JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS

doi:10.1017/S0022109023001424

Where Have All the IPOs Gone? Trade Liberalization and the Changing Nature of U.S. Public Corporations

Thomas P. Griffin
Villanova University Villanova School of Business
thomas.griffin@villanova.edu

Abstract

I show that a tariff policy change that increased trade with China led to a decline in U.S. public listing rates and elevated industry concentration. Consistent with heterogeneous firm models of trade, the shock impeded the entry and performance of small domestic manufacturers but did not adversely impact large multinationals. In addition, stock price reactions to the tariff policy change and threat of reversal imply that trade liberalization creates or destroys value depending on firm size. These findings suggest that recent trends in the U.S. public equity market are driven, in part, by fundamental changes in the global competitive landscape.

I. Introduction

The number of publicly traded U.S. corporations has fallen dramatically since the turn of the 21st century. At the end of 2016, only 3,618 firms were listed on U.S. exchanges – down 50% from the late 1990s. The demise of small public firms was particularly acute. Gao, Ritter, and Zhu (2013) show that small firms accounted for nearly two thirds of the decline in initial public offering (IPO) activity over the past 20 years. Meanwhile, the average listed firm tripled in size as market shares became increasingly concentrated among the largest firms (Grullon, Larkin, and Michaely (2019)). These trends captured the attention of both the academic literature and the business press, with many experts wondering "is the U.S. public corporation in trouble?"[1]

This article examines whether trade liberalization contributed to these market trends. Drawing on heterogeneous firm models of international trade, I argue that liberalization leads to within-industry reallocation of market shares by disproportionally harming small firms. Melitz (2003) develops the intuition behind this

I thank an anonymous referee and Ran Duchin (the editor) for their excellent feedback. I also thank David Becher, Eliezer Fich, Michelle Lowry, Greg Nini, Jérôme Taillard, and seminar participants at Babson College, Drexel University, and Villanova University. A previous version of this article was titled "Globalization and US Industry Concentration."

[1]See "Is the US Public Corporation in Trouble," Kahle and Stulz (2017); "Where Have All the IPOs Gone," Gao, Ritter, and Zhu (2013); "Wall Street's Dead End," *New York Times* (2011); "The Endangered Public Company: The Big Engine That Couldn't," *The Economist* (2012); and the JOBS Act.

hypothesis. In his model, trade liberalization unevenly affects firms within the same industry: small firms cannot afford the fixed cost to establish global operations, face negative profits after liberalization, and exit, while large firms enter the export market and expand.[2] Over time, the model predicts that market shares will reallocate toward larger more productive firms, leading to an increase in concentration and a dearth of small firms.

I empirically test this hypothesis using a change in United States–China trade relations as a natural experiment. Prior to this policy change, China held *temporary* most-favored nation (MFN) tariff status that required annual renewal by the U.S. government. If Congress or the President chose not to renew China's status in a given year, U.S. tariffs on imports from China would have jumped from MFN rates, averaging less than 5%, to punitive non-market economy (NME) rates, averaging over 35%. On May 24, 2000, the U.S. House of Representatives voted 237 to 197 in favor of granting China *permanent* MFN status, thereby eliminating these potential tariff hikes and putting "an end to years of uncertainty in which [U.S. companies] had put off major decisions about investing in China" (Knowlton (2000)).[3] After this watershed event, United States imports from China surged from roughly \$100 billion in 1999 to over \$300 billion in 2007.

I begin my analysis of this tariff policy change by examining short-run stock price reactions to the May 24, 2000 House vote for a sample of 1,831 U.S. public manufacturers. Classifying firms as small if they report less than \$250 million in sales, and large otherwise, I find that small firms experience negative 1.2% cumulative abnormal returns (CARs), on average, in the 5 days around the vote.[4] In contrast, large firms earn positive CARs of 0.8%. These results imply that investors expected the policy change to create or destroy value depending on firm size.

Next, I examine long-run effects using a differences-in-differences (DiD) research design that compares U.S. manufacturing industries pre/post China's receipt of permanent MFN status in 2000 (first difference) depending on the industry's exposure to the tariff policy change (second difference). I calculate each industry's unique "tariff exposure" as the average gap between NME and MFN tariff rates on products that map to the industry in 1999 (i.e., the size of the potential tariff hike eliminated by China's receipt of permanent MFN status). The identifying assumption in the DiD specification is that U.S. industries with high/low tariff exposure would have followed parallel trends absent the policy change. While this assumption is inherently untestable, I argue that industry-level tariff exposure is plausibly exogenous to economic conditions during the 1992–2007 sample period because it primarily derives from variation in NME tariff rates set by the Smoot–Hawley Tariff Act of 1930.

The gap between NME and MFN tariff rates is widely dispersed across industries. For example, the games and toys, broadwoven fabric mills, and

[2]Although the Melitz (2003) model focuses on firm export activity, its framework can be extended to explain selection into other types of multinational activities such as offshoring. See Helpman (2006) for a literature review.

[3]MFN status is the more familiar term for normal trade relations (NTR). See Pierce and Schott (2016) for a comprehensive discussion of the change from temporary to permanent NTR with China.

[4]This size cutoff follows Gao et al.'s (2013) analysis of seasoned firms and denotes the 60th percentile of the distribution.

pesticides industries are all in the top tercile of exposure to the tariff policy change, while the glass containers, paperboard mills, and paint and coating industries are all in the bottom tercile. This industry-level variation in tariff rates is a relevant determinant of the post-2000 rise in Chinese imports; industries in the top/bottom tercile of the exposure distribution followed parallel trends in Chinese import penetration before the policy change and then diverged post-2000. In this sense, tariff exposure can be thought of as an instrument for Chinese import penetration that exploits only tariff-induced variation in trade, and the main empirical framework is akin to a reduced form instrumental variables approach.

I find that the tariff policy change led to a precipitous decline in the number of listed firms and a spike in industry concentration. Using a sample of 363 manufacturing industries with at least 1 U.S. public company listed in the CRSP–Compustat Merged Database between 1992 and 2007, I show that industries with 1-standard-deviation above mean exposure to the tariff policy change experience a 6% larger drop in the number of publicly listed firms post-2000.[5] For comparison, Doidge, Karolyi, and Stulz (2017) report that the total number of listed firms fell by 25% over the same period. In addition, my DiD estimates imply that industries with 1-standard-deviation above mean tariff exposure experience nearly a 3-percentage point bigger increase in HHI after 2000, an economically large effect relative to the 10-percentage point HHI increase that the average U.S. manufacturing industry experienced over the same period.

To better understand the effect of the tariff policy change on U.S. public list rates, I decompose the evolution of U.S. industries into new list and delist rates. While policymakers and the business press focus most of their attention on the weak IPO market, Doidge et al. (2017) show that an abnormally high delist rate played nearly as large of a role in the disappearance of U.S. public firms. I confirm these trends in my sample of manufacturers and find that, after 2000, the new list rate is roughly 20% lower and delist rate is over 28% higher for industries that have 1-standard-deviation above mean exposure to the tariff policy change.

Gao et al. (2013) highlight that the recent decline in new lists is concentrated among small firms and conjecture that the downturn could be driven by an economic change that reduced their profitability. Given this discussion, I examine whether the tariff policy change had a different impact on the listing rate of small and large firms. My results indicate that the *entire* impact of trade liberalization on U.S. listing rates was borne by small firms. Further, I explore the reason behind each delist and find that the estimated increase in small firm delistings was driven by mergers and acquisitions, not voluntary delists. These findings imply that the recent decline in public listings was driven, in part, by changing economic fundamentals that disproportionately harmed small firms, leading them to sell out rather than continue as a standalone firm.

The results thus far are consistent with heterogeneous firm models of international trade. Small firms were less able to cope with Chinese import competition, leading to fewer new lists, more delists, and higher concentration. Drawing

[5]The analysis ends in 2007 to avoid confounding effects of the Great Recession. This cutoff is standard in research that studies the effect trade liberalization with China (e.g., Pierce and Schott (2016), Hombert and Matray (2018)).

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

on these models, I hypothesize that small manufacturers were disproportionally harmed because they were unable to incur the fixed cost to offshore production and remain competitive against foreign imports. Firm-level analyses provide suggestive evidence for this mechanism. First, I classify firms as domestic or multinational to proxy for their ability to incur the fixed cost of offshoring and find that size strongly predicts the likelihood that a firm reports multinational operations. Second, I examine firm responses to the tariff policy change and find that domestic firms significantly cut investment, employment, and debt issuance while multinationals were unaffected. Third, using the text-based offshoring database of Hoberg and Moon (2017), I show that a significant fraction of multinational corporations began producing inputs in China after the tariff policy change. Together, these results suggest that large multinationals were able to withstand U.S. trade liberalization with China in part by offshoring production, while small domestic firms faltered.

A clear concern with the interpretation of my results, however, is that the timing of the tariff policy change coincides with vast economic and regulatory changes. Throughout the article, I highlight how these factors could affect inferences and take steps to mitigate the scope for omitted variable bias. Specifically, I note that, although the tech bubble collapsed and regulation increased during the post period, these factors would need to be correlated with industry-level tariff exposure to bias the main coefficient of interest. A plot of industry-level exposure to the tariff policy change alleviates much of this concern; tariff exposure exhibits considerable cross-sectional variation and does not appear to be systematically higher in tech industries. Moreover, estimated effects of the tariff policy change are similar regardless of whether the specification: i) includes tech industry and regulatory intensity control variables, ii) excludes tech industries from the sample, or iii) excludes observations during the 1998–2002 peak bubble/bust period.[6] Finally, I show that the main results are robust to several alternative specifications, including the use of a binary measure of tariff exposure, less granular fixed effects, and Poisson regressions.

I conclude the analysis with an event study around President Trump's surprise announcement on Mar. 1, 2018 imposing new tariffs and his corresponding tweet claiming that, "…trade wars are good, and easy to win." This reversal in trade policy prompted opposite stock price reactions compared to the MFN vote; Trump's tweet induced positive stock reactions for small domestic manufacturers and negative reactions for large multinationals. This out-of-sample evidence suggests that protectionism improves the competitive outlook of small domestic manufacturers and bolsters the core interpretation that trade liberalization with China harmed small U.S. firms.

This article contributes to the ongoing debate about the cause of the recent decline in U.S. public listing rates. Much of this debate focuses on the costs and benefits of listing on U.S. exchanges. Although a host of critics blame new

[6] I classify technology industries following Loughran and Ritter (2004) and the update on Jay Ritter's website (https://site.warrington.ufl.edu/ritter/ipo-data/). I control for regulatory intensity using the industry-year index developed by Kalmenovitz (2023) and available on his website (https://sites.google.com/view/jkalmenovitz).

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

regulations that increase the cost of being public, academic research shows that regulatory changes cannot fully account for the drop in public listings (Leuz (2007), Doidge, Karolyi, and Stulz (2013), (2017)). Other researchers argue that developments in the private securities market lowered the benefits of being public. Kwon, Lowry, and Qian (2020) and Ewens and Farre-Mensa (2021) provide evidence consistent with this notion by showing that an influx of private capital enabled late-stage startups to postpone public listing and grow to a size that few private firms previously reached. My results offer a complementary view: a significant portion of the decline in U.S. listing rates is due to fundamental changes in the economy that hinder small firms. These findings support the hypothesis of Gao et al. (2013), who document an abnormally high acquisition rate of small private targets and conjecture that the trend may be the result of an ongoing change in the economy that requires greater economies of scope. I provide a direct test of this hypothesis using industry-level exposure to China's receipt of permanent MFN tariff status and find strong evidence supporting the increased importance of economies of scope.

This article also adds to our understanding of how trade liberalization with China affects the U.S. economy. Prior research shows that Chinese import competition led to a decline in U.S. manufacturing employment (Autor, Dorn, and Hanson (2013)) by reducing labor demand within continuing plants and inducing plant exit (Pierce and Schott (2016)), an increase in household debt (Barrot, Loualiche, Plosser, and Sauvagnat (2022)), and a decline in household entrepreneurial activity (Aslan and Kumar (2021)). Hombert and Matray (2018) find that R&D-intensive firms are more resilient to trade shocks. I complement this literature by showing that the ability to respond to the tariff policy change hinged crucially on firm size and multinational scope. In sum, my results show that the inability of small domestic firms to cope with trade liberalization with China contributed to the recent decline in U.S. public listing rates and increase in industry concentration.

II. Institutional Background and Empirical Design

The goal of this article is to understand whether trade liberalization contributed to the recent drop in U.S. public listing rates and the simultaneous increase in industry concentration. To do so, I study China's receipt of permanent MFN status, which eliminated potential tariff hikes on goods imported from China. This section provides institutional details and describes how I employ these features in a DiD research design that compares U.S. manufacturing industries pre and post China's receipt of permanent MFN status in 2000 (first difference) depending on the industry's exposure to the tariff policy change (second difference).

A. Time Series Variation: China's Receipt of Permanent MFN Status

The U.S. tariff schedule contains two types of rates: low "column 1" rates offered to MFNs and high "column 2" rates offered to NMEs. NME rates are vestiges of the Smoot–Hawley Tariff Act of 1930, which led to massive tariff hikes on more than 800 products (Irwin (2011)). These hikes were reversed by the

Reciprocal Trade Agreements Act of 1934 for most trade partners, but high Smoot–Hawley rates were retained on the tariff schedule and later used as a punitive measure against NMEs.[7]

China first received access to low MFN rates in 1980 and successfully renewed their temporary access every year without issue until the Tiananmen Square protests of 1989. After this inflection point, members of the U.S. House of Representatives sought to end trade relations with China and introduced annual legislation to revoke China's temporary MFN status. The legislation received more than 50% of House votes in 3 different years, but never passed the Senate.

Although China retained its temporary MFN status every year between 1980 and 2000, the annual review process generated considerable uncertainty. If Congress revoked China's temporary MFN status, tariffs would have immediately jumped from MFN rates, averaging less than 5%, to punitive NME rates, averaging over 35%. Pierce and Schott (2016) provide anecdotal evidence that the annual renewal process impeded American investment in China. Most incriminating among these anecdotes are reports from the U.S. General Accounting Office (1994) that state, "U.S. government and private sector officials cited uncertainty surrounding the annual renewal of China's MFN status as the single most important issue affecting U.S. trade relations with China." The report continues, "… government policies designed to address concern about China's human rights, trade, and weapons proliferation practices may prevent U.S. companies from being able to more fully realize the business opportunities associated with China's economic growth and development."

In 2000, U.S. Congress passed a bill that granted China permanent MFN status, eliminating uncertainty associated with annual renewals. The bill culminated several years of negotiation regarding China's ascension to the World Trade Organization. According to a report from the U.S. Ways and Means Committee, President Clinton began lobbying for China to receive permanent MFN status during the June 1998 United States–China Summit.[8] The agreement was finalized in Nov. 1999, passed the House by a 237–197 margin in May 2000, passed the Senate by an 83–15 margin in Sept. 2000, and was signed into law in Oct. 2000.

By removing uncertainty about potential tariff hikes, China's receipt of permanent MFN status led to a substantial increase in trade and investment. As noted by Pierce and Schott (2016), a Congressional Commission evaluating the policy change found "an escalation of production shifts out of the US and into China. … [B]etween Oct. 1, 2000 and Apr. 30, 2001 more than eighty corporations announced their intentions to shift production to China, with the number of announced production shifts increasing each month." This anecdote is consistent with research that finds a negative relation between policy uncertainty and corporate investment, particularly for outlays with a high degree of irreversibility (Julio and Yook (2012), (2016), Baker, Bloom, and Davis (2016), Gulen and Ion (2016), and Bonaime, Gulen, and Ion (2018)).

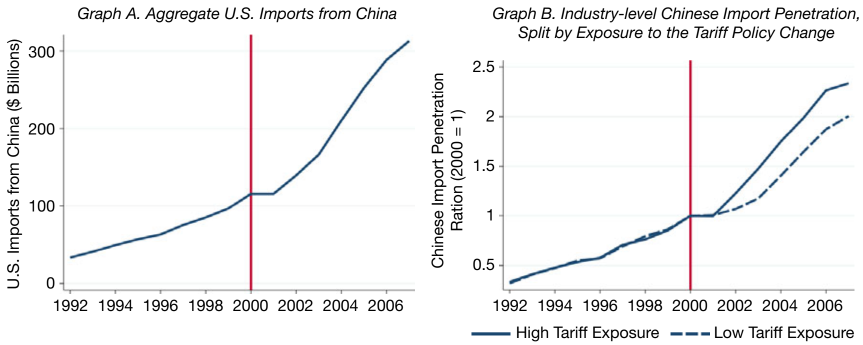
[7]As of Sept. 2023, Cuba, North Korea, Russia, and Belarus are the only countries subject to NME tariff rates.

[8]See https://www.congress.gov/congressional-report/106th-congress/house-report/632/1.

FIGURE 1

U.S. Trade Liberalization with China

Figure 1 displays the rise in U.S. imports from China between 1992 and 2007. China obtained permanent most-favored nation (MFN) status in 2000, eliminating potential tariff hikes on goods shipped to the United States. Graph A plots the annual value of Chinese imports to the United States in billions of 2007 dollars. Graph B displays the average Chinese import penetration ratio for U.S. manufacturing industries that faced a high (top tercile) or low (bottom tercile) potential tariff hike before China obtained permanent MFN status, standardized to unity in 2000.



Graph A of Figure 1 confirms that China's receipt of permanent MFN status was a watershed moment for United States–China trade relations. After this policy change, United States imports from China surged from roughly $100 billion in 1999 to over $300 billion per year in 2007. My DiD specification captures this time-series variation with the variable POST, which equals 0 from 1992 to 1999 and 1 from 2000 to 2007. POST varies across time, but not across industries, and captures the aggregate change in trends pre/post China's receipt of permanent MFN status.

B. Cross-Sectional Variation: Industry-Level Tariff Rates

Although China's receipt of permanent MFN status eliminated potential tariff hikes on all Chinese goods shipped to the United States, exposure to this tariff policy change varied across industries depending on the gap between NME and MFN rates. Importantly, 79% of this variation derives from variation in NME rates, which were established 70 years before the policy change (Pierce and Schott (2016)).[9] According to Irwin (2011), NME rates vary considerably across industries as a result of intense congressional lobbying during the passage of the Smoot–Hawley Tariff Act. Conversely, MFN rates are ubiquitously low across all industries.

My DiD specification captures this cross-sectional variation with the variable TARIFF_EXPOSURE. Because tariff rates are set at the product level, I calculate each industry's TARIFF_EXPOSURE as the average difference between the NME and MFN rate for products that map to the industry in 1999 (i.e., the size of the

[9] Of course, some products did not exist in 1930 and were later assigned their product-level HTS (Harmonized Tariff Schedule) code and tariff rate by the U.S. International Trade Commission based on their relation to broader HTS categories, which are referred to as "chapters" and "headings."

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

potential tariff hike eliminated by China's receipt of permanent MFN status).[10] TARIFF_EXPOSURE varies across industries, but not over time, and captures industry-level exposure to the policy change. In my sample, I find that the average industry has an NME tariff rate of 36%, an MFN rate of roughly 3%, and thus a 33-percentage point potential tariff hike. The interquartile ranges of NME rates, MFN rates, and potential tariff hikes in my sample are 18%, 3%, and 17%, respectively. Graph B of Figure 1 shows that U.S. manufacturing industries in the top and bottom tercile of the TARIFF_EXPOSURE distribution followed parallel trends in Chinese import penetration prior to 2000. After the potential tariff hikes were eliminated, however, Chinese import penetration grew substantially faster in high TARIFF_EXPOSURE industries (top tercile) than in low TARIFF_EXPOSURE industries (bottom tercile).

Figure 2 plots cross-sectional variation in exposure to the tariff policy change. It shows that the gap between NME and MFN tariff rates is widely dispersed across industries, even within the same broad sector. For example, the pesticide industry is in the top tercile of TARIFF_EXPOSURE while paint and coating is in the bottom tercile even though they are both in the chemicals sector. Panel A of Table 1 reports tariff rates for the 10 U.S. manufacturing industries that were most/least affected by trade liberalization with China, based on the percentage point change in Chinese import penetration ratio during the post period. The list (and Graph B of Figure 1) verifies that trade increased more in industries with higher exposure to the tariff policy change.

Importantly, Panel A of Table 1 also highlights that realized trade with China is not perfectly correlated with TARIFF_EXPOSURE. While Chinese import penetration is endogenously determined by industry-level economic conditions, TARIFF_EXPOSURE is relevant to trade but plausibly exogenous for the reasons outlined previously. As such, TARIFF_EXPOSURE can be thought of as an instrument for Chinese import penetration that exploits only tariff-induced variation in trade, and the main empirical framework is akin to a reduced form instrumental variables approach.

C. Differences-in-Differences Research Design

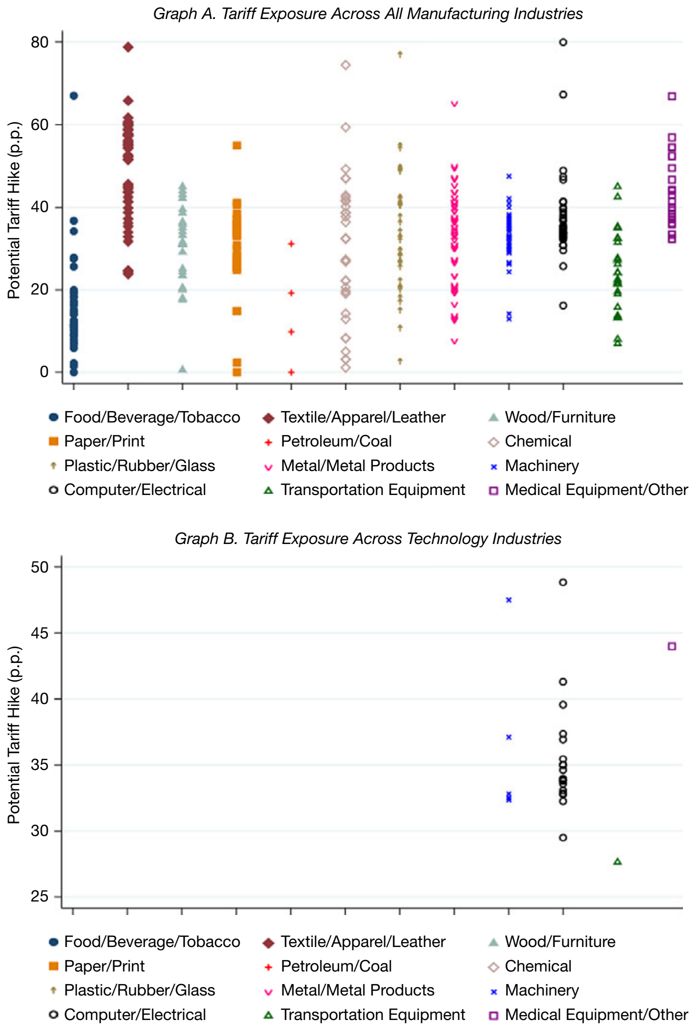
Causal inference of observational data can be complicated by reverse causality and correlated omitted variables. The primary concern when studying the effect of trade liberalization is that unobserved demand or productivity shocks simultaneously influence Chinese import penetration and the structure of U.S. industries. For example, negative productivity shocks would lead to the decline of U.S. industries and more imports from China, upwardly biasing the estimated effect of trade liberalization. Conversely, positive demand shocks would improve U.S. industry conditions and encourage more imports from China, downwardly biasing the estimated effect. Finally, the timing of U.S. trade liberalization with China coincides with vast economic and regulatory changes, which could bias estimates if these factors are correlated with Chinese import penetration.

[10]I map products to their respective industries using the crosswalk posted on David Dorn's website (www.ddorn.net). I assign firms to industries based on their primary operations, according to Compustat. Therefore, firm-level variation is the same as industry-level variation.

FIGURE 2

Cross-Sectional Variation in Exposure to the Tariff Policy Change

Figure 2 plots the potential tariff hike, in percentage points, that each industry faced before China obtained permanent most-favored nation status in 2000. Common markers group 468 6-digit NAICS industry observations into 12 broad manufacturing sectors.



My DiD research design addresses these issues by comparing industries that are differentially exposed to U.S. trade liberalization with China based on historical tariff rates. This strategy lessens concerns about reverse causality because it relies on variation in NME tariff rates that were set 70 years prior. Moreover, variation in TARIFF_EXPOSURE does not appear to be concentrated in areas of the economy that have been on decline as a result of the vast economic/technological changes of the late 1990s/early 2000s. Graph A of Figure 2 plots the distribution of TARIFF_

TABLE 1

Sample Description

Panel A of Table 1 reports tariff rates for the 10 U.S. manufacturing industries that were most/least affected by trade liberalization with China, based on the percentage point change in Chinese import penetration ratio from 2000 to 2007 (Δ Chinese IPR). The main variable of interest, TARIFF_EXPOSURE, is the potential tariff hike that each 6-digit NAICS industry faced before China obtained permanent most-favored nation (MFN) status in 2000, calculated as the average difference between non-market economy (NME) and MFN tariff rates on imported products that map to the industry in 1999. Panel B reports descriptive statistics. The census industry-year sample contains 834 observations from 417 6-digit NAICS industries with data available in the 1997 and 2007 U.S. Economic Census. The Compustat industry-year sample consists of 4,736 observations from 363 6-digit NAICS industries with at least 1 U.S. public manufacturer in the CRSP–Compustat Merged Database between 1992 and 2007. The Compustat firm-year sample contains 28,290 observations from 3,437 U.S. public manufacturers with data available in the CRSP–Compustat Merged Database between 1992 and 2007. Variables are winsorized at 1/99% tails throughout the analysis. The Appendix lists variable definitions.

Panel A. Industries Most/Least Affected by U.S. Trade Liberalization with China

	NAICS Code	Δ Chinese IPR	Tariff Exposure	NME Tariff Rate	MFN Tariff Rate
Most-Affected Industries					
Computer peripheral equipment	334119	359.53	33.89	34.57	0.68
Electronic computer	334111	207.32	35.00	35.12	0.12
Game, toy, and children's vehicle	339932	124.25	54.53	55.10	0.57
Plastics, foil, and coated paper bag	322223	85.89	54.95	57.50	2.55
Institutional furniture	337127	68.19	39.46	41.80	2.35
Radio and TV broadcasting and wireless comm. equip.	334220	67.43	32.24	33.73	1.48
Infants' apparel	315291	64.24	58.62	71.05	12.42
Luggage	316991	63.25	43.75	51.07	7.33
Women's handbag and purse	316992	52.07	44.42	51.40	6.98
Audio and video equipment	334310	50.21	30.74	33.08	2.34
Least-Affected Industries					
Fur and leather apparel	315292	−28.87	44.96	55.78	10.82
Travel trailer and camper	336214	−15.41	18.94	20.00	1.06
Photographic and photocopying equipment	333315	−8.19	29.20	31.12	1.92
Electronic coil, transformer, and other inductor	334416	−7.06	37.36	38.84	1.48
Watch, clock, and part	334518	−1.81	47.38	50.74	3.36
Concrete product	327390	−1.02	29.60	32.14	2.54
Small arms ammunition	332992	−0.81	37.50	37.50	0.00
Smelting, refining, and alloying of nonferrous metal	331492	−0.70	20.75	23.31	2.56
Alumina refining	331311	−0.15	19.61	22.52	2.91
Photographic film, paper, plate, and chemical	325992	−0.06	27.28	29.59	2.31
MOST-AFFECTED_INDUSTRY_AVERAGE		114.24	42.76	46.44	3.68
LEAST-AFFECTED_INDUSTRY_AVERAGE		−6.41	31.26	34.16	2.90

Panel B. Descriptive Statistics

	Mean	Std. Dev.	P25	Median	P75	No. of Obs.
Census Industry-Year Sample						
TARIFF_EXPOSURE (%)	32.69	13.84	24.17	33.50	41.20	834
REGULATORY_INTENSITY	96.48	11.02	93.09	96.14	99.07	834
TECH_INDUSTRY (0/1)	0.06	0.25	0.00	0.00	0.00	834
UNSKILLED_LABOR_SHARE (%)	72.55	10.80	67.26	75.00	80.33	834
NUMBER_OF_FIRMS	623.15	971.68	134.00	299.00	662.00	834
CENSUS_HHI	0.07	0.06	0.03	0.06	0.10	834
Compustat Industry-Year Sample						
NUMBER_OF_LISTED_FIRMS	6.11	11.77	1.00	3.00	5.00	4,736
COMPUSTAT_HHI	0.67	0.30	0.41	0.66	1.00	4,736
NEW_LIST_RATE (%)	5.75	17.70	0.00	0.00	0.00	4,736
DELIST_RATE (%)	8.76	20.65	0.00	0.00	6.90	4,736
SMALL_FIRM_NEW_LIST_RATE (%)	4.27	16.16	0.00	0.00	0.00	4,736
SMALL_FIRM_DELIST_RATE (%)	5.63	16.79	0.00	0.00	0.00	4,736
SMALL_FIRM_M&A_DELIST_RATE (%)	2.45	11.64	0.00	0.00	0.00	4,736
SMALL_FIRM_VOLUNTARY_DELIST_RATE (%)	0.37	4.82	0.00	0.00	0.00	4,736
LARGE_FIRM_NEW_LIST_RATE (%)	1.71	10.41	0.00	0.00	0.00	4,736
LARGE_FIRM_DELIST_RATE (%)	3.15	12.92	0.00	0.00	0.00	4,736
LARGE_FIRM_M&A_DELIST_RATE (%)	2.41	11.23	0.00	0.00	0.00	4,736
LARGE_FIRM_VOLUNTARY_DELIST_RATE (%)	0.03	0.80	0.00	0.00	0.00	4,736
Compustat Firm-Year Sample						
MULTINATIONAL_CORPORATION (0/1)	0.49	0.50	0.00	0.00	1.00	28,290
MARKET_CAPITALIZATION ($B)	1.64	5.84	0.04	0.16	0.65	28,290
RETURN_ON_ASSETS	0.02	0.28	−0.01	0.10	0.17	28,290
PP&E_GROWTH	0.10	0.38	−0.07	0.04	0.21	28,290

(continued on next page)

TABLE 1 (continued)

Sample Description

Panel B. Descriptive Statistics (continued)

	Mean	Std. Dev.	P25	Median	P75	No. of Obs.
EMPLOYMENT_GROWTH	0.06	0.27	–0.05	0.04	0.16	28,290
DEBT_ISSUANCE	0.06	0.18	–0.01	0.00	0.08	28,290
EQUITY_ISSUANCE	0.22	0.68	0.00	0.01	0.09	28,290
OFFSHORE_PRODUCTION_IN_CHINA (0/1)	0.20	0.40	0.00	0.00	0.00	18,022
OFFSHORE_PRODUCTION_IN_ROW (0/1)	0.73	0.45	0.00	1.00	1.00	18,022

EXPOSURE across all industries and Graph B plots the distribution only for industries classified as tech by Loughran and Ritter (2004) and Jay Ritter's website. Comparison of the 2 graphs shows that TARIFF_EXPOSURE exhibits considerable cross-sectional variation and does not appear to be systematically higher in tech industries. I use this variation in a DiD framework to study the impact of trade liberalization.

Specifically, my generalized DiD estimator obtains the average treatment effect on the treated (ATT) as the slope coefficient on the interaction term, TARIFF_EXPOSURE × POST. Per the guidance of Angrist and Pischke (2009), I fully saturate my fixed effects regression model with an indicator for each industry and each year and I use a continuous treatment variable that allows for differential exposure to the tariff policy change across industries. Hence, my 2-way fixed effects (TWFE) DiD regressions estimate the average within-industry change in the outcome variable around China's receipt of permanent MFN status attributable to industry-level exposure to the tariff policy change. I use OLS regression to estimate the following model:

$$\begin{aligned} Y_{i,t} = {} & \beta \times \text{TARIFF\_EXPOSURE}_i \times \text{POST}_t + \theta \\ & \times \text{REGULATORY\_INTENSITY}_{i,t} + \delta \times \text{TECH\_INDUSTRY}_i \\ & \times \text{POST}_t + \varphi \times \text{UNSKILLED\_LABOR\_SHARE}_i \times \text{POST}_t + \gamma \\ & \times \text{INDUSTRY}_i + \tau \times \text{YEAR}_t + \varepsilon_{i,t}. \end{aligned}$$

$Y_{i,t}$ is the outcome variable for 6-digit NAICS manufacturing industry i in year t. TARIFF_EXPOSURE$_i$ is a continuous variable that measures the potential tariff hike industry i faced before 2000 (i.e., the gap between NME and MFN tariff rates) and captures industry-level exposure to the policy change. POST$_t$ is an indicator that equals 1 from 2000 onward and captures the aggregate change in trends pre/-post China's receipt of permanent MFN status. Therefore, the interaction of these variables captures the change in trends pre/post the tariff policy change attributable to industry-level variation in exposure.

The following control variables account for confounding factors at the industry level. REGULATORY_INTENSITY$_{i,t}$ is an industry-year index, developed by Kalmenovitz (2023), that measures the number of active federal regulations relevant to each industry using supervised machine-learning algorithms.[11]

[11]REGULATORY_INTENSITY follows an increasing trend throughout the sample period and spikes in the early 2000s alongside the Sarbanes-Oxley Act (SOX). Kalmenovitz' (2023) measure

TECH_INDUSTRY_i is an indicator that equals 1 for all industries classified as tech stocks by Loughran and Ritter (2004) and the update on Jay Ritter's website.[12] $\text{UNSKILLED\_LABOR\_SHARE}_i$ is the fraction of industry employees that are production workers in 1999. By allowing for different trends after the tariff policy change, these controls lessen the possibility that the coefficient of interest, β, is biased by the post-2000 increase in regulatory costs, the collapse of the technology bubble, or the general decline in America's unskilled-labor intensive industries. INDUSTRY_i represents industry fixed effects that account for the impact of time-invariant industry characteristics at the 6-digit NAICS level. YEAR_t represents year fixed effects that control for aggregate time series trends.[13] These year indicators absorb the effect of early 2000s regulatory changes that affect all industries and mitigate the potential for bias as long as regulatory costs are not spuriously correlated with industry-level exposure to the tariff policy change.

I follow the advice of Petersen (2008) and cluster standard errors by industry to account for potential serial correlation and heteroscedasticity. Finally, I note that my setting is not subject to recent of criticisms of TWFE models under staggered treatment timing because China's receipt of permanent MFN status occurred in one single event. Baker, Larcker, and Wang (2022) write, "TWFE DiD estimates are valid in settings with a single treatment period (even with dynamic treatment effects)" (p. 375).

III. Data

My analysis uses data from the U.S. Harmonized Tariff Schedule (HTS), collected and made available by John Romalis. The Romalis data set contains 8-digit HTS product-level ad valorem tariff rates for MFNs and NMEs.[14] I calculate potential tariff hikes as the difference between the NME and MFN rate for each of the 9,997 unique 8-digit HTS products in 1999, the year before China received permanent MFN status. Next, I map HTS products to 6-digit NAICS industries using crosswalks available on David Dorn's website. The resulting data set contains 468 unique 6-digit NAICS manufacturing industries that map to an average of 76 products (32 median). Finally, I compute industry-

captures aggregate regulation that affects all industries (such as SOX) as well as industry-specific regulation that is relevant for some industries but not others (such as Environmental Protection Agency regulations that disproportionately affect chemical manufacturers).

[12] I map the 4-digit SIC industries defined by Loughran and Ritter (2004) and Jay Ritter's website as technology stocks to 6-digit NAICS industries using the SIC-NAICS crosswalk on David Dorn's website (www.ddorn.net). Here, 4-digit SIC and 6-digit NAICS industries are defined at a similar level of granularity; the U.S. government switched from SIC to NAICS as their primary industry classification system in 1997. I conduct my analysis using NAICS industries because it is more straightforward to map HTS-product tariff data and Census data to NAICS than SIC.

[13] Non-interacted constituent terms that do not vary over time (TARIFF_EXPOSURE_i, TECH_INDUSTRY_i, and $\text{UNSKILLED\_LABOR\_SHARE}_i$) are not included in the regression because they are perfectly collinear with industry fixed effects. Likewise, POST_t is perfectly collinear with year fixed effects and therefore excluded.

[14] See Feenstra, Romalis, and Schott (2002) and www.johnromalis.com/publications for more details.

level exposure to the tariff policy change as the average gap between NME and MFN rates for the corresponding products. I find that the average industry would have experienced a 33-percentage point increase in tariffs if Congress failed to renew China's temporary MFN status (standard deviation of 14 percentage points). These values are identical to the summary statistics reported by Pierce and Schott (2016).

I assign this industry-level measure to manufacturers (NAICS 31–33) with positive sales in the CRSP–Compustat Merged Data set between 1992 and 2007. The sample spans 8 years pre/post China's receipt of permanent MFN status to create a symmetric panel while avoiding the confounding effects of the Great Recession. I filter the sample to include only U.S. public firms (share code 10 or 11) traded on NYSE, NASDAQ, or AMEX (exchange code 1, 2, or 3). Finally, I collapse the data set to the industry-year level, yielding a sample of 4,736 observations from 363 6-digit NAICS industries with at least 1 U.S. public manufacturer between 1992 and 2007.

Panel B of Table 1 reports summary statistics. The average 6-digit NAICS industry-year contains roughly six listed firms. I compute the Herfindahl–Hirschman Index (HHI) by summing the squared market shares of these firms and find that the average industry has an HHI of 0.67, which is close to the 0.69 average HHI reported at the 4-digit SIC level by Ali, Klasa, and Yeung (2008). To better understand the dynamics of U.S. manufacturing industries over time, I follow Doidge et al. (2017) and calculate new list (delist) rates as the number of firms that enter (exit) an industry, divided by the number of listed firms in the industry during the previous year.[15] I find that the average industry-year new list rate and delist rate is 6% and 9%, respectively. Finally, I decompose list rates separately for small and large firms using a threshold of $250 M in sales (2007 purchasing power), which corresponds to the 60th percentile of the size distribution.

Ali et al. (2008) warn that Compustat-based concentration measures may be poor proxies of actual industry concentration and recommend that researchers use U.S. Census-based measures as an alternative. The advantage of Census-based measures is that they cover all firms operating in the United States regardless of ownership status. The drawback of these measures, however, is that the Census only occurs every 5 years and does not use consistent industry definitions. In particular, the Census Bureau's switch from SIC to NAICS codes in 1997 greatly complicates the comparison of industry concentration over time. To minimize measurement error, I hand collect concentration data for 6-digit NAICS industries that did not change between the 1997 and 2007 Economic Census. This process yields a sample of 834 observations from 417 6-digit NAICS industries with data available in the 1997 and 2007 Census. Consistent with Ali et al. (2008), I find that industry concentration is an order of magnitude lower when accounting for sales by private and foreign firms operating in the United States.

Finally, I construct a firm-year sample to examine responses to U.S. trade liberalization with China. I construct the sample using the same filters described

[15] I assign firms to their primary industry using the NAICS data item from Compustat's header (i.e., most recent) file so list rates capture firms entering/exiting the public equity market and are not influenced by firms switching industries.

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

previously, except that I also require non-missing data on firm performance, investment, and financing. These requirements yield a sample of 28,290 observations from 3,437 U.S. public manufacturing firms between 1992 and 2007. I classify these firms as multinational if they report positive foreign sales, and domestic otherwise. The fraction of multinational corporations in my sample is 0.49, which lies between the 0.48 reported by Gu (2017) and 0.51 reported by Dyreng, Hanlon, Maydew, and Thornock (2017). The average manufacturer in my sample has an ROA of 0.02 and employment growth of 0.06, which are identical to the 0.02 and 0.06 reported by Hombert and Matray (2018) over the same sample period. Overall, my summary statistics are similar to those reported in the literature.

IV. Main Results

Heterogeneous firm models of international trade show that trade liberalization unevenly affects firms within the same industry, leading to reallocation of market shares toward larger, more productive firms (see Melitz and Trefler (2012) for a review). By permitting foreign entrants, liberalization induces a negative *competitive effect* that harms all firms. However, by enabling international expansion, liberalization generates a positive *market access effect* for firms that can afford the fixed cost of establishing global operations. I conjecture that the negative competitive effect of Chinese imports outweighed the positive market access effect for all but the largest U.S. manufacturers, contributing to recent trends in the U.S. public equity market. I test this hypothesis by examining whether exposure to China's receipt of permanent MFN status led to i) a decline in public listing rates and increase in concentration ii) by disproportionately harming small firms iii) that were unable to offshore production and remain competitive against foreign imports.

A. Preliminary Evidence: Stock Reactions to China's Receipt of Permanent MFN Status

I begin my analysis with an event study around the May 24, 2000 U.S. House of Representatives vote on China's status. The vote culminated months of lobbying that pitted large corporations against human rights advocates. The expected outcome of the vote was uncertain. On the eve of the vote, administration officials insisted that they were a "handful of votes shy of the 218 needed for passage [and] opponents claimed the race was even at 210" (Schmitt and Kahn (2000)). Surprisingly, the House voted 237–197 in favor of granting China permanent MFN status, thereby eliminating potential tariff hikes on Chinese goods shipped to the United States.[16]

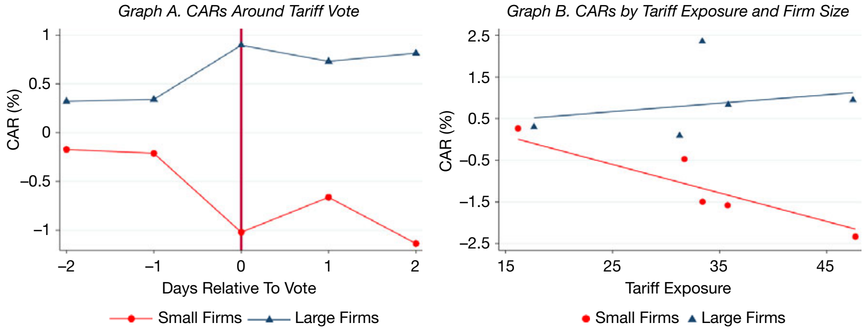
I use this close vote to examine the firm value implications of the tariff policy change. Figure 3 plots CARs in the 5 days around the vote for a sample 1,831 U.S. public manufacturers with data available in the CRSP–Compustat Merged

[16]I focus on the House vote, and not the Senate, because the partisan breakdown implied that the vote would be close in the House but guaranteed the Senate. Indeed, the Senate passed the bill by an 83–15 margin in Sept. 2000.

FIGURE 3

Stock Reactions to China's Receipt of Permanent Most-Favored Nation (MFN) Status

Figure 3 plots percentage cumulative abnormal returns (CARs) associated with China's receipt of permanent MFN status. On May 24, 2000, the U.S. House of Representatives voted 237 to 197 in favor of granting China permanent MFN status, thereby eliminating potential tariff hikes on Chinese goods shipped to the United States. Graph A displays average CARs for 5 days around this vote. Graph B displays binned scatter plots of 5-day CARs against firm exposure to the tariff policy change, measured as the potential tariff hike the firm's industry faced before the vote. Firms are classified as small if they report less than $250 million total sales in the fiscal year preceding the vote (red lines), and large otherwise (blue lines). The sample consists of 1,831 U.S. public manufacturers with data available in the CRSP–Compustat Merged Database.



Database.[17] Diverging returns in Graph A imply that investors expected U.S. trade liberalization with China to create winners and losers depending on firm size. Moreover, the graphical evidence in Graph B shows that stock price reactions are negatively correlated with TARIFF_EXPOSURE and suggests that the effect is not driven by outliers.

I corroborate these findings in Table 2. Estimates in Panel A imply a $3.8 million decrease in market value for the average small U.S. manufacturer ($317 M market cap × −1.2% CAR) and a $44.7 million increase in market value for the average large U.S. manufacturer ($5,589 M market cap × 0.8% CAR). Panel B confirms that the effect varies cross-sectionally with exposure to the tariff policy change. A 1-standard-deviation increase in TARIFF_EXPOSURE is associated with 0.68- to 0.75-percentage point lower CARs for small firms but does not have a statistically significant effect on large firms. Thus, my event study findings support the Melitz (2003) model and suggest that trade liberalization has heterogeneous value implications depending on firm size. This evidence sets the stage for my main empirical analyses in which I study long-run effects.

B. Main Findings: Public Listing Rates and Industry Concentration

In this section, I examine whether trade liberalization with China contributed to recent trends in the U.S. public equity market using the Compustat industry-year sample. I begin by regressing the log number of listed manufacturers on industry fixed effects and the POST indicator. The point estimate in column 1 in Panel A of

[17] I exclude Biological Product manufacturers (NAICS 325414) because of outliers. The industry was in the midst of a large sell-off due to a joint statement by President Clinton and Prime Minister Blair that human genome data should be freely available to all researchers.

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

TABLE 2

Stock Reactions to China's Receipt of Permanent Most-Favored Nation Status

Table 2 reports percentage cumulative abnormal returns (CARs) associated with China's receipt of permanent most-favored nation (MFN) status. On May 24, 2000, the U.S. House of Representatives voted 237 to 197 in favor of granting China permanent MFN status, thereby eliminating potential tariff hikes on Chinese goods shipped to the United States. Panel A displays 5-day CARs split according to firm size and reports significance using *t*-tests for means and Wilcoxon-tests for medians. Panel B reports OLS regressions of 5-day CARs on firm exposure to the tariff policy change, size, and controls. TARIFF_EXPOSURE is the potential tariff hike the firm's industry faced before the vote. Firms are classified as small if they report less than $250 million total sales in the fiscal year preceding the vote, and large otherwise. Continuous independent variables are standardized to have unit variance. Heteroscedasticity-consistent standard errors clustered by industry are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample consists of 1,831 U.S. public manufacturers with data available in the CRSP–Compustat Merged Database. The Appendix lists variable definitions.

Panel A. CARs by Firm Size

	Full Sample	Small Firms	Large Firms	Difference-in-Means	Difference-in-Medians
Mean CAR (%)	−0.42**	−1.20***	0.80***	−2.00***	
Median CAR (%)	−0.06	−0.68***	0.63***		−1.31***
No. of obs.	1,831	1,115	716		

Panel B. CARs by Exposure to the Tariff Policy Change and Firm Size

	CAR (%)			
	1	2	3	4
TARIFF_EXPOSURE	−0.38*	−0.75**	−0.30	−0.68*
	(0.21)	(0.30)	(0.23)	(0.35)
TARIFF_EXPOSURE × LARGE_FIRM		0.97***		0.90**
		(0.35)		(0.37)
LARGE_FIRM		−0.95		−0.64
		(1.14)		(1.19)
REGULATORY_INTENSITY			−0.03	−0.14
			(0.21)	(0.22)
TECH_INDUSTRY			−1.15**	−0.91
			(0.56)	(0.56)
UNSKILLED_LABOR_SHARE			−0.28	−0.43
			(0.31)	(0.30)
No. of obs.	1,831	1,831	1,831	1,831
R^2	0.00	0.02	0.00	0.02
Total effect on large firms		0.22		0.22
		(0.24)		(0.24)

Table 3 implies that the average manufacturing industry in my sample experienced a 36% drop in the number of publicly listed firms between the 1992–1999 pre period and the 2000–2007 post period. Models 2 and 3 isolate the impact of exposure to the tariff policy change. I standardize the TARIFF_EXPOSURE variable to have unit variance so that the coefficient on the interaction term, TARIFF_EXPOSURE × POST, is interpreted as the within-industry change in trend attributable to a 1-standard-deviation increase in exposure to the tariff policy change. Thus, the negative and statistically significant estimate in column 2 implies that an industry with 1-standard-deviation above mean TARIFF_EXPOSURE experiences a roughly 6% larger drop in the number of publicly listed firms after the policy change than the average industry.[18] The specification in column 3 refines this estimate by including industry-level controls for regulatory burden, technology, and unskilled labor. Adding these covariates has little impact on the TARIFF_EXPOSURE × POST

[18]More precisely, the coefficient estimate implies a 6.10% ($e^{0.0592} - 1 = 6.10\%$) larger drop in the number of listed firms.

coefficient, which remains large and statistically significant. The minor impact of these control variables is consistent with the wide dispersion of treatment across industries shown in Figure 2.

Columns 4–6 of Table 3 report within-industry changes in HHI after China received permanent MFN status. The coefficient in column 4 indicates that the average industry experienced a nearly 10-percentage point increase in HHI after 2000, which corresponds to a 15% increase relative to the sample mean (0.098/0.67 = 0.15). Columns 5 and 6 imply that a 1-standard-deviation increase in exposure to the tariff policy change leads to a 4% increase in HHI relative to the mean (0.027/0.67 = 0.04). Together, these estimates confirm that industry concentration increased after 2000 and imply that trade liberalization with China contributed to the trend.

TABLE 3

Evolution of U.S. Industries

Table 3 reports the estimated effect of the China MFN tariff policy change on the composition of U.S. manufacturing industries. TARIFF_EXPOSURE is the potential tariff hike that each industry faced before China obtained permanent MFN status in 2000. POST is an indicator that equals 1 from 2000 onward. Continuous independent variables are standardized to have unit variance and all estimates are multiplied by 100. Heteroscedasticity-consistent standard errors clustered by industry are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Table 1 describes the samples. The Appendix lists variable definitions.

Panel A. Compustat Industry-Year Sample

	ln(No. of Listed Firms)			Compustat HHI		
	1	2	3	4	5	6
POST	−35.78***			9.77***		
	(2.69)			(1.14)		
TARIFF_EXPOSURE × POST		−5.92**	−5.89**		2.71**	2.73**
		(2.87)	(2.89)		(1.29)	(1.31)
REGULATORY_INTENSITY			0.45			−0.35
			(1.56)			(0.64)
TECH_INDUSTRY × POST			−3.96			2.23
			(10.17)			(3.50)
UNSKILLED_LABOR_SHARE × POST			−1.06			1.27
			(2.51)			(1.13)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
No. of obs.	4,736	4,736	4,736	4,736	4,736	4,736
R^2	0.91	0.91	0.91	0.78	0.79	0.79

Panel B. Census Industry-Year Sample

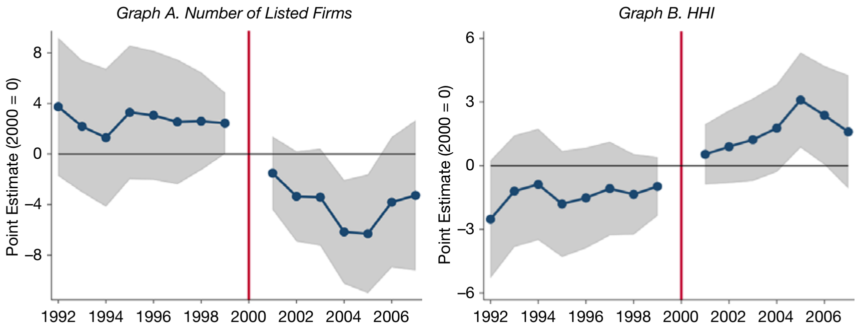
	ln(No. of Firms)			Census HHI		
	1	2	3	4	5	6
POST	−11.68***			1.15***		
	(1.89)			(0.23)		
TARIFF_EXPOSURE × POST		−12.31***	−10.96***		0.56**	0.52**
		(2.04)	(1.94)		(0.27)	(0.26)
REGULATORY_INTENSITY			−4.70***			0.42**
			(1.05)			(0.16)
TECH_INDUSTRY × POST			−15.89**			−0.59
			(6.66)			(1.40)
UNSKILLED_LABOR_SHARE × POST			−4.12**			−0.44
			(1.96)			(0.29)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
No. of obs.	834	834	834	834	834	834
R^2	0.97	0.98	0.98	0.87	0.87	0.87

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

FIGURE 4

Coefficient Dynamics

Figure 4 plots the estimated effect of the China MFN tariff policy change on the composition of U.S. manufacturing industries. Graph A plots point estimates from an industry-year panel regression of the log number of listed firms on exposure to the tariff policy change, controls, industry fixed effects, and year fixed effects. The specification is the same as that reported in column 3 in Panel A of Table 3, except that independent variables are interacted with annual dummies instead of a post 2000 indicator. Graph B plots the estimated effect of the tariff policy change on HHI using a specification analogous to column 6 in Panel A of Table 3. The magnitude of each point estimate is relative to year 2000. Shaded areas display 90% confidence intervals, adjusted for clustering by industry.



This interpretation hinges crucially on the validity of the DiD specification. Therefore, I follow the advice of Roberts and Whited (2013) and plot the timing of the effect to bolster the internal validity of my empirical design. Figure 4 plots estimates from industry-year panel regressions of the main outcome variables on exposure to the tariff policy change, controls, industry fixed effects, and year fixed effects. The specifications are the same as those reported in columns 3 and 6 in Panel A of Table 3, except that TARIFF_EXPOSURE is interacted with annual dummies instead of the post-2000 indicator. In addition, I omit the year-2000 indicator so that the magnitude of each point estimate is relative to the year of the tariff policy change. Visual inspection of Figure 4 reveals a clear break around China's receipt of permanent MFN status, encouraging a causal interpretation.

C. Economic Significance

Doidge et al. (2017) and Grullon et al. (2019) show that the recent decline in public listing rates and spike in concentration was widespread across industries, including nonmanufacturing. Hence, it is important to note that U.S. trade liberalization with China was not the sole driver of these trends. For example, Ewens and Farre-Mensa (2021) and Kwon et al. (2020) show that an increased supply of capital enabled firms to grow larger while private and delay their IPO. In addition, the secular trend in industry concentration may be partly explained by lax antitrust enforcement (Grullon et al. (2019)) and the emergence of information technology that exacerbated productivity differences among firms (McAfee and Brynjolfsson (2008)).

I assess the economic significance of the tariff policy change by calculating the effect relative to a hypothetical industry with 0 exposure (i.e., no gap between NME and MFN rates). To do so, I re-estimate the model from column 3 of Table 3 using the non-standardize TARIFF_EXPOSURE variable, multiply the estimated coefficient by each industry's exposure, and then average the implied effects across industries. My results imply that trade liberalization with China led to a 14% decline in the number of publicly listed firms during the post-period relative to a hypothetical industry with 0 exposure. Similarly, re-estimation of column 6 indicates a tariff policy induced relative increase in HHI of 6 percentage points. Assuming that absolute effects are equal in magnitude to relative effects (as assumed in Autor et al. (2013), Acemoglu, Autor, Dorn, Hanson, and Price (2016)), these estimates suggest that the U.S. trade liberalization with China explains more than one-third of the aggregate drop in publicly listed manufacturers and nearly two-thirds of the increase in manufacturing HHI between 2000 and 2007 ($14/36 = 0.4$ and $6/19 = 0.6$, respectively). Considering that roughly half of all industries with at least one publicly listed firm during the sample period are classified as manufacturing (NAICS 31–33), my estimates imply that the trade liberalization with China can account for roughly one-fifth of the total decline in the number of publicly traded U.S. corporations over the sample period ($0.5 \times 0.4 = 0.2$).[19]

D. Accounting for Private and Foreign-Owned Firms

The previous results indicate that trade liberalization contributed to recent trends among public firms. Ali et al. (2008) warn, however, that Compustat-based measures of industry concentration may be biased because they fail to capture sales from private and foreign firms. To address this concern, I repeat the analysis using data from the U.S. Economic Census, which provides a more comprehensive snapshot of industry conditions by including data from all manufacturers operating in the United States regardless of ultimate ownership. Panel B of Table 3 presents the results. The estimate in column 1 indicates that number of firms operating in the United States fell by roughly 12% in the average manufacturing industry between 1997 and 2007. Columns 2 and 3 imply that a 1-standard-deviation increase in exposure to the policy change is associated with a 12% higher decline, reducing the opportunity set of firms that could potentially be listed on U.S. exchanges.

Analysis of Census-based HHI produces similar inferences. The point estimate in column 4 of Table 3 implies that the average industry experienced a 17% increase in HHI relative to the sample mean ($0.012/0.07 = 0.17$), which is slightly above the 15% increase among public firms. Columns 5 and 6 show that a 1-standard-deviation increase in TARIFF_EXPOSURE leads to an 8% spike in HHI relative to the sample mean ($0.0056/0.07 = 0.08$) – an effect twice as large as the estimate for public firms alone. These results confirm that the tariff policy change led to an increase in industry concentration after 2000. Moreover, the difference between Compustat and Census-based results suggests that private firms,

[19]As noted by Muendler (2017), DiD estimators identify relative disparities between groups and cannot quantify absolute effects without strong assumptions. Because very few manufacturing industries have 0 exposure to the tariff policy change, my aggregation exercise requires substantial out-of-sample extrapolation along with an assumption of linearity. Therefore, while these back-of-the-envelope calculations show that trade liberalization with China played a meaningful role in the post-2000 decline in U.S. listing rates, I encourage readers to use caution when interpreting the precise magnitude of the aggregate effect.

which tend to be smaller, were particularly affected by trade liberalization with China and shows that foreign-owned firms operating in the United States did not offset the aggregate decline.

The analysis in Panel B of Table 3 uses exactly one observation for each industry pre-tariff policy change (from the 1997 Census) and one observation for each industry post (from the 2007 Census). This unique panel structure provides an opportunity to demonstrate why my 2-way fixed effects regressions can be interpreted as the average within-industry change in the outcome variable around China's receipt of permanent MFN status attributable to exposure to the policy change. As noted by Kennedy (2008), "An alternative transformation is first differencing – by subtracting the first period's observation on an individual from the second period's observation on that same individual (e.g., the intercept for that individual is eliminated). Running OLS on the differenced data produces an alternative to the fixed effects estimator. If there are only two time periods, these two estimators are identical" (p. 289). To demonstrate this equivalence, I transform the panel by differencing time-varying variables and retaining one observation per industry. In untabulated analysis, I find that the effect of Chinese trade liberalization on the number of firms in an industry is identical regardless of whether it is estimated using first-differences and no fixed effects or using levels and 2-way fixed effects. Both specifications imply that industries with 1-standard-deviation above mean exposure to the tariff policy change experience a 12% greater drop in firms between the 1997 Census and 2007 Census.

V. The Channel: Demise of Small Firms

Gao et al. (2013) show that IPO activity tumbled from an average of over 300 per year in the 1980s and 1990s to less than 100 per year today. They highlight that the trend is strongest among small firms and conjecture that the downturn could be driven by a fundamental change requiring greater economies of scope. However, the authors "leave the testing of this implication for future work" because to do so "would need industry definitions and measures of which industries have seen the greatest increase in the importance of economies of scope" (Gao et al. (2013), p. 1675). This section provides a direct test of the "economies of scope" hypothesis by studying whether trade liberalization with China had a different impact on the listing rates of small and large firms.

A. New List and Delist Rate by Firm Size

I begin by decomposing the evolution of U.S. industries into new list and delist rates. The point estimate in column 1 of Table 4 indicates that the new list rate fell by roughly 6.0 percentage points in the average manufacturing industry after 2000; an estimate that is identical to the decrease reported by Doidge et al. (2017) over the same horizon. Columns 2 and 3 show that a 1-standard-deviation increase in exposure to the tariff policy change leads to a 1.2-percentage point decrease in new list rates post 2000. Together, these estimates imply that, after 2000, the new list rate is 21% lower for industries with 1-standard-deviation above mean TARIFF_

TABLE 4

Public Listing Rates

Table 4 reports the estimated effect of the China MFN tariff policy change on public listing rates in U.S. manufacturing industries. TARIFF_EXPOSURE is the potential tariff hike that each industry faced before China obtained permanent MFN status in 2000. POST is an indicator that equals 1 from 2000 onward. Continuous independent variables are standardized to have unit variance. Heteroscedasticity-consistent standard errors clustered by industry are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample consists of 4,736 observations from 363 6-digit NAICS industries with at least 1 U.S. public manufacturer in the CRSP–Compustat Merged Database between 1992 and 2007. The Appendix lists variable definitions.

	New List Rate (%)			Delist Rate (%)		
	1	2	3	4	5	6
POST	−5.72***			3.99***		
	(0.52)			(0.59)		
TARIFF_EXPOSURE × POST		−1.20**	−1.17**		1.08*	1.14*
		(0.58)	(0.59)		(0.64)	(0.65)
REGULATORY_INTENSITY			−0.26			−0.17
			(0.47)			(0.51)
TECH_INDUSTRY × POST			0.80			−0.26
			(1.30)			(1.84)
UNSKILLED_LABOR_SHARE × POST			0.32			1.61***
			(0.48)			(0.58)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
No. of obs.	4,736	4,736	4,736	4,736	4,736	4,736
R^2	0.11	0.13	0.13	0.11	0.13	0.14

EXPOSURE (1.2/5.7 = 0.21).[20] Similarly, columns 4–6 imply that, after 2000, the delist rate is nearly 28% higher for industries that have a 1-standard-deviation above mean exposure (1.1/4.0 = 0.275). These results suggest that trade liberalization led to a decrease in the number of U.S. public firms through a combination of abnormally low new list rates and high delist rates.

Table 5 refines the dependent variable to focus separately on small firms in Panel A and large firms in Panel B. Columns 1 and 4 confirm that, although the new list rate fell for both small and large firms after 2000, small firms experienced a substantially larger drop in IPOs. Columns 2 and 3 report the effect of the tariff policy change; the estimates imply that an industry with 1-standard-deviation above mean exposure experiences a 25% larger decrease in the new list rate among small firms (1.11/4.47 = 0.248) and no significant change among large firms. Notably, the null effect for large firms is precisely estimated, with a 95% confidence interval bound tightly around the point estimate of −0.12. Panel B reports similar dynamics for delist rates.

[20] It is important to note that 21% is the estimated *average* treatment effect on the treated. Some highly exposed industries experienced a large drop in IPOs while others experienced a more moderate or 0 drop. For example, the sporting and athletic goods (NAICS 339920), plastics material and resin (NAICS 325211), and other rubber products (NAICS 326299) industries are all in the top tercile of the TARIFF_EXPOSURE distribution. The sporting and athletic goods industry had 20 IPOs over 1992–1999 and 0 over 2000–2007, while the plastics material and resin industry had 5 IPOs over 1992–1999 and 2 over 2000–2007, and the other rubber products industry had 1 IPO pre- and 1 IPO post-2000. I use new list rates instead of IPO counts to adjust for industry size and minimize the effect of outliers. As discussed in Section VI.A, inferences are robust to using fixed-effects Poisson regressions instead of OLS.

TABLE 5

Public Listing Rates by Firm Size

Table 5 reports the estimated effect of the China MFN tariff policy change on public listing rates for small and large U.S. manufacturers. TARIFF_EXPOSURE is the potential tariff hike that each industry faced before China obtained permanent MFN status in 2000. POST is an indicator that equals 1 from 2000 onward. Continuous independent variables are standardized to have unit variance. Heteroscedasticity-consistent standard errors clustered by industry are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample consists of 4,736 observations from 363 6-digit NAICS industries with at least 1 U.S. public manufacturer in the CRSP–Compustat Merged Database between 1992 and 2007. The Appendix lists variable definitions.

Panel A. Small Firms

	New List Rate (%)			Delist Rate (%)		
	1	2	3	4	5	6
POST	−4.47*** (0.46)			2.23*** (0.50)		
TARIFF_EXPOSURE × POST		−1.30*** (0.49)	−1.11** (0.49)		1.15** (0.52)	1.21** (0.54)
REGULATORY_INTENSITY			−1.02** (0.43)			−0.19 (0.40)
TECH_INDUSTRY × POST			0.73 (1.35)			−0.26 (1.43)
UNSKILLED_LABOR_SHARE × POST			0.59 (0.49)			0.70 (0.46)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
No. of obs.	4,736	4,736	4,736	4,736	4,736	4,736
R^2	0.11	0.12	0.13	0.15	0.16	0.16

Panel B. Large Firms

	New List Rate (%)			Delist Rate (%)		
	1	2	3	4	5	6
POST	−1.57*** (0.32)			1.76*** (0.38)		
TARIFF_EXPOSURE × POST		0.01 (0.35)	−0.12 (0.36)		−0.07 (0.44)	−0.07 (0.44)
REGULATORY_INTENSITY			0.51* (0.28)			0.03 (0.32)
TECH_INDUSTRY × POST			0.70 (0.52)			−0.01 (0.98)
UNSKILLED_LABOR_SHARE × POST			−0.23 (0.28)			0.92** (0.37)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
No. of obs.	4,736	4,736	4,736	4,736	4,736	4,736
R^2	0.09	0.10	0.10	0.10	0.12	0.12

B. Delist Rate by Reason

A host of studies show that regulatory changes in the early 2000s increased the cost of being a public company (Zhang (2007), Iliev (2010)) and suggest that increased regulatory costs led small firms to delist from the U.S. stock market (Engel, Hayes, and Wang (2007)). Notably, Leuz, Triantis, and Wang (2008) show that the bulk of SOX-related delistings are voluntarily SEC deregistrations, which they refer to as firms “going dark.” Therefore, I separately examine merger and acquisition (M&A)-related delistings and voluntary delistings to shed light on the economic driver behind my main result; the economies of scope hypothesis argues that trade liberalization increases the net benefit of selling-out to a larger

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

corporation but is silent about a standalone company's decision to remain public or "go dark." If my results are capturing the effect of trade liberalization, I expect the estimated impact of the tariff policy change on the small firm delist rate to be driven by M&As and not by voluntary delists.

Table 6 presents the results. Coefficient estimates in columns 1 and 4 of Panel A confirm that the post-2000 spike in small firm delists was driven by both M&A and voluntary delists. Columns 2 and 3 of Panel A suggest that a 1-standard-deviation increase in TARIFF_EXPOSURE is associated with a 0.7-percentage point increase in the small firm M&A delist rate after the policy change, a sizable impact compared to the 2.5% sample mean. In contrast, the insignificant TARIFF_EXPOSURE ×

TABLE 6

Delist Rates by Reason

Table 6 reports the estimated effect of the China MFN tariff policy change on delist rates for small and large U.S. manufacturers. Delists are classified as M&A-related or voluntary according to CRSP delisting codes. TARIFF_EXPOSURE is the potential tariff hike that each industry faced before China obtained permanent MFN status in 2000. POST is an indicator that equals 1 from 2000 onward. Continuous independent variables are standardized to have unit variance. Heteroscedasticity-consistent standard errors clustered by industry are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample consists of 4,736 observations from 363 6-digit NAICS industries with at least 1 U.S. public manufacturer in the CRSP–Compustat Merged Database between 1992 and 2007. The Appendix lists variable definitions.

Panel A. Small Firms

	M&A Delist Rate (%)			Voluntary Delist Rate (%)		
	1	2	3	4	5	6
POST	0.67**			0.71***		
	(0.30)			(0.18)		
TARIFF_EXPOSURE × POST		0.72**	0.73**		0.14	0.19
		(0.28)	(0.29)		(0.25)	(0.25)
REGULATORY_INTENSITY			0.12			−0.08
			(0.32)			(0.12)
TECH_INDUSTRY × POST			−0.97			−0.89**
			(1.32)			(0.43)
UNSKILLED_LABOR_SHARE × POST			0.02			−0.11
			(0.27)			(0.19)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
No. of obs.	4,736	4,736	4,736	4,736	4,736	4,736
R^2	0.15	0.15	0.15	0.11	0.11	0.12

Panel B. Large Firms

	M&A Delist Rate (%)			Voluntary Delist Rate (%)		
	1	2	3	4	5	6
POST	0.85**			0.00		
	(0.34)			(0.02)		
TARIFF_EXPOSURE × POST		−0.14	−0.16		0.01	0.01
		(0.38)	(0.39)		(0.01)	(0.01)
REGULATORY_INTENSITY			0.15			−0.01
			(0.28)			(0.02)
TECH_INDUSTRY × POST			−0.37			−0.03
			(0.87)			(0.04)
UNSKILLED_LABOR_SHARE × POST			0.23			−0.02*
			(0.34)			(0.01)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
No. of obs.	4,736	4,736	4,736	4,736	4,736	4,736
R^2	0.10	0.12	0.12	0.07	0.07	0.07

POST coefficients in columns 5 and 6 imply that U.S. trade liberalization with China had no incremental effect on the voluntary delist rate among small firms. Likewise, the estimates in Panel B show no statistically significant relation between the tariff policy change and the large firm delist rate. Together, the evidence in Table 6 highlights that the impact of the tariff policy change on delist rates is only evident among small firms that delist for M&A-related reasons, in line with the importance of increased economies of scope after trade liberalization.

Although the post-2000 increase in regulatory costs and associated increase in voluntary delists has received much attention in the financial press, Doidge et al. (2017) conclude that "voluntary delists are not important for understanding the evolution of the number of listings in the U.S." (p. 476). In a similar vein, Eckbo and Lithell (2022) and Lattanzio, Megginson, and Sanati (2023) show that the decline in U.S. public firms since the late 1990s is largely due to an increase in merger activity. My evidence that exposure to U.S. trade liberalization with China significantly increases the M&A-related delist rate among small firms – but not the M&A-delist rate among large firms or voluntary delist rates – supports Gao et al. (2013) "economies of scope" hypothesis and provides an explanation for the documented rise in M&A activity.[21]

Some critics also argue that regulations implemented in the early 2000s, such as SOX Section 404, contributed to the drop in U.S. IPOs.[22] In a review of 120+ articles, however, Coates and Srinivasan (2014) conclude that "the evidence that SOX reduced the number of IPOs is weak at best" (p. 17). Notably, Gao et al. (2013) show in their Figure 1 that the drop in small firm IPOs started in 2001, before SOX, and highlight that SEC revisions that lessened the burden on small companies did not lead to a reversal of the downward trend, inconsistent with the regulatory overreach hypothesis. More recently, Ewens, Xiao, and Xu (2021) draw a similar conclusion using a bunching estimator and structural model, writing that "our counterfactual analysis shows that major regulatory changes in the 2000s have had limited impact on IPO volumes. Removing SOX only increases the average annual IPO likelihood after 2000 from 0.95% to 0.96%, because many potential IPO candidates are small enough to be exempted from this regulation" (p. 5). This research lessens the plausibility of regulatory costs as an alternative explanation for my findings.

C. Potential Mechanism: Offshoring

The preceding results are consistent with heterogeneous firm models of trade that predict liberalization will differently impact large and small firms. The friction that leads to this prediction is a fixed cost of establishing global operations that only large firms have enough sales volume to afford. I conjecture that the tariff policy change affects U.S. firms through a similar mechanism. Specifically, I argue that

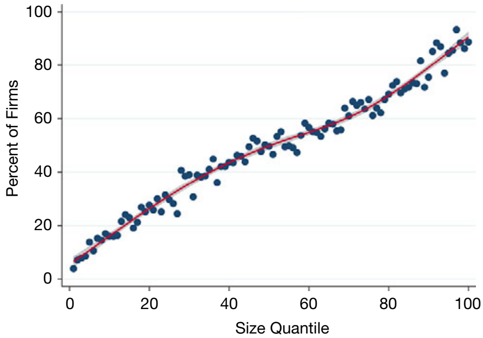
[21]My findings are also broadly consistent with Chemmanur, He, Ren, and Shu (2022), who use proprietary Census data on private firms to examine the decline in IPOs and find that private firms that went public post-2000 had higher total factor productivity relative to those going public pre-2000.

[22]See, e.g., the IPO Task Force report, "Rebuilding the IPO on-ramp: Putting emerging companies and the job market back on the road to growth" at https://www.sec.gov/info/smallbus/acsec/rebuilding_the_ipo_on-ramp.pdf.

FIGURE 5

Firm Size and Multinational Scope

Figure 5 plots the percent of U.S. public manufacturers that report multinational operations across 100 size quantiles. Firms are classified as multinational corporations if they report positive foreign sales and are sorted into 100 size groups based on total sales. The red line and gray shading plot a restricted cubic spline of this relation with 90% confidence intervals. The sample consists of 28,290 observations from 3,437 U.S. public manufacturing firms with data available in the CRSP–Compustat Merged Database between 1992 and 2007.



China's receipt of permanent MFN status exposed U.S. industries to fierce competition and only some U.S. manufacturers were able to remain competitive by offshoring production. This section investigates the validity of my conjecture.

I begin by constructing a proxy of firms' ability to offshore production to China. I do so by classifying firms as multinational if they report positive foreign sales, and domestic otherwise. My assumption is that firms with foreign sales already possess global operations and therefore have the ability to offshore production. Figure 5 confirms that this proxy is strongly related to firm size, consistent with the underlying economic friction.

Next, I examine firm-level responses. Consistent with my event study evidence, Table 7 shows that multinationals were able to withstand the trade liberalization with China while domestic manufacturers suffered. The regression specifications in Table 7 are similar to those described in Section 3, except that they are at the firm-year level rather than the industry-year level. I include firm fixed effects to isolate within-firm changes in behavior based on industry-level exposure to the tariff policy change, and cluster standard errors by industry to allow for correlation among firms with the same TARIFF_EXPOSURE. The estimate in column 1 of Panel A implies that a 1-standard-deviation increase in exposure leads to over a 9% decrease in market capitalization for the average firm after 2000. However, column 2 shows that this effect is concentrated among domestic manufacturers. Analysis of firm profitability, investment growth, and employment growth produces similar results. The results suggest that domestic firms shrank after China received permanent MFN status while multinationals were able to withstand the trade shock.

Panel C of Table 7 explores the role that financing played in firms' ability to respond. Column 2 suggests that exposed domestic firms issued significantly less new debt than exposed multinationals post-2000. Unfortunately, I cannot observe whether domestic firms issued less debt because they had fewer positive net present

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

TABLE 7

Firm Behavior

Table 7 reports the estimated effect of the China MFN tariff policy change on the performance, investment, and financing behavior of U.S. public manufacturers. TARIFF_EXPOSURE is the potential tariff hike the firm's industry faced before China obtained permanent MFN status in 2000. POST is an indicator that equals 1 from 2000 onward. Continuous independent variables are standardized to have unit variance and all estimates are multiplied by 100. Heteroscedasticity-consistent standard errors clustered by industry are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample consists of 28,290 observations from 3,437 U.S. public manufacturing firms with data available in the CRSP–Compustat Merged Database between 1992 and 2007. The Appendix lists variable definitions.

Panel A. Firm Performance

	ln(Market Capitalization)		Return on Assets	
	1	2	3	4
TARIFF_EXPOSURE × POST	−9.11***	−13.45***	−0.62*	−0.44
	(2.89)	(2.97)	(0.34)	(0.48)
TARIFF_EXPOSURE × POST × MULTINATIONAL		7.74**		−0.37
		(3.28)		(0.78)
MULTINATIONAL × POST		−7.31		0.78
		(8.93)		(2.37)
REGULATORY_INTENSITY	0.74	0.78	−0.13	−0.12
	(2.30)	(2.28)	(0.43)	(0.43)
TECH_INDUSTRY × POST	−0.70	−1.92	−4.10**	−4.09**
	(10.14)	(10.21)	(1.82)	(1.81)
UNSKILLED_LABOR_SHARE × POST	−17.78***	−17.85***	−1.23	−1.23
	(4.25)	(4.35)	(0.83)	(0.82)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of obs.	28,290	28,290	28,290	28,290
R^2	0.89	0.89	0.75	0.75
Total effect on multinational corporations		−5.71		−0.81
		(3.83)		(0.54)

Panel B. Firm Investment

	PP&E Growth		Employment Growth	
	1	2	3	4
TARIFF_EXPOSURE × POST	−1.57*	−2.68***	−0.90*	−1.69***
	(0.83)	(0.97)	(0.50)	(0.54)
TARIFF_EXPOSURE × POST × MULTINATIONAL		2.09**		1.64*
		(0.98)		(0.99)
MULTINATIONAL × POST		−2.96		−3.55
		(2.67)		(2.79)
REGULATORY_INTENSITY	−1.20	−1.19	−0.75	−0.76
	(0.79)	(0.78)	(0.54)	(0.55)
TECH_INDUSTRY × POST	−5.13***	−5.35***	−1.58	−1.61
	(1.83)	(1.92)	(1.13)	(1.14)
UNSKILLED_LABOR_SHARE × POST	−1.23	−1.23	−1.30**	−1.28**
	(0.99)	(1.00)	(0.64)	(0.64)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of obs.	28,290	28,290	28,290	28,290
R^2	0.22	0.22	0.21	0.21
Total effect on multinational corporations		−0.59		−0.06
		(0.97)		(0.87)

Panel C. Firm Financing

	Debt Issuance		Equity Issuance	
	1	2	3	4
TARIFF_EXPOSURE × POST	−0.46	−1.17***	0.71	−0.70
	(0.35)	(0.32)	(0.58)	(0.83)
TARIFF_EXPOSURE × POST × MULTINATIONAL		1.61***		2.90
		(0.45)		(1.87)
MULTINATIONAL × POST		−4.59***		−6.30
		(1.25)		(5.17)

(continued on next page)

TABLE 7 (continued)

Firm Behavior

Panel C. Firm Financing

	Debt Issuance		Equity Issuance	
	1	2	3	4
REGULATORY_INTENSITY	0.08	0.06	−2.74	−2.75
	(0.21)	(0.21)	(1.79)	(1.80)
TECH_INDUSTRY × POST	−0.87	−0.79	−0.88	−0.95
	(0.61)	(0.61)	(1.98)	(2.01)
UNSKILLED_LABOR_SHARE × POST	−1.38***	−1.35***	2.27**	2.30***
	(0.35)	(0.34)	(0.90)	(0.88)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of obs.	28,290	28,290	28,290	28,290
R^2	0.21	0.21	0.36	0.36
Total effect on multinational corporations		0.44		2.21
		(0.44)		(1.41)

value projects or because they were unable to secure financing. Nonetheless, anecdotal evidence suggests that United States–China trade relations affect the ability of U.S. multinationals to secure international financing. Prior to China's receipt of permanent MFN status, for example, the U.S. General Accounting Office (1994) stated that, "the annual MFN review process may also be a negative factor for U.S. companies in securing financing for business transactions in China from the international lending community."

Handley and Limão (2017) build a dynamic heterogeneous firm model with trade policy uncertainty and show that China's WTO ascension lowered Chinese export price indices, particularly in industries with high sunk costs of exporting. In an ideal world, I would directly observe whether multinationals responded to the tariff policy change by offshoring production and lowering product prices more than domestic competitors. Since disaggregated price data are not publicly available, however, I can only provide suggestive evidence of this mechanism. To do so, I test whether multinational firms were more likely to offshore production after China received permanent MFN status. The underlying assumption of this analysis is that offshoring enables these firms to better compete with Chinese exporters on price.

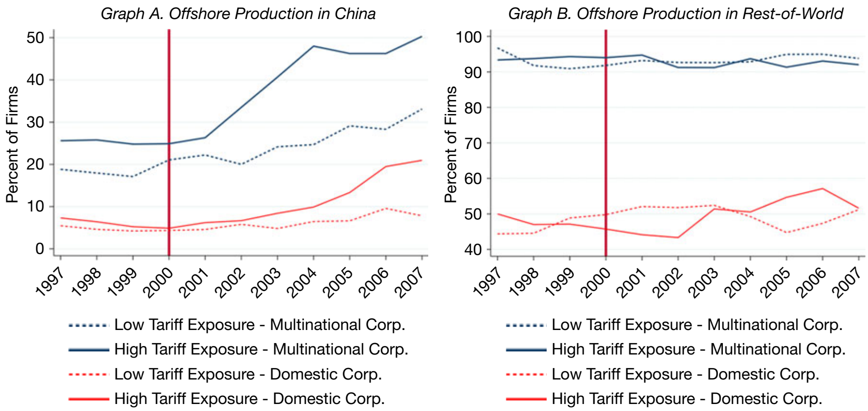
Figure 6 plots offshoring incidence using text-based data from Hoberg and Moon (2017), (2019), which is available at the firm-year level starting in 1997. Graph A shows that approximately 25% of multinationals and 5% of domestic firms produced inputs in China during the late 1990s. This fraction quickly doubled for highly exposed multinationals after the tariff policy change, while it slowly and moderately increased for domestic firms. Notably, Graph B shows that offshoring to the rest of the world remained flat over the same period, reinforcing the validity of the research design. These findings are consistent with Pierce and Schott (2016), who show that U.S. trade liberalization with China increased "related party trade," and suggest that large multinationals were able to withstand Chinese competition partly by offshoring production.

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

FIGURE 6

Offshoring

Figure 6 displays the incidence of offshoring by U.S. manufacturers. Graph A plots the percent of firms that produce inputs in China. Graph B plots the percent of firms that produce inputs in a foreign country other than China. Firms are classified as multinational if they report positive foreign sales (blue lines), and domestic otherwise (red lines). Solid (dashed) lines display firms operating in an industry that faced a high (top tercile) or low (bottom tercile) potential tariff hike before China obtained permanent MFN status. The sample consists of 18,022 firm-year observations from 2,741 U.S. manufacturers with data available in Compustat and the Hoberg and Moon (2017) offshoring database.



My firm-level results build on a large literature that documents heterogeneous responses to trade liberalization.[23] They are most closely related to Pierce and Schott (2018), who show that investment declines due to trade liberalization are concentrated among plants with low initial levels of labor productivity, capital intensity, and skill intensity. In a similar vein, Covarrubias, Gutiérrez and Philippon (2020) use Chinese import competition to establish a causal relation between competition and investment and find that competition induces relative increases in investment among industry "leaders" (defined as firms in the top quartile of market value). My event-study and firm-level analyses add to this literature by providing suggestive evidence that the inability to offshore is a potential mechanism behind the demise of small firms. Indeed, Greenland, Ion, Lopresti, and Schott (2020) show that stock reactions around changes in trade policy are positively correlated with future performance. Other potential mechanisms include differences in the ability to adapt via technological change (Bloom, Draca, and Van Reenan (2016)) or upgrade product quality (Bernard, Jensen, and Schott (2006), Khandelwal (2010)).

VI. Alternative Interpretations, Robustness Checks, and Out-of-Sample Evidence

To identify a causal effect, my research design must meet the following conditions: i) China's receipt of permanent MFN status must increase Chinese

[23]For example, prior research shows that firms with high cash holdings (Fresard (2010)), high R&D stock (Hombert and Matray (2018)), and multi-segment operations (Bai (2021)) are more resilient to trade shocks.

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

import penetration more for industries with higher TARIFF_EXPOSURE (relevance), and ii) variation in TARIFF_EXPOSURE must be uncorrelated with other industry factors that influence the outcome variables (exogeneity). In other words, high/low TARIFF_EXPOSURE industries would have followed parallel trends throughout the sample period if China did not receive permanent MFN status. Section II shows that TARIFF_EXPOSURE is a relevant determinant of Chinese import penetration and provides institutional details that suggest it is plausibly exogenous to economic conditions during the sample period. The timing of the tariff policy change, however, coincides with technological and regulatory changes in the early 2000s that potentially confound the interpretation of my results. This section discusses analyses, robustness checks, and out-of-sample evidence that mitigate the scope for omitted variable bias.

A. Alternative Interpretations and Robustness Checks

I take the following six steps to help rule out technological/regulatory changes as alternative explanations for my findings. First, I note that, although technological/regulatory changes are correlated with POST and have greater implications for small firms, they would need to be correlated with TARIFF_EXPOSURE to bias the estimated coefficient on TARIFF_EXPOSURE × POST in my 2-way fixed effects DiD regressions. Figure 2 alleviates much of this concern; TARIFF_ EXPOSURE is widely dispersed across industries and does not appear to be systematically higher in tech industries. Second, the main tables show that the estimated effect of the policy change is stable regardless of whether the specification includes TECH_-INDUSTRY and REGULATORY_INTENSITY control variables. Third, Table A1 confirms that the estimated effect of the policy change is robust to excluding technology industries from the sample. Fourth, Table A1 presents that the estimated effect of the policy change is similar regardless of whether the sample includes the peak bubble/bust years, 1998–2002. Fifth, Table 6 shows that the policy change leads to a significant increase in M&A-related delists by small firms (supporting the "economies of scope" hypothesis) but is not statistically related to the rate of voluntary delists (as would be expected if the coefficient on TARIFF_EXPOSURE × POST was capturing regulatory costs). Sixth, Figures 1, 3, and 6 show that industries with high/low TARIFF_EXPOSURE followed similar trends prior to China's receipt of permanent MFN status in 2000 and diverged thereafter. If the estimated effect was driven by technological changes, the trends would have started to diverge as the tech bubble began inflating in the late 1990s (Ritter and Welch (2002)). Similarly, if the estimated effect was driven by regulatory changes, the trends would not have diverged until SOX and the exchange listing requirements were implemented in 2002 and 2003, respectively.

The Supplementary Material probes the robustness of the main results to alternative specifications. I begin by creating a binary measure, HIGH_TARIFF_EXPOSURE, that is equal to 1 for industries in the top tercile of the exposure distribution and 0 for the bottom tercile; the middle tercile is excluded from the analysis. Table IA.1 in the Supplementary Material presents that the main results are robust to using this binary measure of tariff exposure. The estimates from the continuous exposure measure are smaller in magnitude than estimates from the

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

binary measure because the continuous measure uses all cross-sectional variation in tariff rates (shown in Figure 2) rather than a discrete cutoff for high/low exposure (in this case, terciles). The benefit of the continuous measure used in the main specification is that it is precisely estimated and does not rely on an arbitrary cutoff for "high" exposure set by the researcher; the drawback is that it imposes linearity when the true effect of tariff exposure may be nonlinear.

Table IA.2 in the Supplementary Material presents that the main results are robust to including unaffected nonmanufacturing industries in the sample.[24] The inclusion of nonmanufacturers does not meaningfully affect inferences because, by definition, these industries do not have any within-fixed effect variation in the main variable of interest (i.e., TARIFF_EXPOSURE × POST always equals 0 for these industries).[25]

Tables IA.3 and IA.4 in the Supplementary Material present that the main result is robust to using alternative fixed effects specifications. The benefit of the fixed effect model used in the main specification is that it allows each granular industry to have a unique intercept, whereas a pooled model assumes all industries in the panel have the same intercept and slope coefficients. Nevertheless, Table IA.3 in the Supplementary Material presents that the main results are robust to using a pooled model that includes no fixed effects and instead controls directly for differences in the pretreatment outcomes. To further assess the robustness of the fixed effects specification, I remove the granular 6-digit NAICS industry fixed effects and replace them with 12 broad sector fixed effects and report the results in Table IA.4 in the Supplementary Material. Unlike the "No Fixed Effects" regression that forces all industries to share a common intercept, the "Broad Sector Fixed Effects" regression only forces narrow industries within the same broad sector to share a common intercept. Visualizing through the lens of Figure 2, this specification forces the pesticide industry and the paint and coating industry (and all other granular industries in the chemicals sector depicted by rose diamonds) to share a common intercept but allows that common intercept to differ from the common intercept estimated for the computer/electronics sector (depicted by black circles). The estimates for TARIFF_EXPOSURE × POST reported in Table IA.4 in the Supplementary Material are statistically significant and directionally consistent with those in the main analysis.

[24]As shown in Figure 2, there are very few manufacturing industries completely unaffected by the tariff policy change. Nonmanufacturing industries, however, do not map to any products in the Harmonized Tariff Schedule (HTS) and therefore have 0 TARIFF_EXPOSURE. For example, while the computer manufacturing industry (NAICS 334111) maps to imported goods in the HTS and therefore has calculable TARIFF_EXPOSURE, computer programing services (NAICS 541511) and Internet service providers (NAICS 518111) do not. In general, firms that both manufacture and sell their products are classified as manufacturers, have TARIFF_EXPOSURE that can be calculated based on the HTS, and are included in the main sample. Although non-manufacturers do not have calculable TARIFF_EXPOSURE, globalization likely also increased the importance of economies of scope for these firms. In follow-on work, Irani, Pinto, and Zhang (2023) show that industry foreign sales is negatively correlated with small-firm IPOs.

[25]As noted by deHaan (2021), fixed effect groupings with no "within" variation do not directly contribute to the coefficient estimate. deHaan advises researchers to drop groups with no "within variation" (in my case, nonmanufacturing industries) if they are dissimilar from groups with "within variation."

A final concern relates to the granularity of the main unit of observation, 6-digit NAICS industry years. The benefit of using 6-digit NAICS industries is that they preserve as much of the product-level variation in tariff rates as possible without introducing measurement error from further aggregation. A potential drawback of using granular industries, however, is that they may have outcome variable distributions that are not best handled by OLS. Cohn, Liu, and Wardlaw (2022) show that fixed-effects Poisson regressions produce consistent estimates when working with count and count-like outcome variables that have a mass of values at 0. Therefore, I repeat all analyses using Poisson regressions and find that these alternative estimates produce similar inferences as the OLS regressions. For example, industries with 1-standard-deviation above mean TARIFF_EXPOSURE experience a roughly 25% larger drop in the small firm new list rate after the tariff policy change according to my OLS estimates and a 30% larger drop according to the Poisson estimates. I report Poisson regression estimates for the main results in Table IA.5 in the Supplementary Material.

B. Out-of-Sample Evidence: Stock Reactions to President Trump's Tariff Announcement

I conclude by examining stock price reactions to President Trump's surprise announcement on Mar. 1, 2018 imposing new tariffs and his corresponding tweet claiming that, "…trade wars are good, and easy to win." Although President Trump had long proclaimed anti-trade sentiments, "no one at the State Department, the Treasury Department or the Defense Department had been told that a new policy was about to be announced" (Ruhle (2018)). Therefore, this event provides an ideal setting for an out-of-sample test on the firm value implications of trade liberalization.

My event study analysis of 1,075 publicly traded U.S. manufacturers suggests that a shift in U.S. trade policy toward protectionism benefits small domestic firms and harms large multinationals. Figure 7 plots CARs in the 5 days around the event. Manufacturers in the bottom size quintile increased in value by nearly 1.5% while manufacturers in the top size quintile lost almost 1% of market value. Similarly, Table 8 shows that domestic manufacturers earned 2.5 percentage points higher CARs, on average, than multinationals around the announcement.

These findings provide an important check of the validity of my empirical design. As noted by Roberts and Whited (2013), if the onset of a treatment causes a change in behavior then its reversal should cause a return to the pre-treatment behavior. Together, my two event studies show that trade liberalization either creates or destroys value depending on firm size.

VII. Conclusion

This article empirically examines whether trade liberalization contributed to recent trends in the U.S. public equity market. Drawing on heterogeneous firm models of trade, I argue that liberalization can lead to within-industry reallocation of

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

FIGURE 7

Stock Reactions to President Trump's Tariff Announcement

Figure 7 plots percentage cumulative abnormal returns (CARs) associated with President Trump's surprise announcement on Mar. 1, 2018 imposing new tariffs and his corresponding tweet claiming that, "…trade wars are good, and easy to win." Graph A displays average CARs for 5 days around the announcement. Firms are classified as multinational if they report positive foreign sales (blue lines), and domestic otherwise (red lines). Graph B displays binned scatter plots of 5-day CARs against the natural logarithm of firm size, measured as total sales in the previous fiscal year. The sample consists of 1,075 U.S. public manufacturers with data available in the CRSP–Compustat Merged Database.

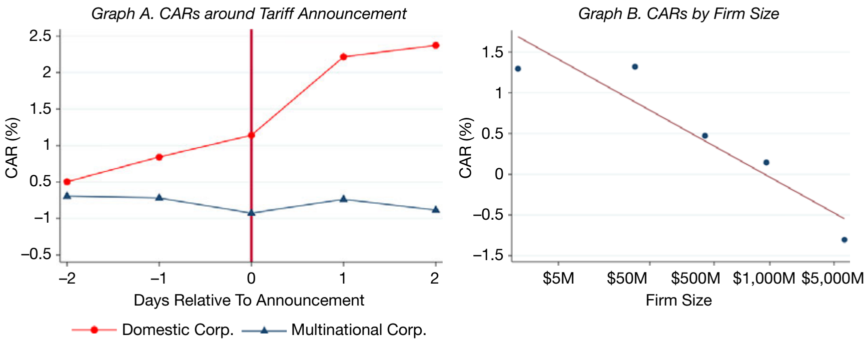


TABLE 8

Stock Reactions to President Trump's Tariff Announcement

Table 8 reports percentage cumulative abnormal returns (CARs) associated with President Trump's surprise announcement on Mar. 1, 2018 imposing new tariffs and his corresponding tweet claiming that, "…trade wars are good, and easy to win." Columns display 5-day CARs split by firm type and report significance using *t*-tests for means and Wilcoxon-tests for medians. Firms are classified as multinational if they report positive foreign sales in the fiscal year preceding the announcement, and domestic otherwise. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample consists of 1,075 U.S. public manufacturers with data available in the CRSP–Compustat Merged Database. The Appendix lists variable definitions.

	Full Sample	Domestic Corporations	Multinational Corporations	Difference-in-Means	Difference-in-Medians
Mean CAR (%)	1.08***	2.61***	0.13	2.48***	
Median CAR (%)	0.05**	1.13***	−0.31		1.44***
No. of obs.	1,075	415	660		

market shares by disproportionately harming small firms. I test this hypothesis in a DiD setting and find that manufacturing industries exposed to a tariff policy change that increase Chinese import competition experienced a decline in public listing rates and elevated concentration. Firm-level analyses show that large multinationals were able to withstand the trade shock while small domestic firms faltered. These findings suggest that public companies today are older, larger, and garner a higher portion of industry revenues, in part, because of fundamental changes in the global competitive landscape. Thus, the recent decline in the number of U.S. IPOs may not be driven solely by a reduction in the net benefits of being a *public* firm (e.g., Doidge et al. (2017), Ewens and Farre-Mensa (2021), and Kwon et al. (2020)), but also as a result of an increase in the costs of being a *small* firm, as first conjectured by Gao, Ritter, and Zhu (2013).

I bolster this interpretation by examining stock price reactions to large shifts in U.S. trade policy. Event study analysis of the May 24, 2000 U.S. House of Representatives vote granting China permanent MFN status indicates that trade liberalization increases the value of large firms and destroys the value of small firms. Similarly, stock price reactions to President Trump's Mar. 1, 2018 tariff hike and tweet that "…trade wars are good, and easy to win" imply that protectionism benefits small domestic firms while harming large multinationals. Together, this evidence suggests that trade liberalization heterogeneously affects firm value.

Although this article highlights distributional consequences of U.S. trade liberalization with China, it remains silent on welfare implications. In the Melitz (2003) model, trade liberalization increases aggregate welfare by raising the 0-profit productivity cutoff. Melitz and Ottaviano (2008) extend the model and show that trade liberalization also raises aggregate welfare through higher product variety and lower prices. However, these models require assumptions that may not perfectly map into the real world. Since young, small firms tend to innovate more than their counterparts (Loderer, Stulz, and Walchli (2017)), trade liberalization could decrease aggregate productivity in the long run by harming key firms. In either case, more research is needed to understand the impact of the trade liberalization-induced drop in U.S. listing rates documented by this article and inform the public policy debate about future trade relations.

Appendix. Variable Definitions

This appendix lists variable definitions in alphabetical order. CCM denotes the CRSP–Compustat Merged Database. Census refers to the U.S. Economic Census. HM denotes the Hoberg and Moon data library. JK denotes Joseph Kalmenovitz' website. JR denotes John Romalis' website. NBER refers to the NBER-CES Manufacturing Industry Database. PS denotes Peter Schott's website. SEG refers to Compustat's Geographic Segment File.

CAR (%): Market model percentage cumulative abnormal return (CAR) estimated using CRSP equal-weighted index returns and a 1-year estimation window (252 trading days) ending 1 month (20 trading days) before the 5-day [−2, +2] event window. Source: CCM.

CENSUS_HHI: Herfindahl–Hirschman Index calculated by summing the squared market shares of the 50 largest firms within each industry-year. Source: Census.

CHINESE_IMPORT_PENETRATION_RATIO (%): Total value of imports from China scaled by the industry's 1990-level of absorption, multiplied by 100. Absorption equals the total value of shipments plus total imports minus total exports. All values are in 2007 dollars. Source: PS and NBER.

COMPUSTAT_HHI: Herfindahl–Hirschman Index calculated by summing the squared market shares of firms within each industry-year. Source: CCM.

DEBT_ISSUANCE: Change in total long-term debt, long-term debt due in 1 year, and notes payable, scaled by lagged assets. Source: CCM.

DELIST_RATE (%): Number of firms that exit industry *j* divided by the lagged number of firms in industry *j*, multiplied by 100. Small (large) firm rates are constructed analogously, except that the numerator only includes firms with less (more) than $250 million sales in 2007 dollars. Source: CCM.

DOMESTIC_CORPORATION (0/1): Indicator equal to 1 if the firm does not report positive foreign sales, and 0 otherwise. Source: SEG.

EMPLOYMENT_GROWTH: Log number of employees minus the log of lagged employees. Source: CCM.

EQUITY_ISSUANCE: Change in common equity and deferred taxes minus change in retained earnings, scaled by lagged assets. Source: CCM.

TECH_INDUSTRY (0/1): Indicator equal to 1 for technology industries, and 0 otherwise. Industries are classified according to Loughran and Ritter's (2004) Appendix 3 and update on Jay Ritter's website. Source: CCM.

LARGE_FIRM (0/1): Indicator equal to 1 if the firm reports more than $250 million sales in 2007 dollars, and 0 otherwise. Source: CCM.

M&A_DELIST_RATE (%): Number of firms that exit industry *j* due to a merger or acquisition divided by the lagged number of firms in industry *j*, multiplied by 100. Delists are classified as M&A-related if CRSP records a delisting code between 200 and 399. Source: CCM.

MARKET_CAPITALIZATION ($B): Common shares outstanding times fiscal year closing price in billions of 2007 dollars. Source: CCM.

MFN_TARIFF_RATE (%): Average most-favored nation (MFN) ad valorem equivalent tariff rate on HTS-8 products that map to the industry in 1999. Source: JR.

MULTINATIONAL_CORPORATION (0/1): Indicator equal to 1 if the firm reports positive foreign sales, and 0 otherwise. Source: SEG.

NEW_LIST_RATE (%): Number of firms that enter industry *j* divided by the lagged number of firms in industry *j*, multiplied by 100. Small (large) firm rates are constructed analogously, except that the numerator only includes firms with less (more) than $250 million sales in 2007 dollars. Source: CCM.

NME_TARIFF_RATE (%): Average non-market economy (NME) ad valorem equivalent tariff rate on HTS-8 products that map to the industry in 1999. Source: JR.

NUMBER_OF_FIRMS: Number of companies with primary operations in industry *j*. Source: Census.

NUMBER_OF_LISTED_FIRMS: Number of publicly listed companies with primary operations in industry *j*. Source: CCM.

OFFSHORE_PRODUCTION_IN_CHINA (0/1): Indicator equal to 1 if 10-K mentions that the firm owns assets and purchases inputs from China, and 0 otherwise. Source: HM.

OFFSHORE_PRODUCTION_IN_ROW (0/1): Indicator equal to 1 if 10-K mentions that the firm owns assets and purchases inputs from a foreign country other than China, and 0 otherwise. Source: HM.

PP&E_GROWTH: Log of net PP&E minus the log of lagged net PP&E. Source: CCM.

POST: Indicator equal to 1 from year 2000 onward and 0 pre-2000.

REGULATORY_INTENSITY: Industry-year index that measures the number of active federal paperwork regulations relevant to each industry using supervised machine-learning algorithms. Kalmenovitz (2023) constructs the index by i) using textual analysis to determine the vocabulary overlap between each firm's 10-K Item 1 business description and each regulation's Form 83-I rule description, ii) using a supervised machine-learning algorithm to classify whether each regulation is relevant or irrelevant for a particular company, and iii) calculating each industry-year's regulatory intensity based on the number of active regulations classified as relevant by the algorithm. Source: JK.

RETURN_ON_ASSETS: Operating income before depreciation, divided by total assets. Source: CCM.

SMALL_FIRM (0/1): Indicator equal to 1 if the firm reports less than $250 million sales in 2007 dollars, and 0 otherwise. Source: CCM.

TARIFF_EXPOSURE (%): Potential tariff hike the industry faced before China obtained permanent MFN status in 2000, calculated as the average difference between the NME and MFN rate for HTS-8 products that map to the industry in 1999. Source: JR.

UNSKILLED_LABOR_SHARE (%): Percent of industry employees in 1999 that are production workers. Source: NBER.

VOLUNTARY_DELIST_RATE (%): Number of firms that exit industry j due to a voluntary delisting divided by the lagged number of firms in industry j, multiplied by 100. Delists are classified as voluntary if CRSP records a delisting code of 570 or 573. Source: CCM.

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press

TABLE A1

Robustness Checks for the Technology Bubble/Burst

Table A1 reports robustness tests for all industry-year analyses to assess the role of the technology bubble/burst. For each outcome, the first column reproduces estimates from the primary specification in the text, the second column repeats the analysis excluding technology industries, and the third column repeats the analysis excluding the technology bubble and bust period. Tech industries are classified according to Loughran and Ritter's (2004) Appendix 3 and update on Jay Ritter's website. Tables 3–6 describe each sample. The Appendix lists variable definitions.

Panel A. Evolution of U.S. Industries: Compustat Industry-Year Sample

	ln(No. of Listed Firms)			Compustat HHI		
	1	2	3	4	5	6
TARIFF_EXPOSURE × POST	−5.89**	−5.81*	−6.93*	2.73**	2.77**	3.44**
	(2.89)	(3.01)	(3.65)	(1.31)	(1.36)	(1.64)
REGULATORY_INTENSITY	0.45	−0.43	0.96	−0.35	−0.05	−0.43
	(1.56)	(1.61)	(2.10)	(0.64)	(0.68)	(0.85)
TECH_INDUSTRY × POST	−3.96		−7.79	2.23		3.51
	(10.17)		(12.85)	(3.50)		(4.70)
UNSKILLED_LABOR_SHARE × POST	−1.06	−1.45	−0.76	1.27	1.35	1.34
	(2.51)	(2.37)	(3.14)	(1.13)	(1.09)	(1.40)
Excluding tech industries	No	Yes	No	No	Yes	No
Excluding 1998–2002 period	No	No	Yes	No	No	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	4,736	4,316	3,218	4,736	4,316	3,218
R^2	0.91	0.88	0.91	0.79	0.76	0.78

Panel B. Evolution of U.S. Industries: Census Industry-Year Sample

	ln(No. of Firms)			Census HHI		
	1	2	3	4	5	6
TARIFF_EXPOSURE × POST	−10.96***	−11.40***	−10.96***	0.52**	0.55**	0.52**
	(1.94)	(2.01)	(1.94)	(0.26)	(0.26)	(0.26)
REGULATORY_INTENSITY	−4.70***	−4.65***	−4.70***	0.42**	0.39**	0.42**
	(1.05)	(1.07)	(1.05)	(0.16)	(0.16)	(0.16)
TECH_INDUSTRY × POST	−15.89**		−15.89**	−0.59		−0.59
	(6.66)		(6.66)	(1.40)		(1.40)
UNSKILLED_LABOR_SHARE × POST	−4.12**	−3.39*	−4.12**	−0.44	−0.39	−0.44
	(1.96)	(1.92)	(1.96)	(0.29)	(0.27)	(0.29)
Excluding tech industries	No	Yes	No	No	Yes	No
Excluding 1998–2002 period	No	No	Yes	No	No	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	834	780	834	834	780	834
R^2	0.98	0.98	0.98	0.87	0.88	0.87

Panel C. Public Listing Rates

	New List Rate (%)			Delist Rate (%)		
	1	2	3	4	5	6
TARIFF_EXPOSURE × POST	−1.17**	−1.20*	−1.82**	1.14*	1.12*	0.30
	(0.59)	(0.62)	(0.82)	(0.65)	(0.68)	(0.89)
REGULATORY_INTENSITY	−0.26	−0.38	−0.92	−0.17	−0.19	0.32
	(0.47)	(0.50)	(0.60)	(0.51)	(0.54)	(0.71)
TECH_INDUSTRY × POST	0.80		0.30	−0.26		2.01
	(1.30)		(1.68)	(1.84)		(2.30)
UNSKILLED_LABOR_SHARE × POST	0.32	0.28	0.39	1.61***	1.68***	2.07**
	(0.48)	(0.48)	(0.60)	(0.58)	(0.57)	(0.80)
Excluding tech industries	No	Yes	No	No	Yes	No
Excluding 1998–2002 period	No	No	Yes	No	No	Yes
Industry and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	4,736	4,316	3,218	4,736	4,316	3,218
R^2	0.13	0.13	0.15	0.14	0.14	0.18

(continued on next page)

TABLE A1 (continued)

Robustness Checks for the Technology Bubble/Burst

Panel D. Public Listing Rates by Firm Size: Small Firms

	New List Rate (%)			Delist Rate (%)		
	1	2	3	4	5	6
TARIFF_EXPOSURE × POST	−1.11**	−1.15**	−1.52**	1.21**	1.28**	0.56
	(0.49)	(0.51)	(0.67)	(0.54)	(0.56)	(0.64)
REGULATORY_INTENSITY	−1.02**	−1.18**	−1.71***	−0.19	−0.28	0.48
	(0.43)	(0.47)	(0.59)	(0.40)	(0.41)	(0.58)
TECH_INDUSTRY × POST	0.73		0.17	−0.26		1.40
	(1.35)		(1.75)	(1.43)		(1.79)
UNSKILLED_LABOR_SHARE × POST	0.59	0.58	0.52	0.70	0.67	0.92
	(0.49)	(0.49)	(0.61)	(0.46)	(0.45)	(0.60)
Excluding tech industries	No	Yes	No	No	Yes	No
Excluding 1998–2002 period	No	No	Yes	No	No	Yes
Industry and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	4,736	4,316	3,218	4,736	4,316	3,218
R^2	0.13	0.12	0.16	0.16	0.16	0.19

Panel E. Public Listing Rates by Firm Size: Large Firms

	New List Rate (%)			Delist Rate (%)		
	1	2	3	4	5	6
TARIFF_EXPOSURE × POST	−0.12	−0.12	−0.35	−0.07	−0.16	−0.26
	(0.36)	(0.37)	(0.52)	(0.44)	(0.45)	(0.68)
REGULATORY_INTENSITY	0.51*	0.53*	0.45	0.03	0.10	−0.17
	(0.28)	(0.31)	(0.33)	(0.32)	(0.35)	(0.42)
TECH_INDUSTRY × POST	0.70		0.95	−0.01		0.61
	(0.52)		(0.66)	(0.98)		(1.38)
UNSKILLED_LABOR_SHARE × POST	−0.23	−0.26	−0.05	0.92**	1.01***	1.16**
	(0.28)	(0.28)	(0.38)	(0.37)	(0.37)	(0.54)
Excluding tech industries	No	Yes	No	No	Yes	No
Excluding 1998–2002 period	No	No	Yes	No	No	Yes
Industry and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	4,736	4,316	3,218	4,736	4,316	3,218
R^2	0.10	0.10	0.13	0.12	0.13	0.16

Panel F. Delist Rates by Reason: Small Firms

	M&A Delist Rate (%)			Voluntary Delist Rate (%)		
	1	2	3	4	5	6
TARIFF_EXPOSURE × POST	0.73**	0.72**	0.43	0.19	0.20	0.19
	(0.29)	(0.30)	(0.40)	(0.25)	(0.26)	(0.41)
REGULATORY_INTENSITY	0.12	0.11	0.67	−0.08	−0.11	−0.22
	(0.32)	(0.33)	(0.46)	(0.12)	(0.13)	(0.22)
TECH_INDUSTRY × POST	−0.97		0.17	−0.89**		−0.59
	(1.32)		(1.59)	(0.43)		(0.51)
UNSKILLED_LABOR_SHARE × POST	0.02	0.09	0.06	−0.11	−0.12	−0.03
	(0.27)	(0.24)	(0.41)	(0.19)	(0.19)	(0.22)
Excluding tech industries	No	Yes	No	No	Yes	No
Excluding 1998–2002	No	No	Yes	No	No	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	4,736	4,316	3,218	4,736	4,316	3,218
R^2	0.15	0.16	0.19	0.12	0.12	0.15

Panel G. Delist Rates by Reason: Large Firms

	M&A Delist Rate (%)			Voluntary Delist Rate (%)		
	1	2	3	4	5	6
TARIFF_EXPOSURE × POST	−0.16	−0.23	−0.25	0.01	0.01	0.01
	(0.39)	(0.40)	(0.61)	(0.01)	(0.01)	(0.01)
REGULATORY_INTENSITY	0.15	0.18	−0.08	−0.01	−0.01	0.00
	(0.28)	(0.29)	(0.38)	(0.02)	(0.02)	(0.01)

(continued on next page)

TABLE A1 (continued)

Robustness Checks for the Technology Bubble/Burst

Panel G. Delist Rates by Reason: Large Firms

	M&A Delist Rate (%)			Voluntary Delist Rate (%)		
	1	2	3	4	5	6
TECH_INDUSTRY × POST	−0.37		0.20	−0.03		−0.05
	(0.87)		(1.25)	(0.04)		(0.03)
UNSKILLED_LABOR_SHARE × POST	0.23	0.29	0.30	−0.02*	−0.02*	−0.01
	(0.34)	(0.34)	(0.47)	(0.01)	(0.01)	(0.01)
Excluding tech industries	No	Yes	No	No	Yes	No
Excluding 1998–2002	No	No	Yes	No	No	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	4,736	4,316	3,218	4,736	4,316	3,218
R^2	0.12	0.12	0.15	0.07	0.07	0.09

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109023001424.

References

Acemoglu, D.; D. Autor; D. Dorn; G. H. Hanson; and B. Price. "Import Competition and the Great US Employment Sag of the 2000s." *Journal of Labor Economics*, 34 (2016), S141–S198.

Ali, A.; S. Klasa; and E. Yeung. "The Limitations of Industry Concentration Measures Constructed with Compustat Data: Implications for Finance Research." *Review of Financial Studies*, 22 (2008), 3839–3871.

Angrist, J. D., and J. S. Pischke. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press (2009).

Aslan, H., and P. Kumar. "Globalization, Competition and Entrepreneurial Activity: Theory and Evidence from US Households." *Journal of Monetary Economics*, 120 (2021), 83–100.

Autor, D. H.; D. Dorn; and G. H. Hanson. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review*, 6 (2013), 2121–2168.

Bai, J. "Organizational Form and Trade Liberalization: Plant-Level Evidence." *Management Science*, 67 (2021), 7755–7784.

Baker, A. C.; D. F. Larcker; and C. Y. Wang. "How Much Should We Trust Staggered Difference-in-Differences Estimates?" *Journal of Financial Economics*, 144 (2022), 370–395.

Baker, S. R.; N. Bloom; and S. J. Davis. "Measuring Economic Policy Uncertainty." *Quarterly Journal of Economics*, 131 (2016), 1593–1636.

Barrot, J. N.; E. Loualiche; M. Plosser; and J. Sauvagnat. "Import Competition and Household Debt." *Journal of Finance*, 77 (2022), 3037–3091.

Bernard, A. B.; J. B. Jensen; and P. K. Schott. "Survival of the Best Fit: Exposure to Low-Wage Countries and the (Uneven) Growth of US Manufacturing Plants." *Journal of International Economics*, 68 (2006), 219–237.

Bloom, N.; M. Draca; and J. V. Reenen. "Trade Induced Technical Change? The Impact of Chinese Imports on Innovation, IT and Productivity." *Review of Economic Studies*, 83 (2016), 87–117.

Bonaime, A.; H. Gulen; and M. Ion. "Does Policy Uncertainty Affect Mergers and Acquisitions?" *Journal of Financial Economics*, 129 (2018), 531–558.

Chemmanur, T. J.; J. He; X. Ren; and T. Shu. "The Disappearing IPO Puzzle: New Insights from Proprietary US Census Data on Private Firms." Working Paper, Boston College (2022).

Coates, J. C., and S. Srinivasan. "SOX After Ten Years: A Multidisciplinary Review." *Accounting Horizons*, 28 (2014), 627–671.

Cohn, J. B.; Z. Liu; and M. I. Wardlaw. "Count (and Count-Like) Data in Finance." *Journal of Financial Economics*, 146 (2022), 529–551.

Covarrubias, M.; G. Gutiérrez; and T. Philippon. "From Good to Bad Concentration? US Industries over the Past 30 Years." *NBER Macroeconomics Annual*, 34 (2020), 1–46.

deHaan, E. "Using and Interpreting Fixed Effects Models." Working Paper, University of Washington (2021).

Doidge, C.; A. Karolyi; and R. M. Stulz. "The US Left Behind? Financial Globalization and the Rise of IPOs Outside the US." *Journal of Financial Economics*, 110 (2013), 546–573.

Doidge, C.; A. Karolyi; and R. M. Stulz. "The US Listing Gap." *Journal of Financial Economics*, 123 (2017), 464–487.

Dyreng, S. D.; M. Hanlon; E. L. Maydew; and J. R. Thornock. "Changes in Corporate Effective Tax Rates over the Past 25 Years." *Journal of Financial Economics*, 124 (2017), 441–463.

Eckbo, B. E., and M. Lithell. "Merger-Driven Listing Dynamics." Working Paper, Dartmouth University (2022).

Engel, E.; R. M. Hayes; and X. Wang. "The Sarbanes–Oxley Act and Firms' Going-Private Decisions." *Journal of Accounting and Economics*, 44 (2007), 116–145.

Ewens, M., and J. Farre-Mensa. "The Deregulation of the Private Equity Markets and the Decline in IPOs." *Review of Financial Studies*, 33 (2021), 5463–5509.

Ewens, M.; K. Xiao; and T. Xu. "Regulatory Costs of Being Public: Evidence from Bunching Estimation." Working Paper, Columbia University (2021).

Feenstra, R. C.; J. Romalis; and P. K. Schott. "US Imports, Exports, and Tariff Data, 1989–2001." Working Paper, University of California Davis (2002).

Fresard, L. "Financial Strength and Product Market Behavior: The Real Effects of Corporate Cash Holdings." *Journal of Finance*, 65 (2010), 1097–1122.

Gao, X.; J. R. Ritter; and Z. Zhu. "Where Have All the IPOs Gone?" *Journal of Financial and Quantitative Analysis*, 48 (2013), 1663–1692.

Greenland, A. N.; M. Ion; J. W. Lopresti; and P. K. Schott. "Using Equity Market Reactions to Infer Exposure to Trade Liberalization." Working Paper, North Carolina State University (2020).

Grullon, G.; Y., Larkin; and R. Michaely. "Are US Industries Becoming More Concentrated?" *Review of Finance*, 23 (2019), 697–743.

Gu, T. "US Multinationals and Cash Holdings." *Journal of Financial Economics*, 125 (2017), 344–368.

Gulen, H., and M., Ion. "Policy Uncertainty and Corporate Investment." *Review of Financial Studies*, 29 (2016), 523–564.

Handley, K., and N. Limão. "Policy Uncertainty, Trade, and Welfare: Theory and Evidence for China and the United States." *American Economic Review*, 107 (2017), 2731–2783.

Helpman, E. "Trade, FDI, and the Organization of Firms." *Journal of Economic Literature*, 44 (2006), 589–630.

Hoberg, G., and S. K. Moon. "Offshore Activities and Financial vs Operational Hedging." *Journal of Financial Economics*, 125 (2017), 217–244.

Hoberg, G., and S. K. Moon. "The Offshoring Return Premium." *Management Science*, 65 (2019), 2876–2899.

Hombert, J., and A. Matray. "Can Innovation Help US Manufacturing Firms Escape Import Competition from China?" *Journal of Finance*, 73 (2018), 2003–2039.

Iliev, P. "The Effect of SOX Section 404: Costs, Earnings Quality, and Stock Prices." *Journal of Finance*, 65 (2010), 1163–1196.

Irani, M. V.; G. Pinto; and D. Zhang. "IPOs on the Decline: The Role of Globalization." Working Paper, University of South Carolina (2022).

Irwin, D. A. *Peddling Protectionism: Smoot–Hawley and the Great Depression*. Princeton, NJ: Princeton University Press (2011).

Julio, B., and Y. Yook. "Political Uncertainty and Corporate Investment Cycles." *Journal of Finance*, 67 (2012), 45–83.

Julio, B., and Y. Yook. "Policy Uncertainty, Irreversibility, and Cross-Border Flows of Capital." *Journal of International Economics*, 103 (2016), 13–26.

Kahle, K. M., and R. M. Stulz. "Is the US Public Corporation in Trouble?" *Journal of Economic Perspectives*, 31 (2017), 67–88.

Kalmenovitz, J. "Regulatory Intensity and Firm-Specific Exposure." *Review of Financial Studies*, 36 (2023), 3311–3347.

Kennedy, P. *A Guide to Econometrics*. Hoboken, NJ: John Wiley & Sons (2008).

Khandelwal, A. "The Long and Short (of) Quality Ladders." *Review of Economic Studies*, 77 (2010), 1450–1476.

Knowlton, B. "Final Passage of BILL to Normalize U.S. Ties is Approved, 83 to 15: Senate Vote Introduces New Era in China Trade." *New York Times*, Sept. 20, 2000.

Kwon, S.; M., Lowry; and Y., Qian. "Mutual Fund Investments in Private Firms." *Journal of Financial Economics*, 136 (2020), 407–443.

Lattanzio, G.; W. L. Megginson; and A. Sanati. "Dissecting the Listing Gap: Mergers, Private Equity, or Regulation?" *Journal of Financial Markets*, 65 (2023), 100836.

Leuz, C. "Was the Sarbanes–Oxley Act of 2002 Really This Costly? A Discussion of Evidence from Event Returns and Going-Private Decisions." *Journal of Accounting and Economics*, 44 (2007), 146–165.

Leuz, C.; A. Triantis; and T. Y. Wang. "Why Do Firms Go Dark? Causes and Economic Consequences of Voluntary SEC Deregistrations." *Journal of Accounting and Economics*, 45 (2008), 181–208.

Loderer, C.; R. Stulz; and U. Waelchli. "Firm Rigidities and the Decline in Growth Opportunities." *Management Science*, 63 (2017), 3000–3020.

Loughran, T., and J. Ritter. "Why Has IPO Underpricing Changed over Time?" *Financial Management*, 33 (2004), 5–37.

McAfee, A., and E. Brynjolfsson. "Investing in the IT That Makes a Competitive Difference." *Harvard Business Review*, 86 (2008), 98.

Melitz, M. J. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity." *Econometrica*, 71 (2003), 1695–1725.

Melitz, M. J., and G. Ottaviano. "Market Size, Trade, and Productivity." *Review of Economic Studies*, 75 (2008), 295–316.

Melitz, M. J., and D. Trefler. "Gains from Trade When Firms Matter." *Journal of Economic Perspectives*, 26 (2012), 91–118.

Muendler, M. A. "Trade, Technology, and Prosperity: An Account of Evidence from a Labor-Market Perspective." Working Paper, World Trade Organization (2017).

Petersen, M. A. "Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches." *Review of Financial Studies* 22 (2008), 435–480.

Pierce, J. R., and P. K. Schott. "The Surprisingly Swift Decline of US Manufacturing Employment." *American Economic Review*, 106 (2016), 1632–1662.

Pierce, J. R., and P. K. Schott. "Investment Responses to Trade Liberalization: Evidence from US Industries and Establishments." *Journal of International Economics* 115 (2018), 203–222.

Ritter, J. R., and I. Welch. "A Review of IPO Activity, Pricing, and Allocations." *Journal of Finance* 57 (2002), 1795–1828.

Roberts, M. R., and T. M. Whited. "Endogeneity in Empirical Corporate Finance." In *Handbook of the Economics of Finance*, Vol. 2, G. M. Constantinides, M. Harris, and R. M. Stulz, eds. Amsterdam: Elsevier (2013), 493–572.

Ruhle, S. "Trump Was Angry and 'Unglued' When He Started a Trade War, Officials Say." *NBC News* (2018).

Schmitt, E., and J. Kahn. "The China Trade Vote: A Clinton Triumph; House, in 237–197 Vote, Approves Normal Trade Rights for China." *New York Times* (2000).

U.S. General Accounting Office. U.S. Government Policy Issues Affecting U.S. Business Activities in China. Report to the Chairman, Committee on Government Affairs, and the Honorable Joseph I. Lieberman, U.S. Senate. (1994).

Zhang, I. X. "Economic Consequences of the Sarbanes–Oxley Act of 2002." *Journal of Accounting and Economics* 44 (2007), 74–115.

https://doi.org/10.1017/S0022109023001424 Published online by Cambridge University Press