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Defining “Firm Nationality”

*An Exploration of the Modern Firm Within the Context of
United States-China Relations*

By

Cory Benjamin Sachs

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Submitted in partial fulfillment of
the requirements for
Honors in the Department of Political Science

UNION COLLEGE

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ABSTRACT

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The turn of the 21<sup>st</sup> century marked the beginning of a modern age in human history. As developing nations continued on their paths to industrialization, global markets became inter-connected, and large swaths of the people were lifted out of poverty throughout the world. As market demand increased due to the influx of new capital, new alliances between nations were drawn and the production of goods transformed.

In today's day and age, firms are more globally fragmented than ever before. Rarely do firms house all facets of production in one location and serve only one market; instead, production is separated to cheapen product cost and maximize efficiency. Though this practice is beneficial for the firms involved, it simultaneously complicates how nation's control markets and protect domestic industries. It is necessary for governments to properly determine firm nationality if they are to govern and regulate appropriately.

Throughout the Trump presidency (2016-2020), US-China relations were stressed as President Trump's "America First" protectionist trade policies clashed with China's attempts to become more self-sufficient. As the nations battled back and forth through a trade war, firms were caught in the middle, awaiting determinations of their fate which was decided based upon their perceived nationality. Accuracy in this process was crucial to limit the damage to markets that sanctions and tariffs would bring; there was little room for error. While sometimes the determination of a firm's nationality was simple, more often than not, it was complicated.

The recent conflict between the United States government, ARM Ltd. (ARM), and telecommunications giant Huawei is one such example that demonstrates the complexities of defining firm nationality. In May of 2019, the US government alleged that Huawei was a national security risk due to the thought that the Chinese government could use the equipment it produced to spy on American networks. Huawei repeatedly denied the allegations, but the United States stood firm and enforced sanctions, all but banning American companies from doing business with Huawei. This situation complicated Huawei's relationships with its suppliers, one of them being ARM.

ARM. specializes in the sale of internally developed intellectual property and is the primary designer of the CPU and GPU of Huawei's processors; its designs are used in 95% of the world's smartphones.<sup>1</sup> Without ARM, Huawei "would effectively be unable to produce new processors" and thus, would be unable to produce new phones.<sup>2</sup> While ARM is based in the United Kingdom (UK), it is owned by the SoftBank Group in Japan and has offices throughout the United States; it is truly a global firm.

Given that ARM believed some of its technology had originated in the United States, its leadership made the decision that the company fell within the extraterritoriality of US law and thus, that their firm was subject to adhering to the ban on selling technology to Huawei. In May of 2019, ARM officially cut ties with Huawei and opened an internal investigation into the matter. While the investigation was underway, Huawei's existence as a firm came into question. Without ARM's designs, Huawei's production of processors came to a halt, and the firm was

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<sup>1</sup> ARM Ltd., Accelerating Digital Immersion on Smartphones.

<sup>2</sup> Gartenberg, ARM Will Continue to License Chip Architecture to Huawei After All, *The Verge*, 2019.

pushed to the brink of disaster. Nearly five months later, ARM's leadership reversed its decision and continued its sale of IP to Huawei when it determined that the technology in its designs was, in fact, from the UK.

As can be seen from this dilemma, firm nationality can have real, potentially crippling implications for firms and broader market structures. Defining firm nationality is not just an academic exercise; rather, it has relevant policy implications. No matter the stances that the United States and China take going forward, it will be of vital importance that decisions are made while accurately considering firms' nationality.

## *CHAPTER ONE*

### *INTRODUCTION*

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Since the 1990s, vertically integrated firms have fragmented, and production “tasks” have been increasingly outsourced and internationalized. Most products are produced through complex networks of firms located around the world, but functionally integrated by “lead” firms that coordinate the value chains.³ This has created unprecedented levels of “interdependence” between countries, as national economies have become interwoven, blurring the boundaries of the national origin of firms and products. It is no longer possible to say that one product is “Made in Japan” or another is “Made in China.” To varying degrees, all products are “Made in the World.”

The fragmentation of production is particularly pronounced in high-tech industries because of the high levels of modularization that can be done. Modularity means that the interface between two components of a product is highly standardized, facilitating easy interoperability; lead firms concentrate on “creation, penetration, and defense of markets for end products,” while manufacturing takes place globally through various “turn-key suppliers.”⁴ This allows very complicated products to interoperate easily and transfer complex information through a simplified and standardized interface. A simple example of this is USB drives on one’s

³ Dicken, *Global Shift*, 2015, p. 50; Baldwin, *The Great Convergence*, 2016, p. 4.

⁴ Sturgeon, *Modular Production Networks: A New American Model of Industrial Organization*, 2002, p. 451.

computer, but similar examples occur in all areas of high-tech. Such modularization has not only facilitated increasing specialization and fragmentation, but it has also influenced the advent of contemporary “global value chains.” The fragmentation of the once domestic firm has clashed with increasingly nationalistic foreign economic and industrial policies and has led some countries to question the implications of a global economy; this has been especially true regarding China and the United States.

China has become one of the centers of modular production since the 1990s, which has arguably been the primary driving force of its very rapid economic and now technological development.⁵ China is no longer a “nation in despair,” but rather, through a combination of economic fundamentals, foreign investment, technology transfers, and government industrial policies, it has steadily “moved up the value chain” to higher value-added tasks.⁶

Over the last two decades, China’s rise to its current state as “the factory of the world” has coincided with an internally driven movement towards becoming technologically self-sufficient.⁷ With many of its existing industries being “low value add, energy-intensive, and highly polluting,” the Chinese Communist Party (CCP), under the rule of President Xi Jinping, has initiated *China Manufacturing 2025* (CM2025), a comprehensive, nationalistic plan to “upgrade its industrial base and to compete in more advanced market segments [worldwide].”⁸ Already possessing 20% of the total share of global manufacturing, CM2025 is the “first of a three-stage plan for establishing China as a leading global manufacturing power by 2049, the

⁵ Steinfeld, *Taking Industry Global*, 2010, p. 71.

⁶ Steinfeld, *Taking Industry Global*, 2010, p. 70.

⁷ European Chamber, *China Manufacturing 2025 Putting Industrial Policy Ahead of Market Forces*, 2017, p. 2,

⁸ *Ibid*, 3.

100th anniversary of the founding of the People's Republic of China.”⁹ Defining self-sufficiency as domestically sourcing “40 and 70 percent of both core components and key basic materials by 2020 and 2025 respectively,” CM2025 will require a drastic overhaul of existing infrastructure if it is to be successful.¹⁰

Fearing that CM2025, and other such policies, “may negatively affect American economic interests... inhibit United States exports, deprive United States citizens of fair remuneration for their innovations, divert American jobs to workers in China, contribute to our trade deficit with China, and otherwise undermine American manufacturing, services, and innovation,” the Trump administration launched an investigation into China’s practices under *Section 301 of the Trade Act of 1974*.¹¹ As a result of the inquiry, not only was CM2025 deemed to specifically target “ten strategic industries,” but the Chinese government was found to be funding the acquisition of American technologies through privately owned firms.¹² Considering these actions to be government attempts to undermine US control of markets, the United States began to form policies targeting Chinese firms. This has not only led to the politicization of companies such as Huawei, a Chinese multinational technology firm, but has led many to question how exactly the nationality of a firm is defined.

⁹ Ibid, 3, 8.

¹⁰ Office of the United States Trade Representative, Findings of The Investigation into China’s Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation Under Section 301 of the Trade Act of 1974, (2018), p.1-15.

¹¹ US Gov., Memorandum Addressing China’s Laws, Policies, Practices, and Actions Related to Intellectual Property, Innovation, and Technology, (2017), p.1-3

¹² Office of the United States Trade Representative, Findings of The Investigation into China’s Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation Under Section 301 of the Trade Act of 1974, (2018), p. ii.

The defining of firms by nationality assumes that in a highly globalized world, a firm's nationality can be easily determined, but it is not that simple. Given the increasing complexity of global value chains, the intertwining of firms, and the international flow of finances, it is becoming increasingly difficult to define the firm nationality. For instance, in the media, TikTok is branded as a 'Chinese' firm. While the headquarters is in Beijing under a company named Bytedance, its legal jurisdiction is the Cayman Islands, over 40% of it is owned by American venture capitalists, most of its executives are foreigners, including its most recent two CEOs (one left Disney to become CEO), and 100% of its sales come from outside China. Is this a Chinese firm?

This is no longer just a theoretical question. With the rise of economic nationalism in the US and China and technology tensions in full swing, both countries constantly target firms perceived to be threats. Thus, government policies require a clear set of criteria by which to define the nationality of a firm. If regulation of firms goes too far, it can be dangerous to markets as a whole, while on the other hand, if regulation is insufficient, existing value chains may be absorbed by other countries.

The nuance of this issue has inspired my thesis, which aims to examine a broad cross-section of high-tech firms that are nominally headquartered in China. My goal is to explore the degree to which high-tech firms can be considered "Chinese" across a range of categories, like ownership, geographic location, the nation of its executives' educations, etc. Combining data across chosen categories, I aim to identify factors that influence the degree to which firms should be considered Chinese. I hypothesize that firms closer to the Industries outlined in *China*

Manufacturing 2025, engaged in more leading-edge technologies (like AI), and targeted by Chinese industrial policy, will have more of the identified factors.

CHAPTER TWO

BACKGROUND

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This chapter aims to contextualize China's historical progression from a developing nation to a world superpower. Through a discussion of China's 20<sup>th</sup> century economic reforms, I aim to identify the most notable events contributing to China's growth and track the origins of the conflict between China and the United States.

#### ***2.1 CHINA'S REFORMS AND THE RISE OF A SUPERPOWER***

China's push for modernization came long before any attempt at self-sufficiency in technologies. Largely isolated for much of its history, China long sought to keep true to its traditions and separate itself from Western influence. Although China had abundant natural resources and a robust economy primarily revolving around agriculture throughout the 18<sup>th</sup> century, "internal crises and invasions by Western powers, Japan and Russia," in the 19<sup>th</sup> century lead to the opening up of its borders and its push for industrialization.<sup>13</sup> Recognizing the shortcomings of keeping itself isolated, China slowly began to accept that the most efficient path to development would be by "learning from the West."<sup>14</sup>

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<sup>13</sup> Huan, China's Open-Door Policy 1978-1984, 1986, p. 1.

<sup>14</sup> Ibid.

Aiming to enhance its military and economic development while remaining true to Chinese culture, in the early 20<sup>th</sup> century, China began a strategy dubbed “self-strengthening” and through it, sent students to industrialized nations, “introduced Western science into Chinese educational institutions,” and imported Western technologies in hopes of advancing.<sup>15</sup> Although the Chinese had hoped to limit broad foreign influence, over time, interactions with the West began to lead to outside investment and the opening up of Chinese markets to the rest of the world.

After a number of internal conflicts throughout the first half of the 20<sup>th</sup> century, in 1949, the Chinese Communist Party (CCP), led by Mao Zedong, took over control of China and renamed it the People’s Republic of China (PRC). Hoping to follow in the footsteps of the Soviet Union, which industrialized rapidly, the CCP closed China to the world and began a series of five-year plans intended to “facilitate industrial growth.”<sup>16</sup> After the *First Five-Year Plan* (1953-1957), which helped to urbanize Chinese cities, Mao instituted the *Second Five-Year Plan* (1958-1962), commonly referred to as the Great Leap Forward, in hopes of stimulating agricultural surpluses to provide for the growing populations in cities.

To procure the amount of food needed, the Chinese government seized private property and forced rural farmers to work together in communes for the common good. Although initially successful, this plan took a turn for the worse when famine struck from 1959-1961, and an estimated 30 million Chinese citizens perished.<sup>17</sup> The Great Leap Forward’s failure served as an

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<sup>15</sup> Ibid.

<sup>16</sup> Yeh, *Economic Transition and Urban Transformation of China: Interplay of the State and the Market*, 2015, p. 2.

<sup>17</sup> Smil, *China’s Great Famine: 40 Years Later*, 1999.

underpinning for the Cultural Revolution in the 1960s and the eventual implementation of the “Open Door Policy” in 1978.

Seeking to eradicate the “capitalist roaders in authority within the [CCP],” in 1966, Mao launched the Great Proletarian Cultural Revolution and, in doing so, a war against the Chinese people themselves.<sup>18</sup> Shutting down schools nationally, Mao called for the youths of China to rid the nation of the “Four Olds: old customs, old culture, old habits, and old ideas.”<sup>19</sup> Forming “paramilitary groups called the Red Guards,” young people joined together to fight back against “class enemies,” many of which were politicians, neighbors, and even family members; in total, an estimated 500,000 to 2,000,000 people were killed throughout China during this period, and another 20 million were banished. As a result, the Chinese economy was crippled, and “the living standards of the majority of the population” were reduced.<sup>20</sup> The Cultural Revolution came to an end in 1976 with Mao’s death, but its effects would be felt for years to come.

After Mao’s death, led by Deng Xiaoping, China undertook several massive reforms, most notably adopting the “Open Door Policy” in 1978. Attempting to repair the damage done in the decades prior and “under strong popular pressure to raise living standards and expand individual freedoms,” Deng elected to open China up to the rest of the world and to transform the economy from centrally-based to market-based.<sup>21</sup> Under Deng, Hong Kong was returned to China from the British, relations were established with the United States, and inflows of foreign

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<sup>18</sup> Chan, The Image of a “Capitalist Roder”-Some Dissident Short Stories in the Hundred Flowers Period, 1979, p. 78-85.

<sup>19</sup> History.com Editors, Cultural Revolution, *History.com* 2020.

<sup>20</sup> Huan, China’s Open-Door Policy 1978-1984, 1986, p. 1.

<sup>21</sup> Ibid.

direct investment were allowed to access China for the first time.<sup>22</sup> His leadership also propelled China's economic growth, increasing the GDP from \$185 Per Capita in 1977 to \$311 Per Capita at the end of his rule in 1987; over the same years, China grew from the "world's thirty-second ranked exporting country... to the world's thirteenth largest trading nation."<sup>23</sup>

After the end of Deng Xiaoping's rule, China continued its push towards modernization through its adoption of a Socialist Market Economy in 1992. This economic system is explicitly defined in Article 6 of China's Constitution:

"The basis of the socialist economic system of the People's Republic of China is socialist public ownership of the means of production, namely, ownership by the whole people and collective ownership by the working people... In the primary stage of socialism, the state upholds the basic economic system with public ownership remaining dominant and diverse forms of ownership developing side by side."<sup>24</sup>

Ensuring "the equity of society" through socialism while assuring economic efficiency through the market, this combination aims to capture the best of both systems while limiting their faults.<sup>25</sup> Coinciding with the creation Socialist Market Economy, China began to encourage domestic investment and ownership by the people through the opening of the Shanghai and Shenzhen Stock Exchanges in the early 1990s. A few short years later, the first Chinese firm, Shandong Huaneng Power Development Co Ltd, would be listed on the New York Stock

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<sup>22</sup> Issitt, Deng Xiaoping, 2006, p.2.

<sup>23</sup> MacroTrends, "China GDP Per Capita 1960-2021," *MacroTrends*; Lardy, Foreign Trade and Economic Reform in China, 1992, p. 2

<sup>24</sup> Ding, "The Socialist Market Economy: China and the World," 2009, p. 236.

<sup>25</sup> Ibid, p. 237.

Exchange. With capital flowing between individuals and firms throughout China, the nation had found the fuel that would power its growth over the following decades.

Simultaneous with China's economic growth was a newfound commitment to combatting poverty. Large scale poverty reduction in the post-1978 reform period had helped to halve China's poverty rate from "49 to 24 percent at the \$1/day income level in the 1980s" and reduce the number of rural poor from 250 million in 1978 to 125 million in 1985, measured at the official poverty line."<sup>26</sup> Although this progress slowed in the early 1990s and the poverty rate had stalled at about 18 percent, at the \$1/day level, the government quickly responded through its *8-7 National Poverty Reduction Program* (1994).<sup>27</sup> This program aimed to "lift the majority of the remaining 80 million poor above the government's poverty line, during the seven-years between 1994-2000, and was largely successful."<sup>28</sup>

China's emerging economy was not without state control; a broad state-strategy of *Grasping the Large and Letting go of the Small*, as discussed by Chang-Tai Hsieh and Zheng (Michael) Song, led to the government privatizing or closing small state-owned firms and merging larger, state-owned firms into large industrial groups under the control of the Chinese state."<sup>29</sup> This practice created many new and large firms that accounted for 23.2 percent of the industrial sector's aggregate growth from 1998-2007; although this control has somewhat faded, the state's footprint remains very large to this day.<sup>30</sup>

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<sup>26</sup> Sangui, Zhou, and Yanshun, *The 8-7 National Poverty Reduction Program in China*áo The National Strategy and Its Impact, 2004, p. 3.

<sup>27</sup> Ibid.

<sup>28</sup> Ibid.

<sup>29</sup> Hsieh and Zheng, *Grasp the Large, Let Go of the Small: The Transformation of the State Sector in China*, 2015, p. 1.

<sup>30</sup> Ibid, p. 3.



By the turn of the century, China had become a formidable force in the manufacturing market and, on December 2, 2001, was able to join the World Trade Organization (WTO).<sup>31</sup> Able to influence the price-setting of “manufactured goods in the world market,” and thus having the ability to “trigger a global deflation,” China had slowly become a world power.<sup>32</sup> To continue this growth, China launched the *Qualified Foreign Institutional Investor program* (QFII), which allowed approved foreign capital to be invested in China’s domestic securities market.<sup>33</sup>

With ample capital flowing into the country, China began its *Medium-to Long-Term Plan for the Development of Science and Technology* (2006), which called for it to become an “innovation-oriented society” by the year 2020, and a world leader in science and technology (S&T) by 2050.<sup>34</sup> To jumpstart this goal, China committed to raising gross research and development (R&D) expenditures to 2.5% of its Gross Domestic Product, limiting its dependence on foreign technology to no more than 30%, and becoming a world leader in the number of patents granted, by the year 2020.<sup>35</sup>

All in all, China’s internal decisions in the post-reform period led to it “growing at a nearly 10% average annual rate for three decades” and becoming the second-largest economy in the world since 2010.<sup>36</sup> Coming to power as the president of the PRC in 2013, Xi Jinping immediately enacted policies to continue this tremendous progress. Establishing the *One Belt One Road* initiative (2013), commonly referred to as the “Belt and Road initiative,” Jinping took

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<sup>31</sup>Yang, *China's Integration into the World Economy: Implications for Developing Countries*, 2013, p. 4.

<sup>32</sup> Ibid.

<sup>33</sup> Shenzhen Stock Exchange, About QFII.

<sup>34</sup> Cong, China’s 15-Year Science and Technology Plan, *Physics Today*, 2006.

<sup>35</sup> Ibid.

<sup>36</sup>Hsieh and Zheng, *Grasp the Large, Let Go of the Small: The Transformation of the State Sector in China*, 2015, p. 1.

a significant step to expedite China's push to become a global superpower. Aiming to "stimulate economic development by dramatically enhancing regional interconnectivity," the Belt and Road initiative aims to connect the landmasses of the world through "a dense network of both 'hard' and 'soft' infrastructure," all linked to China.<sup>37</sup> Although this project is a massive undertaking, in terms of both capital and time, if successful, it will be "one of the defining economic and political constructs of the first half of the 21st century" and solidify China's role on the world stage.<sup>38</sup>

*China Manufacturing 2025*, in combination with the Belt and Road initiative, is China's plan to exploit the global nature of today's markets. Targeting advanced information technology (IT); robotics and automated machine tools; aircraft and aircraft components; maritime vessels and marine engineering equipment; advanced rail equipment; new energy vehicles; electrical generation and transmission equipment; agricultural machinery and equipment; new materials; and pharmaceuticals and advanced medical devices, China is hoping to take control of its destiny and no longer be reliant on external nations.<sup>39</sup> Though these goals are undoubtedly lofty, if China can become self-sufficient in the identified industries and put in place the global infrastructure to facilitate quick, easy trade, its growth potential is nearly limitless.

As discussed earlier, China has been met with a great deal of pushback from the United States regarding its plans. As has been seen throughout history, there can only be one true world

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<sup>37</sup> Rolland Nadege, China's "Belt and Road Initiative": Underwhelming or Game-Changer? *Washington Quarterly*, 2017, p. 2.

<sup>38</sup> Ibid.

<sup>39</sup> Office of the United States Trade Representative, Findings of The Investigation into China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation Under Section 301 of the Trade Act of 1974, (2018), p. ii.

superpower, and the United States is not willing to give up that title without a fight. Though many questioned the effectiveness of the Trump administration's tariffs and rhetoric towards China, it is undeniable that overall, a great deal of effort was spent attempting to protect American industries and consumers. Many believed this would change when Joe Biden was elected president, given the nature of his past relations with China, but it does not seem like that will be the case.

On January 31<sup>st</sup>, 2021, President Biden reaffirmed the United States' commitment to protectionism with an expansion of The Committee on Foreign Investment in the US's (CFIUS) powers. A tool commonly used by the Trump administration, CFIUS's role is primarily to review foreign investments in US companies and real estate for potential national-security risks. With Biden hiring additional personnel for the committee, and the team's "sights on venture-capital investments, even small-dollar deals, where the money can be traced back to China," it seems that tensions will continue to rise into the foreseeable future.<sup>40</sup> In a sense, the United States and China's individualistic policies are shying away from globalization and turning back to the nationalistically-driven global framework of the early 20<sup>th</sup> century.

As CFIUS continues to look into Chinese investments in the United States, it must question if it is acting in a way that makes sense and if its perception of Chinese firms is correct. With such large amounts of capital flowing into the United States from China, by investors looking to grab intangible intellectual property, and likewise from the United States into China, by investors looking to find the next Alibaba, the lines are now more blurred than ever in regards

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<sup>40</sup> Somerville, "Government 'SWAT Team' Is Reviewing Past Start-up Deals Tied to Chinese Investors," *WSJ*, 2021.

to what constitutes the nationality of a firm. With firms currently existing in numerous capacities and forms, a deeper dive must be taken to determine what nation each firm truly belongs to. A proper model for defining firm nationality is essential to track China's progress and to ascertain whether or not the United States' response will be successful.

## ***CHAPTER THREE***

### ***METHODOLOGY***

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This chapter explains the general process involved in the collection of my data. Any info collected throughout this process is openly obtainable and can be manipulated to recreate my results by following the steps I lay out in Chapter Four.

3.1 RETRIEVING MY DATA

Hoping to find a way to properly define firm nationality, I received funding to access the investment database Crunchbase. Crunchbase sources data from “more than 3,500 global investment firms that submit monthly portfolio updates” in hopes of “democratizing the way investors access opportunity.”⁴¹ This relationship ensures Crunchbase has firsthand access to the most up-to-date information regarding companies including, their locations, funding rounds, and investors. Crunchbase also utilizes artificial intelligence and machine learning algorithms to validate data accuracy, scanning for anomalies, and alerting their data science team of conflicts in the data.

Although Crunchbase’s data was extremely useful, some missing pieces would have been useful to analyze; specifically, the exact investment amounts that hedge funds hold in specific

⁴¹ Crunchbase, Our Mission, <https://about.crunchbase.com/about-us/>

companies. This lack of data is not entirely their fault, as early funding rounds in private companies are not required to be disclosed to the public. Though this data would have helped, I made do without it.

Looking to study Chinese firms on the Crunchbase database, I narrowed the list of all firms by location of headquarters in China to end up with a list of 30,462 individual entities. I then compressed this search further by filtering out all firms with under 51 employees; this made my list into one of 12,921 primarily large, valuable companies. With this list constructed, I then used Crunchbase's download tools to download the data of the lead five investors in each of these firms; this metric is determined by the value of the funding rounds each investor has taken part in.

With a list of these names compiled, I filtered out all duplicates and ranked the remaining 6,411 investors by the number of times they were listed as a lead five investor. I cut this list to the final list that I choose to explore. It was 80 investors, which constituted 30% of the total number of lead investors. I assumed that companies that are most frequently named as lead investors have also made the most significant investments in terms of capital.

With my data set clean and ordered, I once again used Crunchbase's search feature to individually download the investment data for all 80 of these investors. With all of these investments compiled into one data processing document, I began to explore the data to find defining characteristics for firm nationality, insights into the nature of start-up markets in the US and China, and insights into markets globally.

CHAPTER FOUR

EXPLORING THE DATA

In this chapter, I aim to display the complications surrounding firm nationality. After identifying that many investors that appear Chinese may be American, I track capital flows and compare the investors' founding location to their headquarters location; this shows that even the most popular tools for defining nationality do not work as intended. I then look into China's largest firms' executive boards to identify trends in education and nationality.

4.1 HQ LOCATION VS. FOUNDING LOCATION OF ALL INVESTORS

To begin the exploration of my data set, I first looked to track the path of capital by ranking the locations by investor density. To do this, I sorted the investments by which city was listed as their investors' founding headquarters (HQ). I then ranked the list by the number of times each location was listed as an HQ location.



Figure 4.1: A ranked chart of the locations with the highest density of investor headquarters.

Source: *Crunchbase*.

China, Beijing	5792
USA, California, Menlo Park	2771
China, Shanghai	1946
China, Shenzhen	1804
New York, New York	1556
USA, California, Santa Clara	1309
Hong Kong, Hong Kong	906
China, Zhejiang	544
Singapore	422
USA, California, San Diego	408
USA, California, Palo Alto	349
China, Liaoning, Chaoyang	147
USA, MA, Boston	93
China, Jiangsu, Nanjing	65

Table: 4.1: A table with the sums of investor headquarters in each city as of January 2021.

As shown in Figure and Table 4.1, the location with the highest density of investor headquarters out of my sample was by far Beijing, China, with 5,792 HQs. This was followed by the American site with the highest investor HQ density, Menlo Park, California, with 2,771 investor HQs. Out of the 12 locations with the highest investor HQ density, seven were located in China, totaling 11,204 HQs, six were found in the United States, totaling 6,486 HQs, and one was located in Singapore, totaling 422 investor HQs. It is important to note that out of the six locations in the United States, five were located in California, making up 4,837 of the total 6,486 American Investor HQ locations.

Defining firm nationality solely by Investor HQ would be extremely useful had globalization never occurred, but with tax implications essentially dictating investor HQ decision making, this metric is not helpful without greater context; this data does not entirely accurately track capital because it does not take into consideration investors who may be investing through shell companies or under the umbrella of a larger entity. An example of this is Sequoia Capital China; although Sequoia Capital China's headquarters is technically located in Beijing, China, the firm is a subsidiary of the larger Sequoia Capital, which was founded and is currently located in Menlo Park, California. For this reason, I needed to refine my data to better account for these alternative investor structures.

To more accurately get a picture of capital flow paths, I used Crunchbase and investor relations sites to compile a list of all the investors' founding HQ locations. Although some of these locations may have moved over the years, in general, the founding location gives the initial

source of the capital behind the firm. I then ran the same sort and rank function on this new data set.

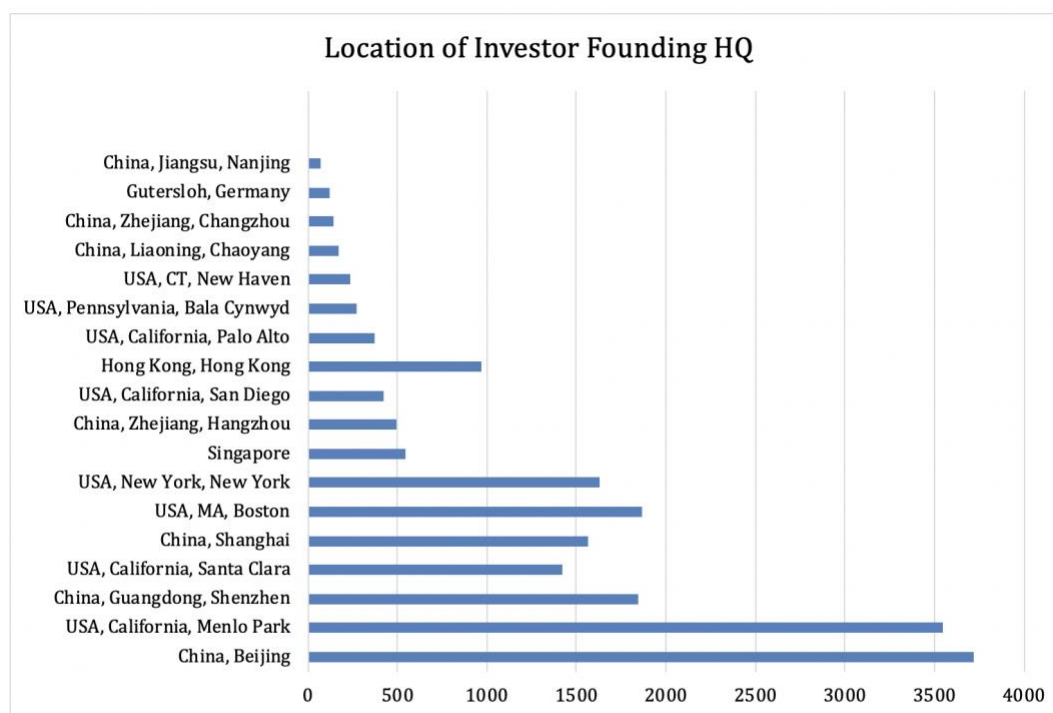


Figure 4.2: A ranked chart of the locations with the highest density of investor founding.

Source: *Crunchbase*.

China, Beijing	3720
USA, California, Menlo Park	3544
China, Guangdong, Shenzhen	1845
USA, California, Santa Clara	1419
China, Shanghai	1568
USA, MA, Boston	1868
USA, New York, New York	1631
Singapore	543
China, Zhejiang, Hangzhou	492
USA, California, San Diego	421
Hong Kong, Hong Kong	971
USA, California, Palo Alto	371
USA, Pennsylvania, Bala Cynwyd	275
USA, CT, New Haven	238
China, Liaoning, Chaoyang	170
China, Zhejiang, Changzhou	140
Gutersloh, Germany	124
China, Jiangsu, Nanjing	73

Table: 4.2: A table with the sums of investor founding headquarters, per city, as of January 2021.

As can be seen in Figure and Table 4.2, although many of the locations of investor founding HQs are the same as their listed HQ location, there are some noticeable differences. Confirming my broader suspicions, it seems as though many investors are using alternative structures to ground their investments. Compared to the earlier investor location HQ data, there are notably nearly 2,000 fewer investors located in Beijing, China, about 800 more investors in Menlo Park, California, and nearly 1,800 more investors located in Boston, MA. There is some variance from practically all of the earlier numbers, but much of it is not particularly evident, with changes of less than 200 investors in almost all instances.

This new data gives a broader sense of where the capital for the investors is coming from; out of the 18 locations listed, eight are from China, which totaled 8,979 HQs, eight are from the United States, which totaled 9,767 HQs, one is from Hong Kong, which totaled 971 HQs, and one is from Germany, which totaled 124 HQs. Although at first glance, one would see these investors as primarily Chinese due to their headquarters location, as can be seen, this is not the case; the United States is the largest source of capital for many of the investors on the list.

4.2 *PRIMARY NATIONALITY OF THE INVESTMENTS*

With knowledge regarding investors' backgrounds, I then began to explore their investments collectively. I used the list of investments that I had filtered by location to add and calculate, as a whole, whether the investors' investments primarily fell in the United States or China. This was done by separating and adding the total amounts of USD raised in China and the United States in the funding rounds that the investors took part in. I assumed that whichever

location had the higher value in USD would represent the primary country of focus for the investor data set as a whole.

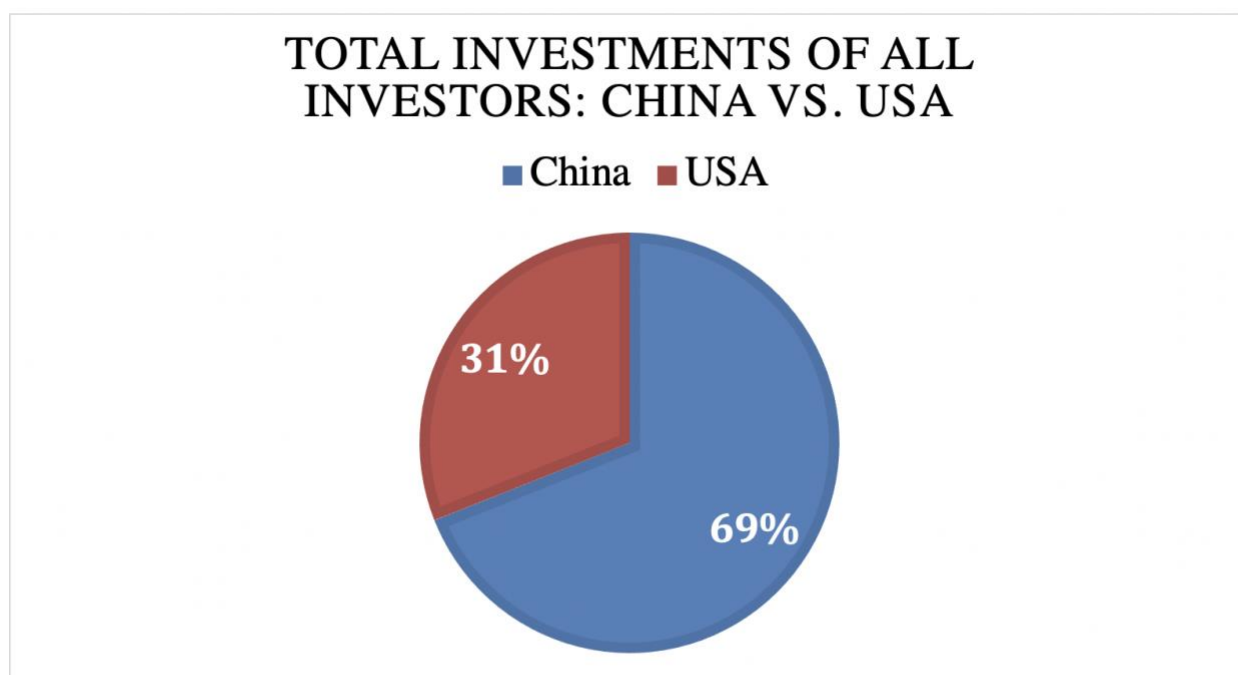


Figure 4.3: A pie chart comparing the locations of the investments, US v. China.

Source: Crunchbase.

China	\$3,011,290,000,000.00
USA	\$1,353,525,541,845.00

Table 4.3: A table with the values of US vs. China investments in the data set as of January 2021.

With a total amount of funding more than double that of firms in the United States, in the dataset, the Chinese firms are clearly attracting absorbent amounts of capital. Figure and Table 4.3 show that investors' primary focus, which is 69% of their total amount of funding, is on Chinese firms.

4.3 ***MOST COMMON TYPES OF FUNDING USED IN INVESTMENTS***

Knowing investors' broad focus, I then began to look into the methods of funding used in the investors' investments. To do this, I populated a list that summed the number of times a type or series of funding was used; for example, if Firm A had participated in angel funding, a Series A round, and a Series B round, each would be counted on my list.

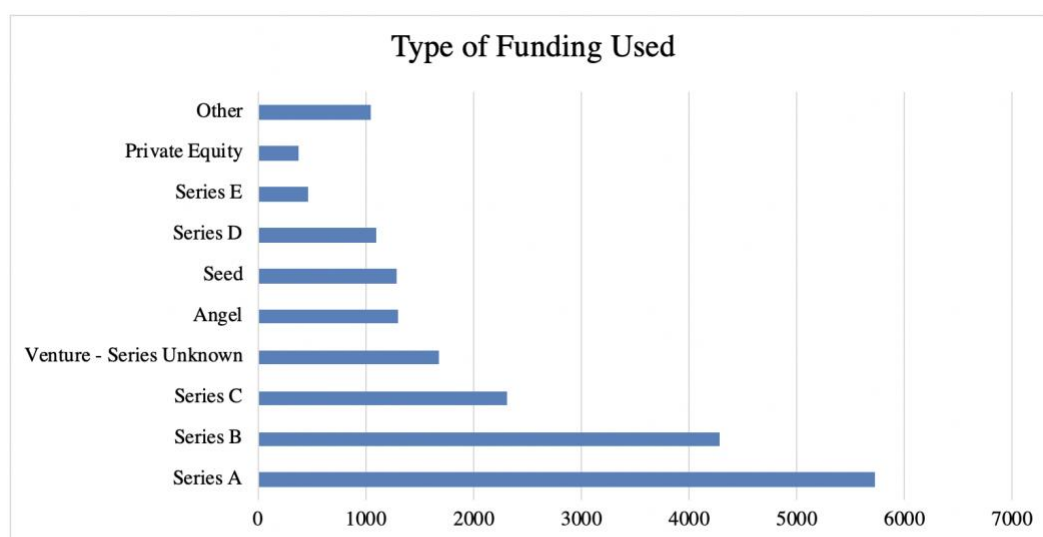


Figure 4.4: A pie chart comparing the types of funding used.

Source: *Crunchbase*.

Series A	5723
Series B	4280
Series C	2313
Venture - Series Unknown	1678
Angel	1292
Seed	1283
Series D	1091
Series E	468
Private Equity	369
Other	1049

Table 4.4: A table with the sums of investment types used in the dataset.

As one would expect and as is shown in Figure and Table 4.4, series A and B funding rounds dominated the data due to the typical progression, alphabetically, of funding rounds. The lesser presence of C, D, and E funding rounds showed that not all of the investors' investments were solely in start-ups; a portion of their capital was funding later-stage ventures. Interestingly, the quantities of angel and seed investments were nearly identical, while both far outpaced private equity investments.

4.4 HQ LOCATION VS. FOUNDING LOCATION OF INVESTORS IN CHINESE-BASED FIRMS

With a better understanding of how exactly the investors were financing their investments, I then broke down the investments into two subsets based on whether their HQ was located in the United States or China. I did this to explore if there were any variances in investor nationality, dependent upon the country the investment was made in. Focusing on China first, I took the list of all of the investors' investments and filtered out all locations not located within China. I then followed the same steps as my initial investor HQ search and compiled a ranked list of the most common HQ locations for investors in Chinese firms.



Figure 4.5: A ranked chart of the locations with the highest density of investor headquarters for investors in Chinese firms.

Source: *Crunchbase*.

China, Beijing	5423
China, Shanghai	1712
China, Guangdong, Shenzhen	1704
USA, California, Menlo Park	693
China, Zhejiang	512
USA, California, Palo Alto	278
Hong Kong, Hong Kong	437
China, Liaoning, Chaoyang	159
Hong Kong, Kowloon, Kowloon City	147
USA, New York, New York	164
USA, California, Santa Clara	111
Singapore	97
USA, MA, Boston	84
China, Jiangsu, Nanjing	70
USA, California, San Diego	50

Table 4.5: A table with the sums of headquarters, per city, for investors in Chinese firms, as of January 2021.

As was expected, given my previous findings regarding discrepancies between HQ location and the true origin of capital and as is shown in Figure and Table 4.5, HQs in China were most common for investors in Chinese firms. Out of the 14 top locations, seven were located in China, totaling 10,164 of the HQs, six were found in the USA, totaling 1,380 HQs, and one was located in Singapore, totaling 97 HQs. With this information, I then performed the same sort and rank of the investors in Chinese firms, but for that search, I used the investors' founding locations to better account for where the capital was coming from.

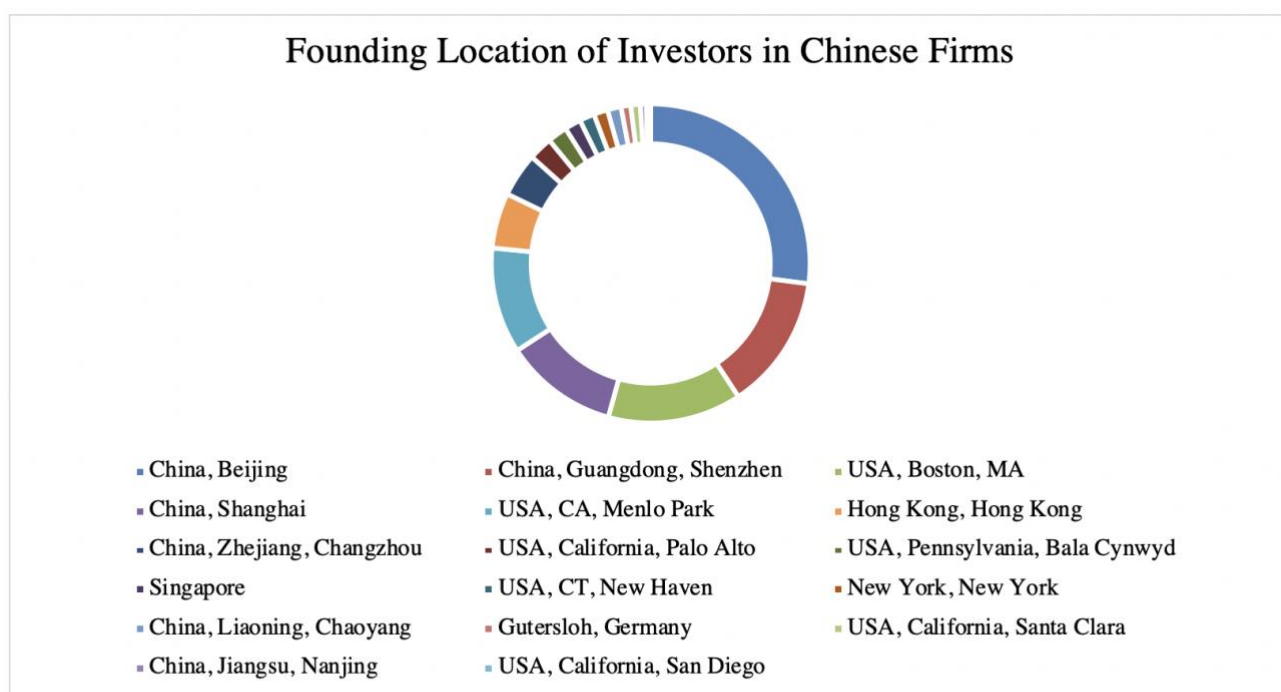


Figure 4.6: A ranked chart of the locations with the highest density of founding for investors in Chinese firms.

Source: *Crunchbase*.

China, Beijing	3113
China, Guangdong, Shenzhen	1576
USA, Boston, MA	1562
China, Shanghai	1326
USA, CA, Menlo Park	1237
Hong Kong, Hong Kong	647
China, Zhejiang, Changzhou	512
USA, California, Palo Alto	278
USA, Pennsylvania, Bala Cynwyd	230
Singapore	190
USA, CT, New Haven	175
New York, New York	164
China, Liaoning, Chaoyang	159
Gutersloh, Germany	113
USA, California, Santa Clara	111
China, Jiangsu, Nanjing	70
USA, California, San Diego	50

Table 4.6: A table with the sums of founding headquarters, per city, for investors in Chinese firms, as of January 2021.

As is shown in Figure and Table 4.6, China also dominated the founding location of many of the investors, though by not as large of a margin. Out of the 17 areas listed, seven were located in China, totaling 7,403 HQs, eight were found in the United States, totaling 3,807 HQs, one was located in Singapore, totaling 190 HQs, and one was located in Germany, totaling 113 HQs. The most significant differences in HQ density came in Beijing, China, which had nearly 2,300 fewer investor HQs than in the search prior, in Boston, MA, which had about 1500 more HQs, and in Menlo Park, CA, which had nearly 550 more HQs, the other locations were relatively stable with a less than 400 HQ margin difference between both searches. Although at first glance a firm may have its HQ located in China and its capital may seem to be Chinese, making it appear as a Chinese firm, in reality, the capital is often coming from the United States;

this blurs the lines of what nationality the firm should be considered as. This example explicitly shows the ambiguities regarding firm nationality; if a firm's location differs from the source of its capital, how should it be considered?

4.5 *HQ LOCATION VS. FOUNDING LOCATION OF INVESTORS IN UNITED STATES-BASED FIRMS*

Having a general understanding of the nationality of Chinese firms, I then performed the same search on firms based in the United States to see if the trend held up. For this search, I filtered out all investments not located in the United States and then ranked and sorted the remaining firms by the HQ location density of their investors.



Figure 4.7: A ranked chart of the locations with the highest density of investor headquarters for investors in United States firms.

Source: *Crunchbase*.

USA, California, Menlo Park	1871
USA, California, Santa Clara	951
New York, New York	925
China, Beijing	583
USA, California, San Diego	233
China, Shanghai	209
Singapore	176
China, Guangdong, Shenzhen	143
USA, California, Palo Alto	72
Hong Kong, Hong Kong	47
China, Zhejiang, Changzhou	35
USA, MA, Boston	10
China, Liaoning, Chaoyang	4
China, Jiangsu, Nanjing	1

Table 4.7: A table with the sums of headquarters, per city, for investors in United States firms, as of January 2021.

Figure and Table 4.7 demonstrate that for firms that have their HQ located within the United States, their investors are also primarily headquartered within the United States. Of the 14 locations listed, six were located within the United States, totaling 4,062 HQs, seven were located in China, totaling 1,022 HQs, and one was found in Singapore, totaling 176 HQs. Given the aforementioned concerns of the United States regarding technology theft by China, with four times as many United States-based investors as Chinese-based ones, this data did not seem entirely correct. To confirm my assumption, I once again ran the same sort and rank on the United States investment list, but this time, I used the investors' founding locations.

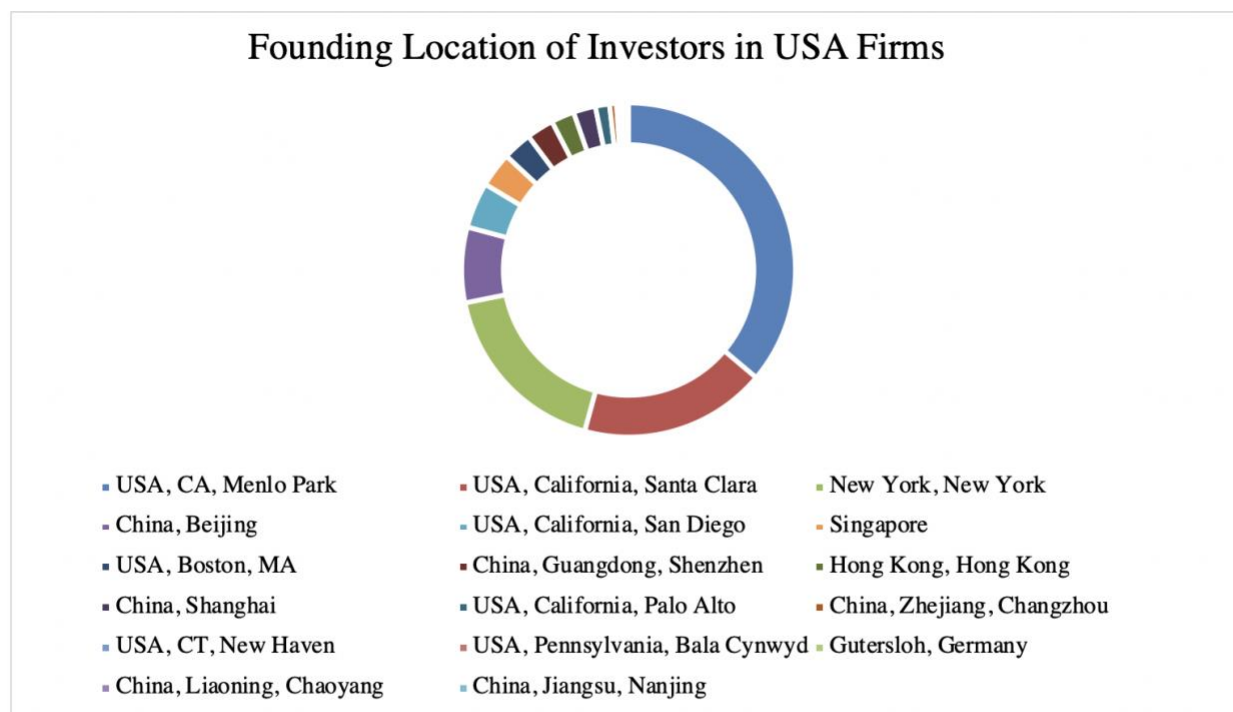


Figure 4.8: A ranked chart of the locations with the highest density of founding for investors in USA based firms.

Source: *Crunchbase*

USA, CA, Menlo Park	1900
USA, California, Santa Clara	951
New York, New York	925
China, Beijing	384
USA, California, San Diego	233
Singapore	177
USA, Boston, MA	148
China, Guangdong, Shenzhen	139
Hong Kong, Hong Kong	118
China, Shanghai	113
USA, California, Palo Alto	72
China, Zhejiang, Changzhou	35
USA, CT, New Haven	25
USA, Pennsylvania, Bala Cynwyd	24
Gutersloh, Germany	7
China, Liaoning, Chaoyang	4
China, Jiangsu, Nanjing	1

Table 4.8: A table with the sums of founding headquarters, per city, for investors in United States firms, as of January 2021.

As can be seen in Figure and Table 4.8, upon completing the investor founding location density rank and sort, there was very little difference from the initial search of the United States-based firms' investors. While I had initially thought that many more of the United States headquartered investors would be funded by Chinese money, that did not turn out to be the case. Out of the 17 locations listed, the United States had eight locations, totaling 4,278 investor founding HQs, China had seven locations, totaling 794 HQs, Singapore had one location, totaling 177 HQs, and Germany had one location, totaling 7 HQs. Rather than even a small increase, as I had predicted, the number of Chinese-based investors decreased slightly when considering founding location.

It is important to note, given how I went about collecting the data, that these numbers do not necessarily represent the broader array of investors in United States-based firms. With the investments I analyzed being those of the lead five investors initially compiled, and knowing their China focus, it makes sense that my search would not capture the entirety of Chinese investments within the United States.

4.6 *CM2025 INDUSTRIES*

Turning away from capital flows, I began to focus specifically on CM2025 industries within the investment data. Given that China's focus has been primarily on developing CM2025 industries over the past ten years, I sought to investigate how the 80 lead investors behaved within the Information Technology; Pharmaceuticals and Advanced Medical Devices; Transportation; New Energy; Robotics; Agricultural Machinery and Equipment; Advanced

Materials; Electrical Generation and Distribution fields. I also wished to see if there was any variance in this behavior, whether it occurred in the United States or China.

Initially looking within China, I sorted the data by location so that all non-China-based investments were excluded. Then, utilizing the “Organization Industry” search feature of my data set, included by Crunchbase in my initial download, I sorted for the CM 2025 industries by their names.

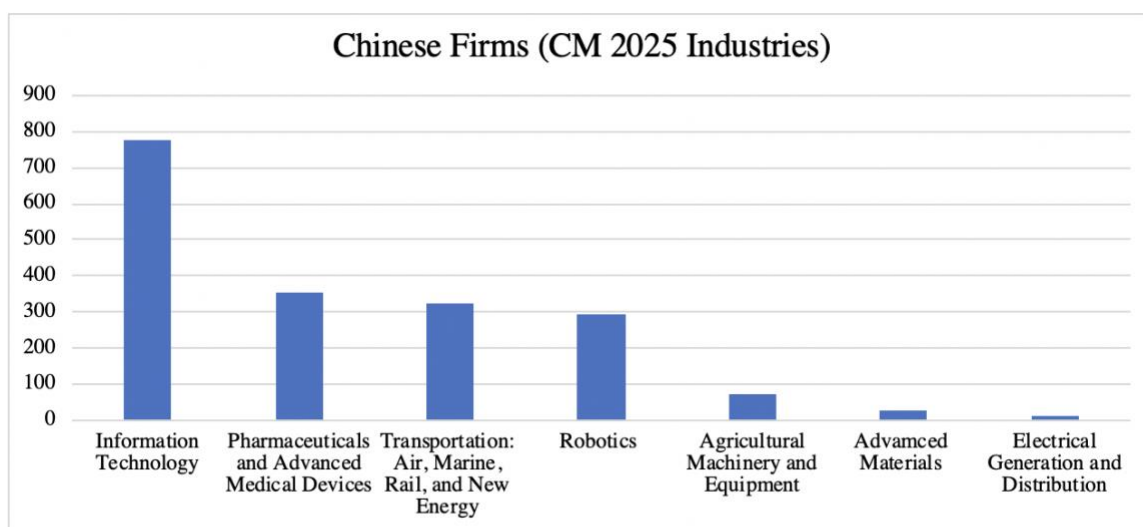


Figure 4.9: A bar graph comparing CM2025 industries within China.

Source: *Crunchbase*

Information Technology	777
Robotics	293
Transportation: Air, Marine, Rail, and New Energy	323
Electrical Generation and Distribution	11
Agricultural Machinery and Equipment	74
Advanced Materials	25
Pharmaceuticals and Advanced Medical Devices	352

Table 4.9: Sum of CM2025 industry-based firms, located in China, in the dataset.

As is shown in Figure and Table 4.9, out of the firms located within China, 1,855 fell under the CM2025 industry umbrella. While Information Technology was by far the most dominant field, with 777 firms, Pharmaceuticals and Advanced Medical Devices, Transportation, and Robotics were all similar in their number of firms, each around 300, and were followed by Agricultural Machinery and Equipment, Advanced Materials, and Electrical Generation and Distribution, each of which had less than 100 firms. Although investor specialization may have influenced my results, as was expected, China is well on its way to becoming self-sufficient in CM2025 industries.

With a solid grasp of the landscape of CM2025 industry firms China in my data set, I began to look at the investors' investments within the United States. Given the public outcry by United States government officials regarding technology theft and current protectionist policies, I expected a strong presence of CM2025 industries within the United States firms. For this search, I sorted the data by location so that all non-United States-based investments were excluded and then sorted for the CM2025 industry-labeled firms.

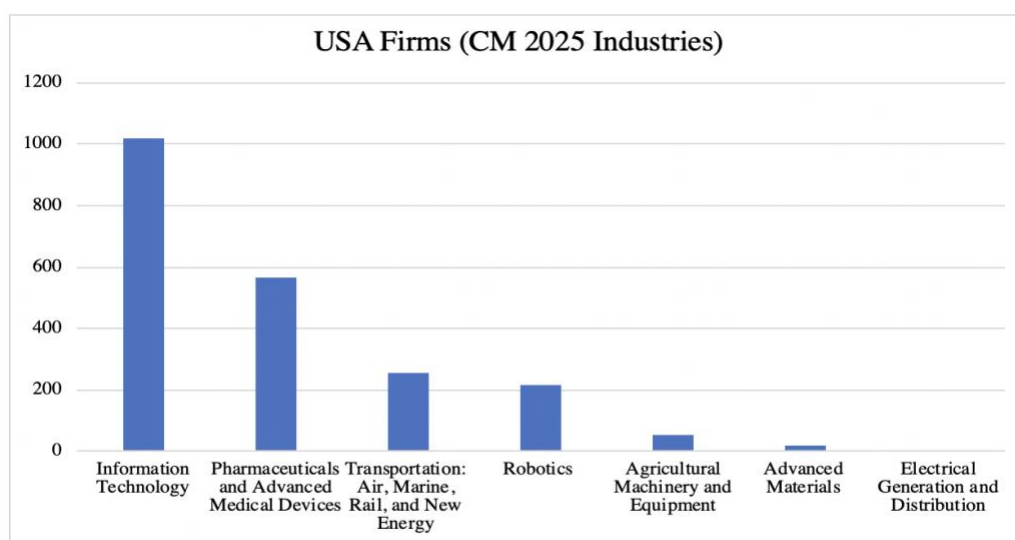


Figure 4.10: A bar graph comparing CM2025 industries within the United States.

Source: *Crunchbase*

Information Technology	1017
Pharmaceuticals and Advanced Medical Devices	565
Transportation: Air, Marine, Rail, and New Energy	255
Robotics	216
Agricultural Machinery and Equipment	54
Advanced Materials	19
Electrical Generation and Distribution	5

Table 4.10: Sum of CM2025 industry-based firms, located in the United States, in the dataset.

Figure and Table 4.10 show that out of the United States-based firms, 2,131 were considered part of a CM2025 industry. Overall, the proportion of firms in each field were very similar throughout the United States and China, although the exact numbers were slightly varied. Information Technology once again led the pack, with around 300 more firms than China, following next was Pharmaceuticals and Advanced Medical Devices, with nearly 200 more firms than China. Transportation and Robotics once again had very similar numbers, which both were less than in China, but within 100 firms. The remaining fields, Agricultural Machinery and Equipment, Advanced Materials, and Electrical Generation and Distribution, all also had slightly lesser numbers than their equivalents in China but were each within 20 or fewer firms.

Given these results, it seems that United States' concerns over theft in CM2025 industries may be warranted. With the 80 lead investors being substantially invested in these industries, in both the United States and China, there is a reasonable case to be made that technology and intellectual property are legitimately being transferred from one nation to the other. More research is necessary to reach an official conclusion regarding this matter, but given CFIUS's

new orders, it seems likely that actions will be taken to prevent illegal transfers in the coming years.

4.7 EDUCATION OF EXECUTIVES

China's goal of becoming technologically self-sufficient poses several questions regarding what self-sufficiency truly means. At the most basic level, China is attempting to build the CM2025 industries and supply chains domestically, thus, making them geographically Chinese, but in terms of ownership, the issue is much more political and unclear, especially regarding the education of executives. To dig into the theoretical implications of a ban on executives being educated in the United States, I looked into the educational backgrounds of executives at the largest firms located within China. To do this, I first filtered out all non-China-based firms in my dataset and then ranked the remaining firms by Money Raised (USD).

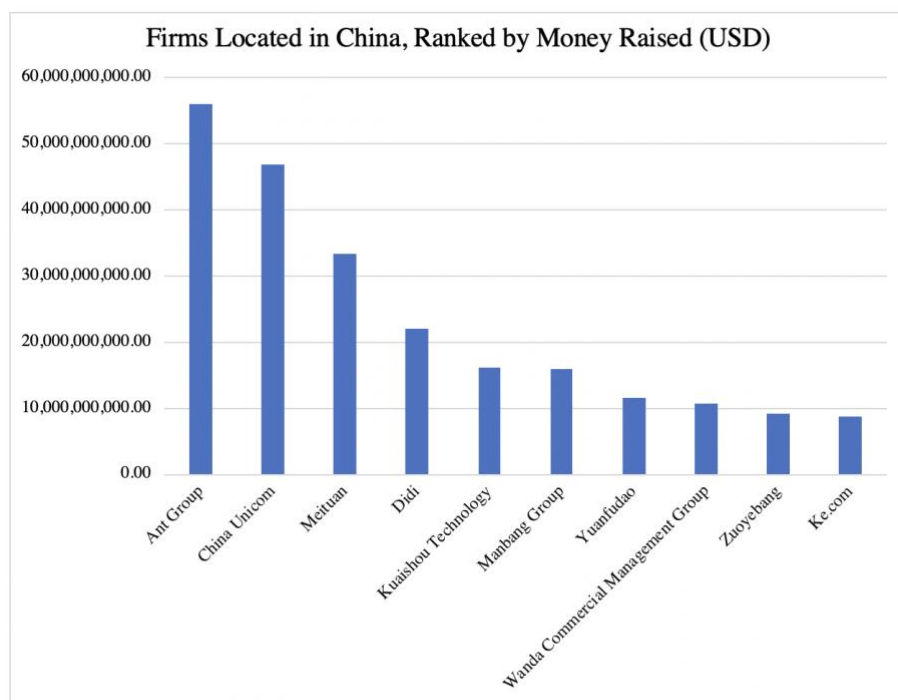


Figure 4.11: A bar graph comparing the largest firms within China.

Source: *Crunchbase*

Ant Group	56,000,000,000.00
China Unicom	46,800,000,000.00
Meituan	33,200,000,000.00
Didi	21,903,000,000.00
Kuaishou Technology	16,090,000,000.00
Manbang Group	15,900,000,000.00
Yuanfudao	11,554,000,000.00
Wanda Commercial Management Group	10,730,646,568.00
Zuoyebang	9,130,000,000.00
Ke.com	8,802,538,240.00

Table 4.11: Largest firms in China, ranked by money raised in USD, in the dataset.

With a list of the largest firms in China compiled, I then went back onto Crunchbase and used the “People” search feature to identify each company’s executives and their educations. Although I had hoped to find at least two senior executives for each firm, the available information was somewhat limited, and I could not find information for all of the firms. To combat this problem, I included additional executives from the other firms; altogether, I looked into the educations of 26 individuals.



Figure 4.12: A bar graph comparing the educations of Chinese firm executives.

Source: *Crunchbase*

As can be seen in Figure 4.12, the educations of the executives spanned a wide variety of schools. While most schools only had one executive who attended their institution, Beijing University of Posts and Telecommunications had two, and Tsinghua University boasted a whopping four executives. With my list of executives' schools compiled, I then began to explore how United States educational institutions compared to Chinese ones, in terms of numbers of executives who attended each, and to see if any specific locations dominated the pack. Although many of the schools' locations were intuitive given their names, to be accurate, I utilized Google to add the exact locations of the schools to my data.

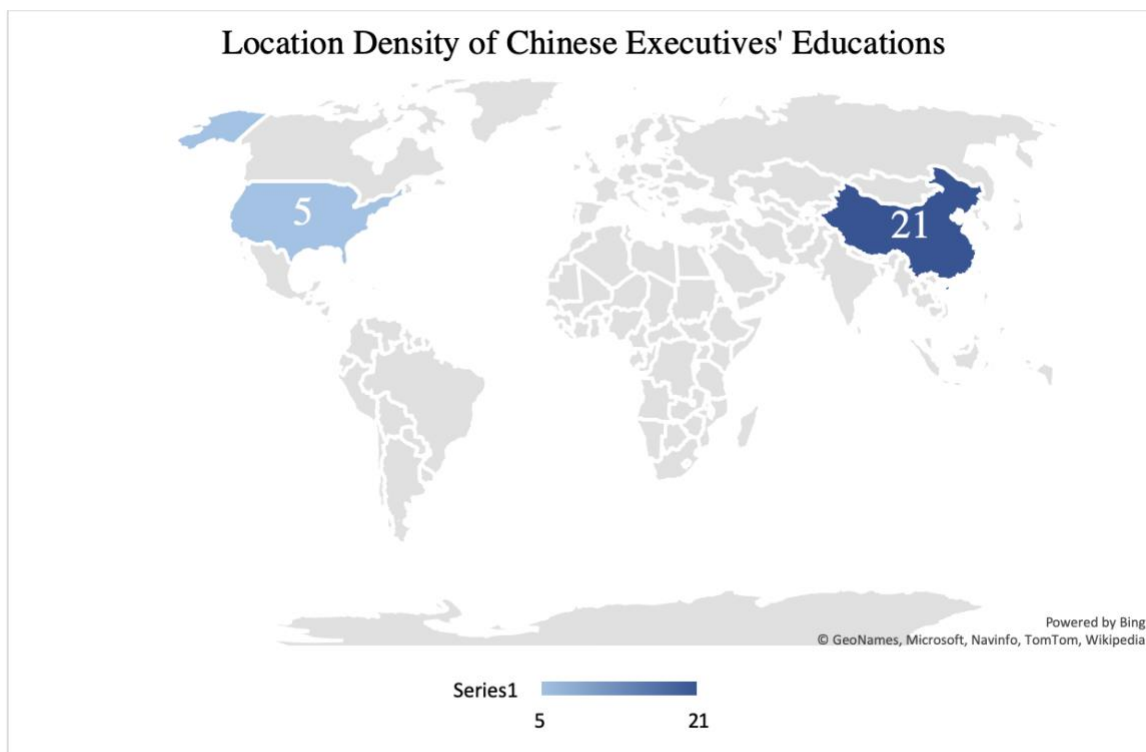


Figure 4.13: A map comparing the locations of Chinese executives' educations.

Source: *Crunchbase*

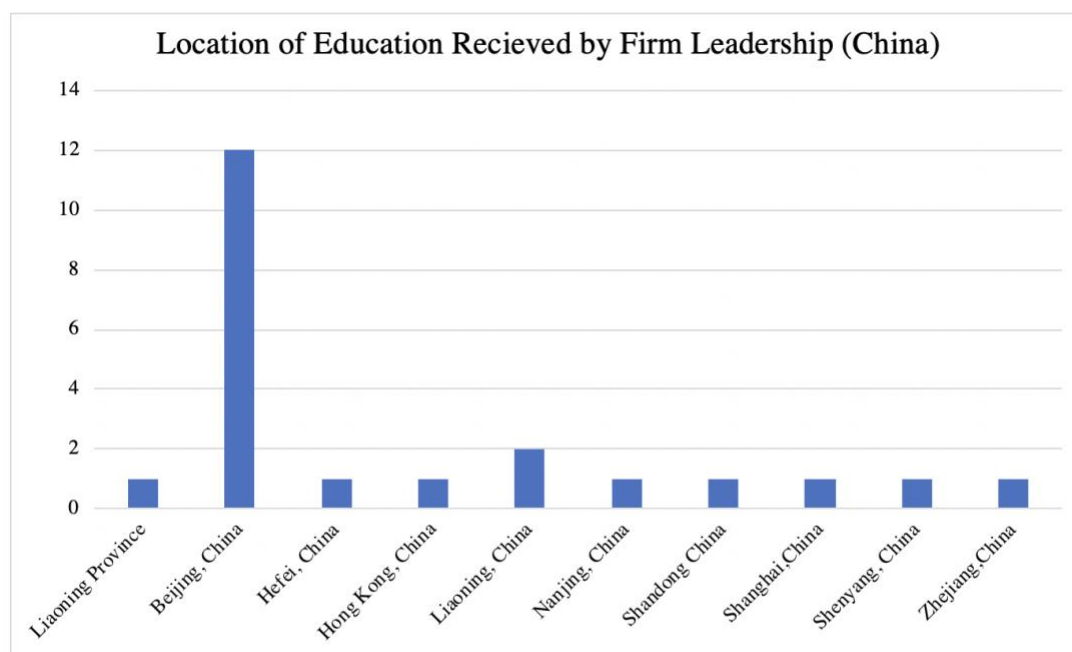


Figure 4.14: A bar graph comparing the attendance of executives at schools in China.

Source: *Crunchbase*

As can be seen in figures 4.13 and 4.14, twenty-one executives were educated in China, while only five were educated in the United States; of those five, two were educated in both the United States and China. Within China itself, Beijing was the most frequented city to be educated in, with 12 executives educated there; all other cities had only one executive educated there, except Liaoning, which had two. Overall, it seems that if China was to put in place an outright foreign education ban, that the effects would not be too drastic; given the data, it appears that China is already very much self-sufficient in the education of its executives. I wonder if such a policy would affect Chinese firms' ability to be competitive selling products in foreign markets. If, theoretically, an American education gives these executives an edge due to increased knowledge about United States markets, then a lack of that edge could potentially hurt the firms.

CHAPTER FIVE

CONCLUSION

This chapter provides a general understanding of what my research means as a whole. After discussing my findings, I then ponder my data's primary implications and provide questions for further research going forward.

5.1 SUMMARY OF FINDINGS

The current adversarial relationship between the United States and China can be best described as one that is pushing back against the globalist tendencies of the late-20th century in favor of more nationalistic ones. As China attempts to accomplish the goals laid out in *China Manufacturing 2025* and the United States continues to respond with retaliatory actions and tariffs, global production networks and alliances throughout the world will be greatly affected.

If the United States wishes to remain the world's primary superpower, its response must be consistent with the current structure of traditional and start-up markets, which can be tricky given the global fragmentation of many of today's firms. Firm nationality can no longer simply be defined based upon geographic location.

As was seen in Chapter Four, although many firms may appear to be Chinese based upon geographic location, many of their primary investors, and the capital behind them, are truly United-States based. As the United States continues to utilize its regulatory tools, such as the Committee on Foreign Investment in the United States for managing incoming capital and imports, and the Bureau of Industry and Security for managing outgoing capital and exports, firm nationality must be looked at through a modern analytic lens. Suppose most of a firm's capital is being spent in China, the firm is primarily located in China, but ownership is mainly coming from the United States; in that case, its individual circumstances must be looked into to determine its nationality properly.

If the United States continues to regulate firms based upon their geographic location, they may cause unintended harm to markets as well as individual firms. Geographic location is and will stay relevant to firm nationality, but alternative factors must be considered as part of the equation when evaluating a firm in today's world. Before taking predatory actions, it is necessary to consider circumstances surrounding firms holistically to ensure that proper decisions are made.

5.2 *POLICY IMPLICATIONS*

As the United States and China both attempt to clean the networks they operate within, each must consider new factors when retaliatorily targeting firms; considerations of firm nationality must be adapted to fit the layout of today's modern firms. More so than ever, it is essential to take account of geographic location, investor location, employee nationality, and the primary location of executives' educations when determining a firm's true nationality.

Headquarters location has been and will likely remain an effective partial determinant for firm nationality and a deciding factor in whether a nation will interfere in a firms' practices. Though a firm may have subsidiaries throughout the world, its headquarters location has political implications due to the legal jurisdiction of the nation it is located within. Even if most of a firm's business is completed in another nation, domestic governmental oversight and local laws dictate both internal and external policy at the headquarters and can significantly impact broader business structure and strategy. Given that many times, headquarters location also correlates to where a firm has its highest density of employees, it can alternatively be used as a rough measure of a firm's workforce's nationality. Employee nationality can help determine the local labor laws and regulations that a firm works within.

When determining a firm's nationality, its primary investors' founding locations are also necessary to consider. As was seen with the example of Sequoia Capital and Sequoia Capital China, although an investment may initially seem to be of one nationality, when the path of its capital is tracked to its origin, it will often be from another nation, which is commonly where the founding location is located. Knowledge of a firm's investors' founding locations is essential if a proper determination is to be made as to the firm's nationality.

Given that a small leadership team controls the day-to-day operations and has central decision-making responsibilities in nearly all firms, it is imperative to consider executives' backgrounds when contemplating firm nationality. Although executives' nationality and education may not initially seem to be essential elements of a firm, each influences how executives process information and how the firms they work in behave. While a diverse

executive team may not be particularly telling of a firm's nationality, a more homogeneous one can give great insights into a firm's inner workings and its true nationality.

5.3 *SUGGESTIONS FOR FUTURE RESEARCH*

The next few decades will be particularly telling for the future of global markets as a whole. If the United States and China continue in their battle for superiority, it is more likely than not nationalistic tendencies will cause firms to back away from globalization and to place a greater emphasis on domestic sourcing and production. To limit such a transition's damages, it is necessary that nations dig below the surface when defining firm nationality.

As the landscape of global firms continues to change, further research will be necessary to ensure that definitions of firm nationality are, in fact, up to date and correct. Although my study produced telling results, a more in-depth data set that included the specific amount of investment for investors would increase accuracy and generate further conclusions. The constantly evolving nature of modern firms necessitates continual exploration of firm data. Future research, aimed at discovering alternative indicators of company location and firm origin, would help to ensure that nations are making proper decisions and regulating firms appropriately.

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