the world's top talent have all been elements of attraction for FDIs. However, the emergence of new markets and players in the global economy means the United States must actively compete with other countries—namely China—to maintain its appeal for foreign direct investment.<sup>24</sup>

While it is too early to speculate, the recent slowdown of FDI into the United States and the slow but steady rise of FDI inflows into China might be the start of a long-run trend that could end with the United States losing its position as the largest recipient of FDI in the world. The recent trends could certainly be reversed in the coming years, as the Biden administration, now in its second year, is giving high priority to rebuilding the United States' position in the international arena as a global leader and reestablishing strong economic and political ties with traditional US allies and others. At the same time, it is not clear if China will be able to maintain the upward trajectory of the past decade in attracting FDI, especially given the recent Chinese crackdown on Didi and other tech companies,<sup>25</sup> which could cost China trillions of dollars in capital flows throughout the next decade.<sup>26</sup>

<sup>20</sup> Portions of this issue brief were previously published as a blog by the author titled "Foreign Direct Investment: A New Strategy for the United States." https:// www.atlanticcouncil.org/blogs/foreign-direct-investment-a-new-strategy-for-the-united-states/

<sup>21</sup> Rana Foroohar, "America and the EU Are Stronger Together," *Financial Times*, June 27, 2021, https://www.ft.com/content/0f50071d-08e4-4857-9c58-1429a2dad057.

<sup>22</sup> Julia Fioretti and John Cheng, "Chinese Firms Are Listing in the U.S. at a Record-Breaking Pace," Bloomberg, April 24, 2021, https://www.bloomberg.com/news/ articles/2021-04-24/chinese-firms-are-listing-in-the-u-s-at-a-record-breaking-pace.

<sup>23</sup> Thilo Hanemann, Daniel H. Rosen, Mark Witzke, Steve Bennion, and Emma Smith, *Two-Way Street: 2021 Update US-China Investment Trends*, Report of the US-China Investment Project, Rhodium Group and National Committee on U.S.-China Relations, 2021, https://rhg.com/wp-content/uploads/2021/05/RHG\_TWS-2021\_Full-Report\_Final.pdf; Agatha Kratz, Max Zenglein, and Gregor Sebastian, "Chinese FDI in Europe–2020 Update," Rhodium Group and Mercator Institute for China Studies, 2021, https://rhg.com/research/china-europe-2020/; and Jeremy Mark, "Taking Stocks Off the Board: The Rising Threat of Delisting in US-China Relations," Atlantic Council (blog), May 10, 2021, https://www.atlanticcouncil.org/blogs/taking-stocks-off-the-board-the-rising-threat-of-delisting-in-us-china-relations/.

<sup>24</sup> Portions of this issue brief were previously published as a blog by the author titled "Foreign Direct Investment: A New Strategy for the United States." https:// www.atlanticcouncil.org/blogs/foreign-direct-investment-a-new-strategy-for-the-united-states/

<sup>25</sup> Hung Tran, "Caveat Emptor: Lessons from China's Actions against Didi Global," New Atlanticist, Atlantic Council (blog), July 30, 2013, www.atlanticcouncil.org/ blogs/egyptsource/part-i-can-the-tran-sitional-government-turn-the-egyptian-economy-around; and Hiroshi Murayama, "China's Tech Crackdown Widens to Tencent from Alibaba," Nikkei Asia, August 8, 2021, https://asia.nikkei.com/Business/China-tech/China-s-tech-crackdown-widens-to-Tencent-from-Alibaba.

<sup>26</sup> Frederick Kempe, "Op-ed: The Crackdown on Didi and Companies Like It Could Cost China as Much as \$45 Trillion in New Capital Flows by 2030," CNBC, July 10, 2021, https://www.cnbc.com/2021/07/10/op-ed-crackdown-on-didi-and-companies-like-it-could-cost-china-as-much-as-45-trillion-by-2030.html.



Waste coal is loaded into a truck at an Abandoned Mine Land reclamation site in Clinchco, western Virginia, U.S., May 12, 2021. Picture taken May 12, 2021. REUTERS/Dane Rhys.

Nonetheless, Chinas' central role in global manufacturing and its dominance in the global supply chain of strategic industries such as large capacity batteries and solar photovoltaic (PV) panels are important elements that could play in its favor in attracting an increasing share of global FDI in the coming years and decades. For example, as of 2020, China was responsible for around 30 percent of global manufacturing output (compared to 18 percent for the United States); more than two-thirds of solar PV panel production (vs. 3 percent for US production); and more than 80 percent of total cobalt refining capacity (with practically none in the United States). Moreover, Beijing's state-backed outbound FDI has provided China with access to strategic commodities and markets. For example, in 2019, China's FDI stock in the SSA region surpassed \$110 billion,<sup>27</sup> more than 2.5 times that of

the United States. Most of these FDI positions are concentrated in key industries such as energy, metals, mining, and transportation, which have strengthened China's supply chain and resilience in strategic commodities.<sup>28</sup>

The United States' aging infrastructure is not up to the task of supporting the kind of economic growth and productivity the country needs to successfully compete with other advanced and emerging economies. According to an April 2021 Council on Foreign Relations report,<sup>29</sup> "US infrastructure is both dangerously overstretched and lagging behind that of its economic competitors, particularly China," and is costing the US economy hundreds of billions of dollars each year as well as putting people's health and lives at risk. As Henry Petroski argues

<sup>27</sup> Shirley Ze Yu, "Why Substantial Chinese FDI Is Flowing into Africa," China-Africa Initiative (blog), April 2, 2021, https://blogs.lse.ac.uk/africaatlse/2021/04/02/whysubstantial-chinese-fdi-is-flowing-into-africa-foreign-direct-investment/.

<sup>28</sup> Portions of this issue brief were previously published as a blog by the author titled "Foreign Direct Investment: A New Strategy for the United States." https:// www.atlanticcouncil.org/blogs/foreign-direct-investment-a-new-strategy-for-the-united-states/

<sup>29</sup> Mike Dorning, "The State of U.S. Infrastructure," Council on Foreign Relations, November 8, 2021, https://www.cfr.org/backgrounder/state-us-infrastructure.

in his book titled The Road Taken: The History and Future of America's Infrastructure,<sup>30</sup> delays as a result of growing traffic congestion and aging airport infrastructure alone cost the US economy upward of \$160 billion per year. For example, United States' strained web of roads and ports have made just-in-time manufacturing largely impossible,<sup>31</sup> creating inefficiencies ranging from workers and production lines going idle when materials don't arrive in time to allocating more storage space and management time for inventory of materials.

Furthermore, 25 percent of the US bridges are in need of substantial repairs and are not in a state to handle current traffic. What's more, the United States has by far the highest rate of deaths in road accidents among the members of the Organisation of Economic Co-operation and Development (OECD): 112 (per one million inhabitants in 2019) compared to twenty in Norway, twenty-eight in the United Kingdom, thirty-seven in Germany, forty-seven in Australia, fifty-two in Canada, and fifty-three in Italy.<sup>32</sup> It is important to note that while most of the OECD members have been making significant improvements in this area, the US rate was roughly flat for the past decade and then increased slightly from 106 in 2010 to 112 in 2019. Adding accidents to the mix of already congested highways and ports has meant that since 2000, according to the Texas A&M Transportation Institute, freight truck delays have increased 77 percent in about five hundred urban areas of the United States, costing the US economy billions of dollars every year.<sup>33</sup> Moreover, similar to many other economies around the world, the increasing vulnerability of US infrastructure to extreme weather conditions as a result of climate change, and rising frequency of cyberattacks on US critical infrastructure are threatening the well-being and resilience of the US economy.<sup>34</sup> In short, it is immediately clear that increasing congestion, delays, and vulnerabilities in US infrastructure are

hampering the global competitiveness of the US economy, and especially so for its US manufacturing sector.<sup>35</sup>

#### The United States is facing serious challenges regarding nontraditional infrastructure, which is central to the competitiveness and resiliency of the US economy and its ability to attract FDI.

The United States also is lagging behind many other developed and emerging economies when it comes to nontraditional infrastructure, such as high-speed broadband access. With more than twenty million Americans lacking access to high-speed broadband, the United States ranks twenty-fourth and sixty-fifth globally in terms of fixed-broadband and mobile-cellular subscriptions per one hundred individuals, respectively. Moreover, the United States is not among the top ten countries in terms of average Internet speed and is trailing Singapore, South Korea, Taiwan, Sweden, Romania, and five other economies.<sup>36</sup> In short, as Senator Elizabeth Warren puts it very clearly: "We lag behind many other developed nations [and emerging economies] in connectivity and speed, while also paying more for that service." In this globalized era when high-speed broadband is central to the productivity, efficiency, and overall competitiveness of an economy, the United States is in a disadvantaged position in this regard vis-à-vis the majority of advanced economies.

The US semiconductor industry is another nontraditional yet crucial industry that has suffered from underinvestment in the past few decades, making the country dangerously dependent on foreign producers.<sup>37</sup> The share of the United States in the global semiconductor manufacturing capacity is 12 percent, down from 37 percent in 1990. This trend becomes especially worrisome because much of this drop was filled with China and, moreover, China is projected to be

<sup>30</sup> Henry Petroski, The Road Taken: The History and Future of America's Infrastructure (New York City: Bloomsbury USA, 2016).

<sup>31</sup> James McBride and Anshu Siripurapu, "Just-in-Time Manufacturing? Not With Rickety U.S. Infrastructure," Bloomberg, August 4, 2021, https://www.bloomberg. com/news/articles/2021-08-04/infrastructure-bill-ceos-hope-biden-congress-deal-can-fix-logistics-issues.

<sup>32</sup> OECD, "Road Accidents," OECD (website), 2022, accessed February 2, 2022, doi: 10.1787/2fe1b899-en.

<sup>33 &</sup>quot;Texas Transportation Researcher," Texas A & M Transportation Institute (website), December 2021, https://tti.tamu.edu/researcher/big-data-saves-dots-timeresources-for-truck-parking-analysis/.

<sup>34 &</sup>quot;National Climate Assessment," US Global Change Research Program, https://nca2014.globalchange.gov/highlights/report-findings/infrastructure#intro-section.

<sup>35</sup> Christopher Flavelle, Brad Plumer, and Hiroko Tabuchi, "Texas Blackouts Point to Coast-to-Coast Crises Waiting to Happen," *New York Times*, February 21, 2021, https://www.nytimes.com/2021/02/20/climate/united-states-infrastructure-storms.html.

<sup>36</sup> Paul Dughi, "U.S. Lags Behind the World When it Comes to Broadband Internet Speeds," Medium (online platform), June 24, 2020, https://medium.com/ stronger-content/u-s-lags-behind-the-world-when-it-comes-to-broadband-internet-speeds-65eaf3dda1bd.

<sup>37</sup> Eun-Young Jeong and Dan Strumpf, "Why the Chip Shortage Is So Hard to Overcome," *Wall Street Journal*, April 19, 2021, https://www.wsj.com/articles/why-thechip-shortage-is-so-hard-to-overcome-11618844905?mod=article\_inline.

the home to about 40 percent of the world's new chipproduction capacity in the next decade.<sup>38</sup> The current layout of the global semiconductor industry has created serious vulnerabilities and supply-chain risks in the production of almost everything in the United States, from appliances to cars to all kinds of electronics, tools, and machineries. Like the traditional infrastructure highlighted above, the United States' unfavorable standing on many fronts of nontraditional infrastructure has serious ramifications for its competitiveness and resiliency.

#### The well-being of the US economy depends heavily on immediate and massive investments in the US infrastructure. Incentivizing FDI in the US infrastructure can help.

As discussed briefly above, the ailing and outdated US infrastructure could pose a serious drag on the nation's overall productivity and competitiveness, negatively impacting the United States' position in the global FDI marketplace. However, the United States is not able to meet the current financing and technological gap solely through domestic private and public investment schemes.<sup>39</sup> Therefore, it is imperative for the US to incentivize greenfield and brownfield FDI in US infrastructure—both traditional and nontraditional. This would in turn increase the productivity, efficiency, and competitiveness of the US economy, contributing to its sustained appeal as a leading FDI destination in the second quarter of the twenty-first century.<sup>40</sup>

For example, a report by Boston Consulting Group highlights the need for government incentives to promote private investments in the US semiconductor industry.<sup>41</sup> The report estimates that \$50 billion in governmentfunded incentive programs over the next ten years would be a good start for the US government to gradually reestablish the United States "as an attractive location for

advanced semiconductor manufacturing." To be accurate, the United States is still the leading economy in the design of semiconductors, but it is responsible for only 12 percent of all chips produced globally and none when it comes to the world's most advanced chips—in nodes less than 10 nanometers—as all such production capacity is located in Taiwan (92 percent) and South Korea (8 percent). In addition to encouraging private-sector investments, government involvement in the semiconductor industry would create jobs and boost economic output. According to a study conducted by Semiconductor Industry Association in partnership with Oxford Economics, a \$50 billion federal investment program to incentivize domestic semiconductor manufacturing would create 185,000 temporary US jobs annually between 2021 and 2026, and then add 280,000 permanent jobs after 2026.42

The private sector (whether domestic or foreign) will only get involved if sufficient government incentives and guarantees are in place, enabling and protecting such massive investment. Specifically, for the United States to start producing some of world's most advanced semiconductors, it needs to attract investments from Taiwan's Taiwan Semiconductor Manufacturing Company (TSMC) and South Korea's Samsung. The good news is that Samsung is planning to build an advanced 5-nanometer extreme ultraviolet (EUV) lithography chip-making plant in Austin, Texas, which will become operational in 2024.43 Moreover, TSMC also is considering increasing its previous investment plans in the United States by tens of billions of dollars and building a more advanced 3-nanometer plant in Phoenix, Arizona, with a target production date of 2025.

However, most experts agree that much more is needed—on the order of \$1.4 trillion over a decade—<sup>44</sup> to meaningfully reduce US dependency on China and other East Asian economies, especially given that Beijing

<sup>38</sup> Antonio Varas, Raj Varadarajan, Jimmy Goodrich, and Falan Yinung, Government Incentives and US Competitiveness in Semiconductor Manufacturing, Boston Consulting Group and Semiconductor Industry Association (SIA), September 2020, https://web-assets.bcg.com/27/cf/9fa28eeb43649ef8674fe764726d/bcggovernment-incentives-and-us-competitiveness-in-semiconductor-manufacturing-sep-2020.pdf.

<sup>39</sup> Economic Development Research Group Inc., "Failure To Act: Closing the Infrastructure Investment Gap for America's Economic Future," American Society of Civil Engineers, 2016, https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/ASCE-Failure-to-Act-2016-FINAL.pdf.

<sup>40</sup> James McBride and Anshu Siripurapu, "The State of U.S. Infrastructure," Council on Foreign Relations, November 8, 2021, https://www.cfr.org/backgrounder/ state-us-infrastructure.

<sup>41</sup> Varas, Varadarajan, Goodrich, and Yinung, Government Incentives.

<sup>42</sup> SIA and Oxford Economics, Chipping In: The Positive Impact of the Semiconductor Industry on the American Workforce and How Federal Industry Incentives Will Increase Domestic Jobs, May 2021, https://www.semiconductors.org/chipping-in-sia-jobs-report/.

<sup>43 &</sup>quot;Samsung Electronics Could Begin Construction of New U.S. Chip Plant in Q3: Electronic Times," Reuters, last updated May 17, 2021, https://www.reuters.com/ technology/samsung-electronics-could-begin-construction-new-us-chip-plant-q3-electronic-2021-05-18/.

<sup>44</sup> SIA and Oxford Economics, *Chipping In.* 

is ramping up its semiconductor investments to counter US plans.<sup>45</sup> Together, the size of Samsung and TSMC's investments in the US advanced semiconductor industry is around \$40 billion over the next three years, or around \$14 billion per year. This is only 10 percent of the average \$140 billion needed every year over the next decade to reestablish a strong footing for the US semiconductor industry. Clearly, much more investment is needed, and the US government plays a central role to make sure that happens.<sup>46</sup>

The same is true for most other more traditional infrastructure projects. The financing gap in such projects are massive (around \$2 trillion in the United States), requiring long-term public- and private-sector involvement.<sup>47</sup> Hence, infrastructure financing schemes through public-private partnership (PPP) have become commonplace in the past two decades, wherein government funding, incentives, and guaranties crowd in financing from the private sector and other stakeholders.<sup>48</sup> The recent \$1 trillion infrastructure law is a step in the right direction and is expected to spur domestic and foreign investment from other parts of the economy.<sup>49</sup> For example, Bill Gate's climate investment fund will commit \$1.5 billion to collaborate with the US government on developing technologies for lowering carbon emission.<sup>50</sup>

#### Institutional investors also could play an important role in infrastructural investment. This would require classifying US infrastructure as an asset class to invest in.

Institutional investors—such as sovereign wealth funds, pension funds, and retirement funds—are particularly well positioned to invest in infrastructure projects as their investment time horizons are long term, matching those typical for most infrastructure projects. At the same time, government guaranties and investment will diminish risk for portfolios of infrastructure projects, which is appealing to institutional investors. As of 2021, US retirement market assets (public and private) totaled around \$35.5 trillion. Mobilizing a small percentage of these massive sums would be sufficient to address the financing gap in US infrastructure, but it would require classifying the US infrastructure as an asset class to invest in (as mentioned above).<sup>51</sup> This calls for substantial discussion and coordination among regulatory bodies, government agencies, and private-sector stakeholders, and the United States has a lot to learn from the experiences of and best practices in countries where their pension funds have been investing in infrastructure for some time now, such as Canada.<sup>52</sup>

To conclude this part of the discussion, the United States faces infrastructure challenges on several fronts. Traditional infrastructure is outdated, extremely overstretched, and congested for the size of the US economy, and is becoming more and more vulnerable to climate change events and cyberattacks. At the same time, nontraditional infrastructure trails that of many advanced economies and in some cases is dangerously dependent on other actors, posing serious vulnerabilities for the US economy. In addition to undermining the well-being of the US economy in the long run, these issues could have significant impact on the appeal of the US economy as a destination for FDI, calling for urgent and significant investments in US infrastructure. Direct government spending on infrastructure is certainly one way to go about this, but the government should also spur private investments in US infrastructure, both domestic and FDI, through various incentive programs.

<sup>45</sup> Sohee Kim, "Samsung Weighs Second Texas Site For \$17 Billion U.S. Chip Plant," Bloomberg, July 16, 2021, https://www.bloomberg.com/news/ articles/2021-07-16/samsung-weighs-second-texas-site-for-17-billion-u-s-chip-plant.

<sup>46</sup> Stephen Nellis, "EXCLUSIVE: TSMC Looks to Double Ddown on U.S. Chip Factories as Talks in Europe Falter," Reuters, May 14, 2021, https://www.reuters.com/ technology/exclusive-tsmc-looks-double-down-us-chip-factories-talks-europe-falter-2021-05-14/.

<sup>47</sup> Jared Katseff, Shannon Peloquin, Michael Rooney, and Todd Wintner, "Reimagining Infrastructure in the United States: How to Build Better," McKinsey & Co., July 6, 2020, https://www.mckinsey.com/business-functions/operations/our-insights/reimagining-infrastructure-in-the-united-states-how-to-build-better.

<sup>48 &</sup>quot;Understanding Poverty: Public-Private Partnerships," The World Bank (website), https://www.worldbank.org/en/topic/publicprivatepartnerships/.

<sup>49</sup> Adie Tomer, Caroline George, Joseph W. Kane, and Andrew Bourne, "America Has an Infrastructure Bill. What Happens Next?," *The Avenue*, Brookings Institution (blog), November 9, 2021, https://www.brookings.edu/blog/the-avenue/2021/11/09/america-has-an-infrastructure-bill-what-happens-next/.

<sup>50</sup> Timothy Puko, "Bill Gates Pledges \$1.5 Billion for Infrastructure Bill's New Climate Projects," *Wall Street Journal*, August 12, 2021, https://www.wsj.com/articles/ bill-gates-pledges-1-5-billion-for-infrastructure-bills-new-climate-projects-11628769601.

<sup>51</sup> OECD, Pension Markets In Focus: 2021, https://www.oecd.org/daf/fin/private-pensions/Pension-Markets-in-Focus-2021.pdf; and Norman Anderson, "The Infrastructure Bill & Pension Funds: A \$3 Trillion Action Item," Forbes, June 21, 2021, https://www.forbes.com/sites/normananderson/2021/06/21/the-infrastructure-bill--pension-fundsa-3-trillion-action-item/?sh=7da8ae5749b1.

<sup>52</sup> Paula Sambo, "Canada Pension Fund Aims to Double Investment in Infrastructure," Bloomberg, June 18, 2021, https://www.bloomberg.com/news/ articles/2021-06-18/canada-pension-fund-aims-to-double-investment-in-infrastructure.



U.S. Vice President Kamala Harris speaks with a bus driver of an electric bus during a tour at the Charlotte Area Transit System facility, as Transportation Secretary Pete Buttigieg and North Carolina Governor Roy Cooper look on, in Charlotte, North Carolina, U.S. December 2, 2021. REUTERS/Chris Keane.

#### Growing supply-chain risks of critical metals and earth materials are threatening the health and resiliency of the US economy, and declining US FDI in sub-Saharan Africa is not helping.

As shown above, US FDI in sub-Saharan Africa (SSA) has been declining, while China's involvement in the region has been expanding. For example, the mining sector in SSA is heavily dominated by Chinese companies, and cobalt is a particularly illustrative case.<sup>53</sup> According to the US Department of Energy's Office of Energy Efficiency and Renewable Energy, the highest material supplychain risk for lithium-ion batteries and electric vehicles (EVs) is cobalt.<sup>54</sup> The strategic importance of cobalt and other critical materials needed for lithium-ion batteries for the US economy is highlighted in a recent White House report on supply-chain resilience, one-fourth of which is dedicated to large capacity batteries.<sup>55</sup> Referring to China's "Go Out" policy, the US report warns that through state-led and -supported FDI, Chinese firms have dominated the global cobalt mining and refining industry, which is mainly concentrated in a few SSA economies such as the Democratic Republic of the Congo (DRC) and Zambia.<sup>56</sup> Home to approximately 80 percent of the world's known cobalt reserves and accounting for more than 40 percent of global cobalt ore exports, the DRC

<sup>53</sup> Mohseni-Cheraghlou, "Development Finance."

<sup>54 &</sup>quot;Reducing Reliance on Cobalt for Lithium-ion Batteries," US Department of Energy, April 6, 2021, https://www.energy.gov/eere/vehicles/articles/reducingreliance-cobalt-lithium-ion-batteries.

<sup>55</sup> Deese and Sullivan, Building Resilient Supply Chains, The White House.

<sup>56</sup> Hongying Wang, A Deeper Look at China's "Going Out" Policy, Centre for International Governance Innovation, March 8, 2016, https://www.cigionline.org/ publications/deeper-look-chinas-going-out-policy/.

remains the largest player in the global cobalt market.<sup>57</sup> While China's presence in the DRC's cobalt mining industry has been increasing, with 40 to 50 percent Chinese ownership, the United States has been widely absent, risking the long-term resilience of US industries that are dependent on lithium-ion batteries, specifically the EV and renewable energy industries, which will be increasingly important as momentum builds to make the US economy more green.<sup>5859</sup>

The substantial involvement of the Chinese state in supporting FDI abroad has meant that US firms, lacking government support, are not able to compete with statebacked Chinese firms that are investing heavily in the energy, transport, real estate, minerals, and metals sectors in SSA, the Middle East, North Africa, and elsewhere.<sup>60</sup> This is one reason why the US FDI stock in SSA contracted by 21 percent in the last decade while Chinese investment in the region expanded rapidly. Therefore, in the absence of a government-led industrial strategy and state-backed targeted FDI in strategic SSA economies, US manufacturing—specifically the EV and renewable energy industries—will continue to face serious supply-chain risks and vulnerabilities. Some of these vulnerabilities could certainly be mitigated through increasing US FDI in allies' economies, such as Canada and Australia,<sup>61</sup> which have considerable mining operations (especially cobalt) and practices that are ethically and environmentally more conscious than companies operating in the DRC and other SSA countries. The heavy reliance on cobalt from SSA has brought about significant malpractices within

the supply chain: environmental pollution and human rights violations, such as child labor, in the region's cobalt industry have increased criticism from consumers demanding a supply chain free of these issues.<sup>62</sup> As a result, major industry actors are motivated to source cobalt from other countries, such as Australia and Canada. Yet the SSA's enormous share of the world's cobalt and other rare earth material reserves means the region will continue to play a central role in this industry for the foreseeable future. Reducing supply-chain risks is therefore tantamount to promoting FDI in strategic mining sectors in the SSA region.<sup>63</sup>

Given that large capacity batteries are central to some of the components of the 2021 bipartisan infrastructure law, it is not inconceivable that the federal government might also allocate funding, as part of the infrastructure spending, to secure a reliable supply base of rare earth materials needed for lithium-ion as well as next generation batteries.<sup>64</sup> Achieving this objective, as the White House report correctly recommends, requires the United States to work closely with its allies and partners to increase production of batteries and ensure reliable access to the necessary raw and refined materials.<sup>6566</sup> The recent Build Back Better World (B3W) initiative, which was launched by President Biden and G7 leaders in the latest G7 meetings in June 2021, could act as a platform for such future collaborations between the United States, the EU, and other allies, encouraging targeted international investment and strategic FDI in SSA economies that are rich in mineral and earth materials.<sup>67</sup> Launched in June 2019, the

<sup>57</sup> Alexander James Gaspar Simoes and César A. Hidalgo, "The Economic Complexity Observatory: An Analytical Tool for Understanding the Dynamics of Economic Development," in *Scalable Integration of Analytics and Visualization*, Papers from the 2011 Association for the Advancement of Artificial Intelligence (AAAI) Conference, Technical Report WS-11-17 (Menlo Park, California: The AAAI Press, 2011).

<sup>58</sup> Luiza Ch. Savage, "How America Got Outmaneuvered in a Critical Mining Race," *Politico*, December 2, 2020, https://www.politico.com/news/2020/12/02/china-cobalt-mining-441967.

<sup>59</sup> Portions of this issue brief were previously published as a blog by the author titled "Foreign Direct Investment: A New Strategy for the United States." https:// www.atlanticcouncil.org/blogs/foreign-direct-investment-a-new-strategy-for-the-united-states/

<sup>60</sup> Mohseni-Cheraghlou, Development Finance.

<sup>61</sup> Ernest Scheyder and Jeff Lewis, "Exclusive: U.S. Looks to Canada for Minerals to Build Electric Vehicles: Documents," Reuters, March 18, 2021, https://www. reuters.com/article/us-usa-mining-canada-exclusive/exclusive-u-s-looks-to-canada-for-minerals-to-build-electric-vehicles-documents-idUSKBN2BA2AJ; and Scarlett Evans, "Australia Cashes In on Cobalt," *Mining Technology*, March 8, 2021, https://www.mining-technology.com/features/australia-cashes-in-on-cobalt/.

<sup>62</sup> Dr. Ewelina Ochab, "Are These Tech Companies Complicit in Human Rights Abuses of Child Cobalt Miners in Congo?," *Forbes*, January 13, 2020, https://www. forbes.com/sites/ewelinaochab/2020/01/13/are-these-tech-companies-complicit-in-human-rights-abuses-of-child-cobalt-miners-in-congo?sh=6f5c0bbe3b17.

<sup>63</sup> Savage, "How America Got Outmaneuvered."

<sup>64</sup> Adie Tomer, Caroline George, Joseph W. Kane, and Andrew Bourne, "America Has an Infrastructure Bill. What Happens Next?," *The Avenue*, Brookings Institution (blog), November 9, 2021, https://www.brookings.edu/blog/the-avenue/2021/11/09/america-has-an-infrastructure-bill-what-happens-next/.

<sup>65</sup> Portions of this issue brief were previously published as a blog by the author titled "Foreign Direct Investment: A New Strategy for the United States." https:// www.atlanticcouncil.org/blogs/foreign-direct-investment-a-new-strategy-for-the-united-states/

<sup>66</sup> Deese and Sullivan, Building Resilient Supply Chains, The White House.

<sup>67</sup> The White House, "Fact Sheet: President Biden and G7 Leaders Launch Build Back Better World (B3W) Partnership," 2021, White House Briefing Room (website), https:// www.whitehouse.gov/briefing-room/statements-releases/2021/06/12/fact-sheet-president-biden-and-g7-leaders-launch-build-back-better-world-b3w-partnership/.

## Figure 3. Nexus of FDI, Infrastructure, and Supply-Chain Resiliency



United States' Prosper Africa initiative has been a step in the right direction,<sup>68</sup> and the Biden administration's recent revamping and rebooting of the program is a positive sign that US FDI in SSA will move into a new high gear.<sup>69</sup> It is important to also realize that China's growing economic activities and investments in SSA have meant greater Chinese presence in the region, with Beijing eying many SSA countries as potential political and military allies, posing serious geosecurity challenges for the United States and the EU in the long run. As a result, increasing US FDI in SSA could help to keep China's political and military ambitions in the region in check.<sup>70</sup>

#### State-backed investments in strategic industries must be part of a US FDI strategy for the remainder of the twenty-first century.

There is no doubt that the well-being of the US economy in the twenty-first century and beyond will depend greatly on a new industrial strategy through which the United States, with the help of its allies, would revitalize its infrastructure, strengthen its strategic supply chains, and increase its resilience. The government plays a central role in this new strategy. In the words of Director Deese, "the idea of an open, free-market global economy ignores the reality that China and other countries are playing by a different set of rules. Strategic public investment to shelter and grow champion industries is a reality of the twenty-first century economy. We cannot ignore or wish this away. That's why we need a new strategy." Traditional infrastructure (such as roads, ports, and utilities) and nontraditional infrastructure (such as highspeed broadband and semiconductors, and strategic rare earth materials including cobalt and lithium) are some of

the areas that US policymakers should prioritize to actively promote inbound and outbound FDI as part of United States' new industrial strategy for the second quarter of the twenty-first century.

Through the promotion of FDI and domestic investment in US traditional and nontraditional infrastructure, the US government would increase the productivity and competitiveness of the US economy. At the same time, US-backed investment in strategic sectors abroad would increase the resilience of the US economy and strengthen its supply chains. These approaches can work in tandem to increase growth, stability, and resilience in the US economy, and maintain the United States' appeal as the leading destination for further FDI (Figure 3).

It is time for the US policymakers to go back to the drawing table and identify specific areas and countries that are crucial for the United States to invest in to maintain its competitiveness—especially vis-à-vis China and at the same time increase its resilience against adverse events while also strengthening its supply chains. After all, industrial policy and state-backed strategic FDI are undeniable realities of our time.

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<sup>68</sup> US Agency for International Development, "Increasing Trade & Investment Between the U.S. and African Countries," Prosper Africa (initiative), USAID, https:// www.prosperafrica.gov/.

<sup>69</sup> Adva Saldinger, "Biden Administration Launches Reboot of Prosper Africa Initiative," Devex, July 29, 2021 https://www.devex.com/news/biden-administrationlaunches-reboot-of-prosper-africa-initiative-100490.

<sup>70</sup> Associated Press, "China's Africa Outreach Poses Growing Threat, US General Warns," Voice of America (website), May 6, 2021, https://www.voanews.com/a/ east-asia-pacific\_chinas-africa-outreach-poses-growing-threat-us-general-warns/6205496.html.



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