

The obstruction of customs enforcement at privately operated port terminals: A study of Chinese state-owned enterprises

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Abstract

Port terminals which facilitate the import, export, and transshipment of seaborne cargo are predominantly operated by private firms. While private sector involvement in terminal operations has brought many advantages, their profit-oriented interest in deregulation and maximizing cargo throughput can put them at odds with port-level regulatory agencies. This is particularly the case with customs agencies, for which enforcement activities often require slow and intrusive scrutiny of cargo passing through port terminals. In this article, we argue that this tension may cause private terminal operators (PTOs) to obstruct customs enforcement. We identify six mechanisms through which PTOs can obstruct customs enforcement. And we argue the conditions under which PTOs are most likely to so obstruct customs enforcement through a case study of Chinese PTOs. On this basis, we present PTOs as an important stakeholder in efforts to ensure compliance with customs regimes and offer policy recommendations for improving PTO-customs relations in privately operated port terminals.

Keywords

Port terminal, privatization, customs, enforcement; China; state-owned enterprises.

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Introduction

Since the 1980s, seaports around the world have been increasingly subject to privatization as port authorities seek to expand their efficiency, connectivity, and profitability.¹ This wave of port privatization has created numerous benefits for ports and port states, including integration with maritime trade networks, economic development in port cities, reduced logistics costs, employment, and profits through port fees.² While these benefits are widely acknowledged, the shift from ports as public utilities to combined public/private spaces has brought new challenges to port governance. Several such challenges related to information sharing, risk sharing, and collective action have been argued in the literature.³ One governance challenge associated with the growing role of the private sector in port terminal operations that has yet to be interrogated, however, is that related to customs enforcement, which is centered on monitoring the movement of goods through port terminals and intercepting illicit, dangerous, and undeclared cargoes.

As profit-driven private terminal operators (PTOs) have increasingly taken over port terminal operations, they have prioritized speed and efficiency in cargo handling.⁴ This creates a tension with public customs enforcement agencies, whose functions often require slow and intrusive scrutiny of cargo passing through those terminals.⁵ In this paper, we investigate how this tension bears on PTO-customs relations in privately

¹ Shu-Ling Chen, "Port Administrative Structure Change Worldwide: Its Implication for Restructuring Port Authorities in Taiwan," *Transport Reviews* 29, no. 2 (2009); Theo Notteboom, "Chapter 19 Concession Agreements as Port Governance Tools," *Research in Transportation Economics* 17 (2006); Alfred J Baird, "Port Privatisation: Objectives, Extent, Process, and the Uk Experience," *International Journal of Maritime Economics* 2, no. 3 (2000).

² On the externalities of port development, see Salvador del Saz-Salazar and Leandro García-Menéndez, "Port Expansion and Negative Externalities: A Willingness to Accept Approach," *Maritime Policy & Management* 43, no. 1 (2016); S. J. Pettit, "United Kingdom Ports Policy: Changing Government Attitudes," *Marine Policy* 32, no. 4 (2008); César Ducruet, Juhász, Réka, Nagy, Dávid Krisztián, Steinwender, Claudia, *All Aboard: The Aggregate Effects of Port Development*, Working Paper 28148 (NBER Working Paper Series, 2021); Maurice Jansen, Rob van Tulder, and Rikky Afrianto, "Exploring the Conditions for Inclusive Port Development: The Case of Indonesia," *Maritime Policy & Management* 45, no. 7 (2018).

³ See, for example, Martijn R. Van Der Horst and Peter W. De Langen, "Coordination in Hinterland Transport Chains: A Major Challenge for the Seaport Community," *Maritime Economics & Logistics* 10, no. 1 (2008); Carlos Oliveira Cruz and Rui Cunha Marques, "Risk-Sharing in Seaport Terminal Concessions," *Transport Reviews* 32, no. 4 (2012).

⁴ Jose Tongzon and Wu Heng, "Port Privatization, Efficiency and Competitiveness: Some Empirical Evidence from Container Ports (Terminals)," *Transportation Research Part A: Policy and Practice* 39, no. 5 (2005).

⁵ Nitin Bakshi, Stephen E Flynn, and Noah Gans, "Estimating the Operational Impact of Container Inspections at International Ports," *Management Science* 57, no. 1 (2011).

operated port terminals. Specifically, we argue that PTOs have two general strategies for relieving this burden of customs enforcement: facilitating customs enforcement, for example by improving the efficiency of enforcement activities through information sharing and the provision of state-of-the-art inspection equipment; and obstructing customs enforcement, for example by withholding access to terminal facilities and corrupting enforcement agents. We further argue that PTOs are more likely to choose to obstruct customs enforcement when they are state-owned enterprises (SoEs).

In making this argument, this paper makes three primary contributions to the literature. First, it demonstrates the influence that PTOs have in the effectiveness of customs enforcement at seaports. This should encourage port states to engage with PTOs as stakeholders in customs compliance efforts. Second, it identifies the conditions under which PTOs are most likely to obstruct customs enforcement, thereby raising the risk of customs violations (i.e. by importers/exporters moving cargoes through the terminal) succeeding. This understanding of risk will assist port states in crafting interventions and directing limited customs enforcement resources to port terminals of greatest need. And third, it advances a series of policy recommendations for reducing the obstruction of customs enforcement activities by PTOs, providing port states with a suite of tools for improving PTO-customs relations and, by extension, port-level compliance with customs regimes.

This paper proceeds in six stages. First, we advance a theory of PTO-customs relations, arguing that PTOs will strategically choose to facilitate or obstruct customs enforcement activities based on their beneficial ownership. Second, we advance a methodology for testing this theory. Third, we execute that methodology, finding tentative support for our theory. Fourth, we draw out the policy implications of this finding. Fifth, we suggest areas for further study. And sixth, we offer concluding remarks.

PTO-customs relations in privately operated port terminals

For most of the 20th Century, the public sector had a dominant role in the development, operation, and regulation of ports. This public dominance lasted until the 1980s, at which point declining port performance pushed government authorities to turn to the private sector.⁶ Privatizing seaports

⁶ Grace Wenyao Wang, Kris Joseph Knox, and Paul Tae-Woo Lee, "A Study of Relative Efficiency between Privatised and Publicly Operated Us Ports," *Maritime Policy & Management* 40, no. 4 (2013).

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was seen to have two main advantages. First, it would inject private capital into ports, minimizing the need for public-sector financing to support trade. And second, it would improve the efficiency and profitability of ports by leveraging private sector expertise.⁷ Thus began the global wave of port privatization. While port states would typically retain their regulatory functions through statutory port authorities, the development and operation of the port terminals handling cargo were outsourced to PTOs.⁸

As commercial entities, PTOs have an overarching interest in maximizing profits. In the business of port terminal operations, the speed and efficiency with which cargo is handled is one of the most significant determinants of profits.⁹ More speed and more efficiency means higher throughput and faster deliveries, which in turn means more and higher-value cargo handling fees.¹⁰ Given the commercial importance of speed and efficiency in private terminal operations, *any* factor that hinders the speed or efficiency with which cargo is imported, exported, or transshipped through a port terminal will be viewed by the PTO as a liability.¹¹ Customs enforcement is one such factor. Acts of customs enforcement include, for example, holding consignments in port while their supporting documentation (export licenses, certificates of origin etc.) are verified; boarding vessels to inspect for signs of smuggled cargo; running packed consignments through inspection devices such as radiation portals and x-ray scanners; and physically opening and unpacking consignments for visual inspection. All such activities have the potential to slow the movement of cargo and impose costs on PTOs.¹² In an extreme example, customs enforcement agencies may demand the inspection of a container onboard an incoming vessel, requiring the PTO

⁷ Alfred J. Baird and Vincent F. Valentine, "Port Privatisation in the United Kingdom," *Research in Transportation Economics* 17 (2006); Baird, "Port Privatisation: Objectives, Extent, Process, and the UK Experience."

⁸ Dirk Sommer, *Private Participation in Port Facilities: Recent Trends* (World Bank, 1999).

⁹ Wayne K. Talley, "Note: Determinants of Cargo Port Choices by Cargo Port Service Providers," *Transportation Research Part E: Logistics and Transportation Review* 132 (2019).

¹⁰ George Vrakas, Caroline Chan, and Vinh V. Thai, "The Effects of Evolving Port Technology and Process Optimisation on Operational Performance: The Case Study of an Australian Container Terminal Operator," *The Asian Journal of Shipping and Logistics* 37, no. 4 (2021).

¹¹ Karol Moszyk, Mariusz Deja, and Michal Dobrzynski, "Automation of the Road Gate Operations Process at the Container Terminal—a Case Study of Dct Gdańsk Sa," *Sustainability* 13, no. 11 (2021).

¹² Andrew Grainger, "Trade and Customs Compliance Costs at Ports," *Maritime Economics & Logistics* 16, no. 4 (2014); Bakshi, Flynn, and Gans, "Estimating the Operational Impact of Container Inspections at International Ports."; Alwyn Hoffmann, Schalk Rabe, and Kristen Hartpence, "Quantifying the Relative Contributions of Customs, Trade and Ports to Cargo Time Delays," *World Customs Journal* 15 (2021).

to hold the vessel in port while it unloads all higher-tier containers, removes the container of interest, and then re-loads the unloaded containers, potentially slowing by hours or days the shipment of hundreds or thousands of legitimate consignments. Thus, profit-oriented PTOs will invariably look for strategies to relieve the burden of customs enforcement.

Strategies for relieving the burden of customs enforcement

There are two general, ideal-type approaches that PTOs can take to relieve the burden of customs enforcement: facilitation and obstruction. 'Facilitation' involves a PTO working with customs enforcement agencies to improve the efficiency with which the latter's activities are undertaken, the logic being that, while disruptive customs enforcement activities will still occur, they will at least be completed quicker and more efficiently, thus minimizing their net disruptive effect on cargo handling. Facilitation may, for example, involve the PTO coordinating terminal operations with customs enforcement, such as through harmonizing standard operating procedures or facilitating information sharing on inbound/outbound cargo; or providing customs agencies with advanced, non-intrusive inspection technologies such as x-ray scanners and radiation portals to offset the need for slower visual inspections.¹³

'Obstruction' takes the opposite approach. Rather than viewing improved efficiency in customs enforcement as the path to minimizing disruptions, an obstructionist approach aims to minimize the burden of customs enforcement by reducing the frequency and intensity of enforcement activities. In other words, PTOs will 'obstruct' enforcement activities in the hope that the reduced scrutiny of their cargo will speed up cargo handling, leading to higher profits.

There are several mechanisms through which PTOs, in the course of ordinary business, can so obstruct customs enforcement activities. First, PTOs may *restrict terminal and/or cargo access* (mechanism 1). Customs agencies may require access to the operator's terminal facilities and the cargo contained therein, for example to observe the movement of cargo to inspection zones, conduct on-site inspections, or inspect cargo and vessels for the red flags of non-compliant trade. PTOs can obstruct these activities by hindering customs agencies' access to their terminal facilities and/or the cargo contained therein, for example by refusing to

¹³ Stephen Osborne, ed. *Handbook of Best Practices for Strategic Trade Control Enforcement at Ports* (London: Centre for Science and Security Studies, King's College London, 2023), pp. 14-15.

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provide escorts; refusing to provide labor or equipment for moving and unpacking cargo; fabricating reasons as to why inspectors cannot enter the terminal, e.g. due to safety concerns or equipment failure; charging unreasonable costs for moving and unpacking cargo; challenging in legal fora agencies' rights to enter the terminal; or threatening to scale back or terminate operations if access is enforced.

Second, PTOs may *restrict information sharing* (mechanism 2). Importers/exporters typically submit documentation on cargo consignments—bills of lading, import/export licenses etc.—to both local customs agencies and the PTO. In some cases, the former may want to validate these documents by comparing their copies with those of the latter to look for inconsistencies that may suggest the misreporting of cargo contents. PTOs can obstruct these activities by hindering customs agencies' access to their documentation using similar methods as above: challenging in legal fora agencies' rights to access the documents, threatening to scale back or terminate operations if document access is enforced, etc.

Third, PTOs may *underreport the red flags of customs violations* (mechanism 3). PTOs may become aware of potential customs non-compliant trade running through their terminals, for example through analysis of documentation submitted by the importer/exporter or by observing the red flags of illicit trade: broken tamper seals, etc. In such cases, the PTO may choose to not notify customs agencies of these findings, preventing the proper scrutiny of the suspicious consignment.

Fourth, PTOs may *fail to provide the necessary infrastructure and equipment for customs enforcement* (mechanism 4). Under private terminal operations agreements, PTOs are often required to provide, develop, and maintain terminal infrastructure and equipment. Certain such infrastructure and equipment will be necessary for customs enforcement, for example inspection zones, office space for enforcement staff, and enforcement-relevant equipment such as x-ray scanners.¹⁴ PTOs may obstruct customs enforcement by hindering the provision, development, and maintenance of such infrastructure and equipment, for example by constructing substandard facilities, stalling works, or lobbying to have such requirements scrapped from the terminal operations agreement.

¹⁴ For a sample enumeration of such infrastructure and equipment, see "Port Infrastructure Fund," Cabinet Office (UK), <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/974603/20201002-Prospectus-PIF-Port-Prospectus-vFINAL.pdf>.

Fifth, PTOs may *disrupt customs-relevant information flows* (mechanism 5). In most modern ports, customs-relevant equipment such as x-ray scanners, radiation detectors, and weigh-in-motion bridges return results digitally.¹⁵ Where PTOs provide this equipment, PTOs may knowingly provide equipment with backdoors that they use to disrupt customs enforcement, for example by blocking data transfers or returning false results. In an illustrative example, a multimillion-dollar contract for x-ray scanners in Canada was cancelled after concerns were raised that they might contain backdoors that would allow the 'spoofing of scanning results' and thus allow the unchecked entry of 'nefarious devices'.¹⁶

And sixth, PTOs may *engage in corruption with customs enforcement officers* (mechanism 6). Certain customs enforcement officers, as with individuals in nearly every profession, engage in corruption, with a 2020 report from the World Bank concluding that 'There are few public agencies in which the preconditions for corruption are as clearly present as they are in customs administrations.'¹⁷ In most cases, corrupt activities will be initiated by the customs enforcement officers themselves, for example by artificially holding up consignments and demanding 'fees' to have them released.¹⁸ In some cases, however, PTOs may leverage the corruptibility of customs enforcement officers as a strategy for minimizing the burden of customs enforcement, for example by bribing officers to eschew inspections or release detained cargo without proper scrutiny.

Strategic decision making

Profit-motivated PTOs can thus adopt one of two ideal-type strategies for relieving the burden of customs enforcement: facilitation or obstruction (Figure 1). This is, admittedly, a simplification of the relationship between

¹⁵ Chenhao Zhou et al., "Emerging Technology and Management Research in the Container Terminals: Trends and the Covid-19 Pandemic Impacts," *Ocean & Coastal Management* 230 (2022); F. Heijmann, Tan, Y.-H., Rukanova, B., & Veenstra, A., "The Changing Role of Customs: Customs Aligning with Supply Chain and Information Management," *World Customs Journal* 14, no. 2 (2020).

¹⁶ Robert Kitchen (ed.), *Ensuring Robust Security in Federal Purchasing: Report of the Standing Committee on Government Operations and Estimates* (House of Commons (Canada), 2021), p. 40. See also Gordon Lubold Aruna Viswanatha, Kate O'Keeffe, "Pentagon Sees Giant Cargo Cranes as Possible Chinese Spying Tools," *The Wall Street Journal*, <<https://www.wsj.com/politics/national-security/pentagon-sees-giant-cargo-cranes-as-possible-chinese-spying-tools-887c4ade>>.

¹⁷ Ernani Checcucci Filho and Gaël Raballand Odd-Helge Fjeldstad, "Customs Administration," in *Enhancing Government Effectiveness and Transparency: The Fight against Corruption* (Washington D.C.: World Bank, 2020), p. 123.

¹⁸ See the literature on 'rent extraction,' e.g. Fred S. McChesney, "Rent Extraction and Rent Creation in the Economic Theory of Regulation," *The Journal of Legal Studies* 16, no. 1 (1987).

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PTOs and customs agencies. In practice, PTOs may adopt elements of both facilitation *and* obstruction in their engagements with customs agencies. And there may be PTO behaviors vis-à-vis customs enforcement that don't neatly fit into the facilitate/obstruct dichotomy.

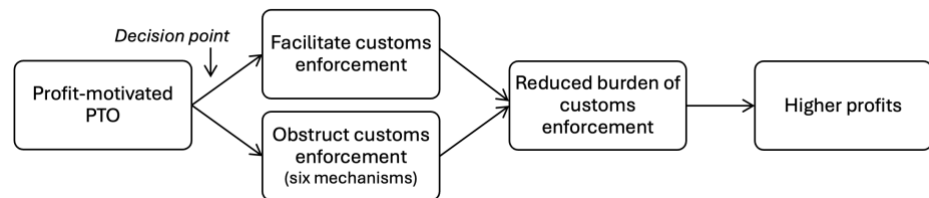


Figure 1 Competing PTO strategies for relieving the burden of customs enforcement

While a simplification, this conceptual framework does enable two critical deductions regarding PTO-customs relations. First, conflicting PTO behaviors toward customs agencies (i.e. facilitation vs obstruction) can both be rational responses to the same underlying challenge of burdensome customs enforcement. And second, understanding that a PTO's facilitation or obstruction of customs enforcement is the result of strategic decision making allows one to theorize the conditions under which PTOs will choose one approach over the other.

In this section, we theorize that PTOs that are beneficially owned by a national government (i.e. SoEs) are more likely to obstruct customs enforcement than their privately owned counterparts. There are two causal mechanisms underpinning this theoretical claim. First, state-owned PTOs may be compelled by their controlling government to obstruct customs agencies. National governments often have an interest in keeping trade to and from their jurisdictions confidential, for example to maintain secrecy in industrial strategy; to prevent adversaries from learning of the movement of strategic goods; or to prevent embroilment in diplomatic spats when they or their citizens move sensitive, controlled, and even illicit goods through foreign jurisdictions. For example, in 2018 China instructed its national customs authority to delay indefinitely the release of Chinese trade data for fear that the publication of such data could undermine its position in trade negotiations with the US.¹⁹ The Chinese government has also been accused of either covertly facilitating or suppressing evidence of sensitive and/or restricted trades to and from

¹⁹ Chen Aizhu and Tom Daly, "Where's the Data? Angst for Commodities Traders as China Trade Figures Held in Limbo," Yahoo Finance, <<https://uk.finance.yahoo.com/news/wheres-data-angst-commodities-traders-china-trade-figures-122340240--finance.html>>; "China Audit Office Tells Customs Selling Trade Data Is A'problem'," Reuters, <<https://www.reuters.com/article/us-china-economy-trade-idINKBN1JG1DN>>.

China, including oil exports to North Korea²⁰—and advanced technology imports from the US.²¹ To the extent that the national government is able to leverage its beneficial ownership over PTOs to influence the latter's port-level behavior;²² and to the extent that the PTO handles cargo running to, from, or through the jurisdiction of its controlling government, that PTO may be compelled to obstruct customs agencies to protect these interests in trade confidentiality.²³

The second reason why state-owned PTOs are theoretically more likely to obstruct customs enforcement than their privately owned counterparts relates to government advocacy. National governments that beneficially own PTOs may lobby foreign port states to advance the commercial interests of the former's PTOs.²⁴ Returning to the China example, in 2018 the Chinese Embassy in Athens petitioned the Greek Government directly to put down industrial action at terminals in the Port of Piraeus operated by the Chinese state-owned PTO COSCO Shipping.²⁵ And in 2021, Sri Lankan authorities discovered in the Port of Hambantota an undeclared consignment of uranium hexafluoride bound for China that had docked at the terminal of Chinese state-owned PTO China Merchants. According to the Sri Lankan Leader of the Opposition, 'the Sri Lankan government continues to be pressurized by a "diplomatic mission" to bury the issue', almost certainly a reference to China.²⁶ Such advocacy is likely to give state-owned PTOs confidence that they can obstruct customs

²⁰ Daniel Wertz, "China-North Korea Trade: Parsing the Data," 38 North, <<https://www.38north.org/2020/02/dwertz022520/>>; Christopher J. Watterson, "What Next for Sanctions against North Korea?," *Bulletin of the Atomic Scientists* 75, no. 5 (2019).

²¹ *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2019*, (Washington D.C.: Office of the Secretary of Defense, 2019), pp. 103-4.

²² See Isaac B. Kardon and Wendy Leutert, "Pier Competitor: China's Power Position in Global Ports," *International Security* 46, no. 4 (2022).

²³ OECD, *State-Owned Enterprises as Global Competitors: A Challenge or an Opportunity?* (Paris: OECD Publishing, 2016), p. 19.

²⁴ OECD, *State-Owned Enterprises as Global Competitor*, p. 30; Xu Yi-Chong, "Chinese State-Owned Enterprises in Africa: Ambassadors or Freebooters?," *Journal of Contemporary China* 23, no. 89 (2014). Though such support may also be extended to private enterprises. See Geoffrey Gertz, "Commercial Diplomacy and Political Risk," *International Studies Quarterly* 62, no. 1 (2018).

²⁵ Ilias Bellos, "Piraeus Port Blockade Draws China Complaint," Ekathimerini, <<https://www.ekathimerini.com/news/229209/piraeus-port-blockade-draws-china-complaint/>>.

²⁶ AFP (Colombo), "Sri Lanka Expels Ship Carrying Nuclear Material for China," France 24, <<https://www.france24.com/en/live-news/20210421-sri-lanka-expels-ship-carrying-nuclear-material-for-china>>; "Sri Lanka Expels China-Bound Vessel with Nuclear Material at Hambantota Port," Statecraft, <<https://www.statecraft.co.in/article/sri-lanka-expels-china-bound-vessel-with-nuclear-material-at-hambantota-port>>.

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enforcement by raising the expectation that their controlling government will intervene to prevent sanctions in the event of a dispute.²⁷

The sum of these theoretical considerations is that we would, *ceteris paribus*, expect to see higher rates of obstructing customs enforcement at port terminals operated by state-owned PTOs compared with those operated by privately owned PTOs. In the following section, we develop a methodology for testing this hypothesis.

Methodology

Testing our hypothesis requires observing the extent to which state-owned and privately owned PTOs obstruct customs enforcement at their port terminals. Sourcing such data is, however, problematic. Interactions between customs and PTOs, particularly when it comes to PTOs *obstructing* customs enforcement, are generally underreported by both sides, for example due to concerns around reputational damage, privacy, libel, and non-disclosure.

Accordingly, and in the absence of reliable primary data, we developed a proxy variable for indirectly observing the extent to which PTOs obstruct customs enforcement at their port terminals. Specifically, we measured the *sentiment* of public reporting on specific PTOs operating at specific port terminals ('PTO-terminals,' our unit of analysis). We posit that lower levels of such reporting sentiment will correlate with higher levels of the obstruction of customs enforcement by the PTO at the PTO-terminal. This posited correlation between the obstruction of customs enforcement and negative reporting sentiment is based on three assumptions. First, the actual obstruction of customs enforcement by PTOs at their terminals, where it becomes public, will lead to negative reporting on the PTO-terminal. Second, customs violations are more likely to succeed (i.e. avoid interdiction by the customs agency) at terminals where PTOs obstruct customs enforcement. Where these customs violations are discovered, it will lead to negative reporting on the PTO-terminal. And third, a PTO's obstruction of customs enforcement at a particular terminal will cultivate wider pathologies in terminal operations that are likely to attract negative reporting, for example disputes between the terminal operator and customs (mechanism 1), infrastructure development delays and equipment failure (mechanism 4), and corruption in local customs enforcement (mechanism 6).

²⁷ For a similar dynamic in environmental regulation, see Sarah Eaton and Genia Kostka, "Central Protectionism in China: The "Central Soe Problem" in Environmental Governance," *The China Quarterly* 231 (2017).

We chose to focus our analysis on PTOs from the People's Republic of China, inclusive of Hong Kong ('China'). This is because China is home to numerous privately owned and state-owned PTOs with significant foreign investment portfolios, providing many data points for analysis. At the same time, limiting analysis to PTOs from a single state controls for confounding variables related to the PTO's home country. For example, PTOs from certain states may be more or less inclined to facilitate or obstruct customs agencies abroad due to more or less stringent laws governing transparency and customs compliance at home.²⁸

For data on Chinese PTO-terminals, we referred to the Watterson-de Saint Rapt-Yun Chinese Port Investment Dataset, which provides the most comprehensive enumeration of Chinese PTOs and their terminals that the authors are aware of. This Dataset also includes data on the beneficial ownership of those PTOs, i.e. whether they are private- or state-owned.²⁹ We excluded from analysis PTO-terminals that were coded only as 'construction' projects as construction doesn't typically give the PTO control over the day-to-day terminal operations that are most likely to intersect with customs enforcement. We also excluded from analysis PTO-terminals for which data on the PTO's beneficial ownership were not available or were coded with low confidence. We counted as state-owned those PTOs that were coded as beneficially owned by the national Chinese government as well as provincial Chinese governments.

We used the Bing Web Search API to scrape the internet for all English-language webpages that mentioned both: (1) the PTO; and (2) the terminal that they operate and/or the port in which that terminal is located. We then performed a sentiment analysis of these results on a ten-point scale (higher scores meaning more positive sentiment) using natural language processing. Natural language processing utilized OpenAI's GPT (generative pre-trained transformer) model for generative artificial intelligence. GPT models are trained on large-scale datasets to process, classify, integrate, and deduce meaning from text. This capability enables the GPT to infer the sentiment of a prompt text probabilistically, rather than relying on predefined rules or lexicons.³⁰ The GPT was tasked with returning sentiment scores based on a text prompt. The full texts of identified web pages (as above) were then fed into the GPT as discrete text prompts and the returned sentiment score for each was recorded.

²⁸ Justin Tan and Liang Wang, "Mnc Strategic Responses to Ethical Pressure: An Institutional Logic Perspective," *Journal of Business Ethics* 98, no. 3 (2011).

²⁹ Christopher J. Watterson, Jean-Annet de Saint Rapt, and Eunha Yun, "China's State-Led International Port Development: Challenges for Port States," *Marine Policy* 155 (2023).

³⁰ Tom Brown et al., "Language Models Are Few-Shot Learners," *Advances in neural information processing systems* 33 (2020).

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Because the API returned every webpage that mentioned both the PTO and the terminal/port, there were many results that had no substantive link to PTO-customs relations, e.g. telephone directories. To manage the random error challenges associated with this, we implemented a control to filter out irrelevant results. Specifically, in addition to returning a sentiment score for the chosen webpage, we asked the GPT to return a score (again, on a one-to-ten scale) in response to the following question: 'To what extent does this result discuss the functions and/or performance of the terminal operator?' We then excluded from analysis observations that did not score at least a '5' on this scale.

To allow us to sort the observations based on relevance to our dependent variable (the obstruction of customs enforcement), we nominated nine keywords conceptually relevant to the six mechanisms of obstruction outlined above (keywords included 'corruption,' 'contraband,' etc.) and recorded how frequently each appeared in the webpage text.³¹ We then divided the discrete sentiment scores for each PTO-terminal into two groups: those from webpages with at least one mention of at least one key word, and those without. For each PTO-terminal, sentiment scores from webpages *without* keywords were averaged and treated as the baseline sentiment score for that PTO-terminal. And, for that same PTO-terminal, sentiment scores from webpages *with* at least one keyword were averaged and compared to the baseline score to return the treatment effect, i.e. the change in reporting sentiment regarding specific PTO-terminals when reporting addressed customs-related matters. We then recorded this difference in means as our treatment effect for each PTO-terminal. For example, if the treatment effect had a value of -1.5, the reporting sentiment for the focal PTO-terminal dropped 1.5 points (on a ten-point scale) when discussing customs-related matters.³²

As per the assumptions outlined above, we recognize lower values of the treatment effect as a proxy for higher levels of the PTO's obstruction of customs enforcement at the PTO-terminal. For example, the treatment effect for Hutchinson Ports operating at the Port of Brisbane was 0.32, whereas the treatment effect for COSCO operating at the Port of Antwerp was -0.12. This result implies that COSCO obstructs customs enforcement at the Port of Antwerp at a higher level than Hutchinson Ports does at the Port of Brisbane.

³¹ Bribe, compliance, contraband, corruption, customs, export controls, inspect, sanctions, smuggle. The GPT would count related words, e.g. 'bribing' would count for the keyword 'bribe.'

³² As a general control against random error, we excluded from analysis PTO-terminals for which there were fewer than 20 sentiment scores constituting the average sentiment score for the baseline and treatment measurements, respectively.

While we judge this to be a workable proxy for our dependent variable, by no means will it be perfect. We do not have the capability to reliably infer the peer reviewed-status of webpage content, or whether webpages are promotional in nature, potentially introducing inaccuracies and bias into the data.³³ And the large number of observations (over ten thousand) makes it impractical to validate the GPT's codings manually. Additionally, and more fundamentally, by using this proxy variable, our analysis will not be based on direct observations of the phenomenon of interest, i.e. the obstruction of customs enforcement by PTOs at their terminals.

For these reasons, our analysis should only be regarded as a tentative evaluation of our hypothesis regarding the obstruction of customs enforcement by state-owned PTOs, more aligned in function to a 'plausibility probe' which is a 'preliminary, rather loose and inconclusive, but suggestive [test], before more rigorous tests are conducted.'³⁴ The value of plausibility probes, as put by Eckstein, is that they are a 'cheap means of hedging against expensive wild-goose chases, when the costs of testing are likely to be very great.'³⁵ A finding in favor of our theory through this plausibility probe would thus provide a basis for incurring the likely 'very great' costs of securing primary data on PTO-customs relations given the constraints noted above.

To test our hypothesis that state-owned PTOs obstruct customs enforcement at their port terminals more than privately owned PTOs, we aggregate and compare the observed treatment effects for PTO-terminals with state-owned PTOs against those with privately owned PTOs. A finding that the treatment effects for state-owned PTOs are, on average, lower than those for privately owned PTOs would support our hypothesis. We assess the statistical significance of any such variance using a student's test.³⁶

To test the robustness of our findings, we also conducted a series of robustness checks. First, we control for potential sensitivities to (automated) coding decisions, specifically the minimum threshold for excluding observations on the basis of irrelevance as above. In addition to the baseline threshold of '5,' we re-ran the test with thresholds of '4' and '6.' And second, we control for potential biases in regional reporting. For

³³ To manage positive reporting bias in the results, we did exclude from analysis any webpage hosted on a Chinese server.

³⁴ Harry Eckstein, "Case Study and Theory in Political Science," in *Case Study Method: Key Issues, Key Texts*, ed. Martyn Hammersley and Peter Foster Roger Gomm (Thousand Oaks, California: SAGE, 2000), p. 142.

³⁵ Eckstein, "Case Study and Theory in Political Science," p. 142.

³⁶ Two-tailed test. A Levene's Test did not find statistically significant variance between the two populations, so for the purposes of the t test, we adopted an assumption of homoscedasticity.

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example, extreme reporting (either positive or negative) on PTO-terminals located in certain regions may be skewing results. To control for this, we re-ran the test five times, each time excluding PTO-terminal observations from Africa, the Americas, Asia, Europe, and the Pacific, respectively.

Analysis

When reporting on customs-related matters, reporting sentiment for Chinese, privately owned PTO-terminals decreased on average 0.15 points (on a ten-point scale), compared with a 0.68-point decrease in reporting sentiment for Chinese, state-owned PTO-terminals (see Figure 2). This variation was statistically significant ($p < 0.01$). This suggests that, consistent our hypothesis, state-owned PTOs exhibit higher rates of obstructing customs enforcement at their port terminals when compared with privately owned PTOs. This finding proved robust, with all robustness checks returning larger drops in reporting sentiment for state-owned PTO-terminals at statistically significant levels ($p < 0.05$; see Table 1).

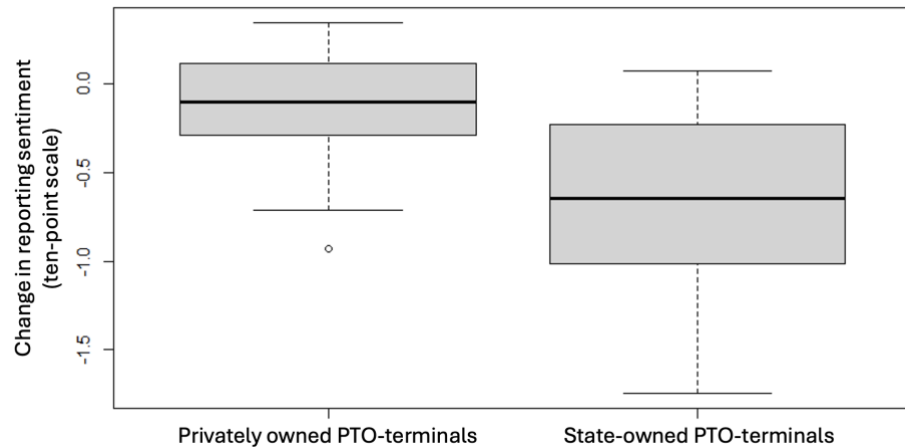


Figure 2 Change in reporting sentiment for Chinese PTOs when discussing customs-related matters.

Table 1 Robustness checks

| | | Treatment effect (private) | | Treatment effect (SoEs) | | |
|-------------------------------|--------------------|-------------------------------|----|----------------------------|----|----------------|
| Minimum relevance score | Excluded region | Mean | n | Mean | n | Δ Means |
| 5 | None | -0.15 | 14 | -0.68 | 23 | -0.53** |
| 4 | None | -0.14 | 14 | -0.68 | 23 | -0.53** |
| 6 | None | -0.10 | 8 | -0.75 | 15 | -0.65** |
| 5 | Africa | -0.15 | 14 | -0.50 | 14 | -0.36* |
| 5 | The Americas | -0.19 | 12 | -0.69 | 20 | -0.50** |
| 5 | Asia | -0.14 | 11 | -0.63 | 18 | -0.50* |
| 5 | Europe | -0.05 | 8 | -0.79 | 19 | -0.74*** |
| 5 | The Pacific | -0.18 | 11 | -0.73 | 21 | -0.55** |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Values reflect change on a ten-point scale.

Numbers may not add up due to rounding.

Policy recommendations

PTOs can exhibit two ideal-type responses to customs enforcement activities: obstruction and facilitation. Obstruction involves PTOs stonewalling customs agencies to reduce the frequency and intensity of enforcement activities, for example by blocking agencies' access to terminal facilities or failing to report the red flags of customs violations. And facilitation involves PTOs working with customs agencies to improve the efficiency with which the latter's activities are undertaken, for example through information sharing and streamlined inspection processes. From the port state perspective, pushing PTOs to favor facilitation over obstruction is a potentially important means to improve port-level compliance with customs regimes.

Reflecting on the theory advanced above, there are several complementary strategies that port states can pursue to promote the facilitation of customs enforcement by PTOs operating in their jurisdictions. The first is to lower the costs to PTOs of facilitating customs enforcement. There are several approaches that port states can take in this regard. First, port states can reward PTO transparency and cooperation with customs enforcement with reduced regulatory scrutiny,

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for example through Authorized Economic Operator programs.³⁷ Second, port states can implement business-enabling services for PTOs that facilitate and improve interactions with customs enforcement, for example automated document submission systems and single-window support.³⁸ And third, port states can conduct outreach to PTOs to sensitize them to customs obligations and build their capacity to comply with these requirements. This may include, for example, circulars on new customs requirements or training on customs-relevant functions.³⁹

The second strategy available to port states to promote PTO facilitation of customs enforcement in their jurisdictions is to implement programs targeting the six mechanisms of obstruction identified above. For example, customs agencies could establish port-level consultative committees that provide a forum for PTOs and customs to discuss issues of mutual concern. Such committees would enable coordination of customs' access to PTO facilities and documentation (countering mechanisms 1 and 2) and the sensitization of PTOs to their customs obligations, for example with respect to reporting on non-compliant cargo (countering mechanism 3) or maintaining customs-relevant infrastructure (countering mechanism 4). Such exercises in 'sensitization' would also fill PTO knowledge gaps regarding their customs obligations while invalidating ignorance-based excuses for non-compliance.⁴⁰ Notably, many ports already have public-private consultative committees in the form of Port Security Advisory Committees which were established pursuant to the 2003 International Labor Organization/International Maritime Organization Code of Practice on Security in Ports.⁴¹ The scope of these committees could be expanded to include such customs-relevant issues.

Another initiative targeting the six mechanisms of PTOs obstructing customs enforcement is 'Suspicious Activity Identification Programs,' where port staff or members of the public can report suspected customs violations at port terminals, for example through anonymous tip lines or

³⁷ See *Aeo Implementation and Validation Guidance*, (Brussels, Belgium: World Customs Organization, 2021).

³⁸ Vivian C Jones and Marc R Rosenblum, *Us Customs and Border Protection: Trade Facilitation, Enforcement, and Security* (Washington D.C.: Congressional Research Service, 2013).

³⁹ For an example of the former, see *Sanctions Advisory for the Maritime Industry, Energy and Metals Sectors, and Related Communities*, (Washington D.C.: U.S. Treasury, 2020).

⁴⁰ *Strategic Trade Control Enforcement Implementation Guide*, (Brussels: World Customs Organization, 2023), p. 30.

⁴¹ Safety and Health in Ports Tripartite Meeting of Experts on Security, *Code of Practice on Security in Ports* (Geneva: International Maritime Organization, 2003), p. 8.

web forms.⁴² Such programs would allow customs agencies to, in effect, recruit additional 'eyes and ears' that furnish intelligence on customs non-compliance in and around privately operated port terminals.⁴³ Such intelligence may be useful for filling gaps left by underreporting by PTOs (countering mechanism 3) and may provide enforcement agencies with probable cause that can be leveraged to force immediate access to PTOs' facilities and documentation (countering mechanisms 1 and 2). The scope of such programs may also be extended to reporting on port-level corruption, as with the Danish Maritime Anti-Corruption Network⁴⁴—thereby acting as a deterrent to corruption among customs enforcement officers (countering mechanism 6).

And the third strategy available to port states to promote PTO facilitation of customs enforcement in their jurisdictions is to implement investment screening that assesses the risk of tendering PTOs obstructing customs enforcement. PTOs are typically awarded the right to develop and operate port terminals through tendering processes. When being considered, tenders (in particular those from foreign entities) typically pass through a screening mechanism governed by the port state.⁴⁵ This screening mechanism is designed to filter out those tenders that would, if accepted, pose a wider risk to the port state, for example in terms of national security. Those tenders that are assessed as 'high risk' may only be awarded with certain conditions; or may, in extreme cases, be rejected outright.⁴⁶

⁴² For examples of similar programs directed toward port crime and security, see "Coastal Watch," Royal Canadian Mounted Police, <<https://www.rcmp-grc.gc.ca/en/qc/coastal-watch>>; "Help Keep Our Ports Secure," Crimestoppers UK, <<https://crimestoppers-uk.org/news-campaigns/campaigns/help-keep-our-ports-secure>>.

⁴³ Some states already have port-based Suspicious Activity Identification Programs, however they are primarily focused on port crime and security rather than customs compliance. See, for example, "Coastal Watch"; "Help Keep Our Ports Secure". For guidance on developing such programs, see Maritime and Aviation Security Awareness Workshops project, *A Guide to Developing and Implementing a Suspicious Activity Identification Program at Ports* (International Maritime Organization).

⁴⁴ "Macn Anonymous Reporting System," Maritime Anti-Corruption Network, <<https://macn.dk/incident-reporting/>>.

⁴⁵ See, for example, "The Committee on Foreign Investment in the United States (Cfius)," U.S. Department of the Treasury, <<https://home.treasury.gov/policy-issues/international/the-committee-on-foreign-investment-in-the-united-states-cfius>>; "Investment Screening," European Commission, <https://policy.trade.ec.europa.eu/enforcement-and-protection/investment-screening_en>.

⁴⁶ Cheng Bian, "Foreign Direct Investment Screening and National Security: Reducing Regulatory Hurdles to Investors through Induced Reciprocity," *The Journal of World Investment & Trade* 22, no. 4 (2021).

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Recognizing the risk that tendering PTOs may obstruct customs enforcement once they begin terminal operations, port states may incorporate into their tender screening mechanisms assessments of such risk. There are many factors that may go into an ex-ante assessment of such risk, for example which terminal functions are to be delegated to the PTO, or the PTO's record of cooperating with customs agencies in other jurisdictions. Additionally, as argued in this paper, state-owned PTOs may have unique interests in obstructing customs enforcement, for example to protect sensitive trade data or because government advocacy will shield them from sanctions in the event of a dispute. Accordingly, in the screening process, port states may consider if and to what extent state-ownership of tendering PTOs may pose long-term risks to PTO-customs relations.

Areas for further study

This study suggests several potentially fruitful areas for further scholarship. First, this study demonstrated the potential validity of our theory of PTO-customs relations through a plausibility probe. This positive result provides a basis for advancing to primary data collection—i.e. despite the likely 'very great' costs of doing so as argued above—to more comprehensively test theories of PTO decision making regarding the facilitation and obstruction of customs enforcement. Potential data sources include public legal proceedings involving the prosecution of customs violations or contract disputes involving PTOs, freedom of information requests from customs agencies, and anonymous interviews with customs officers.

Second, much of our theoretical development was built on examples from China, and the analysis was limited to Chinese cases. This raises questions regarding the external validity of our inferences to non-Chinese PTOs, and in particular non-Chinese, state-owned PTOs such as PSA International (beneficially owned by the Government of Singapore) and Dubai Ports World (beneficially owned by the Government of the United Arab Emirates). Future studies may challenge the external validity of our theory of state-owned PTOs obstructing customs enforcement by testing it with non-Chinese PTOs.

Third, the finding that PTOs strategically choose to facilitate or obstruct customs enforcement invites the development of new theories of PTO-customs relations that extend beyond the effects of the beneficial ownership of PTOs on decision making. For example, the compliance capability and capacity of PTOs, the length of the PTO-customs relationship, and the strength of legal institutions in the port state are all potentially significant factors in PTO decision making.

Fourth, the finding that PTOs strategically engage in facilitation or obstruction to relieve the burden of customs enforcement might encourage research into the extent to which this model extends to other private sector stakeholders in customs enforcement. For example, do freight forwarders, customs brokers, and importers/exporters similarly attempt to minimize the costs of engaging with customs by facilitating or obstructing customs enforcement?

And fifth, the finding that SoEs are more likely to obstruct regulatory agencies due to trade secrecy and political patronage might encourage research into the extent to which these causal mechanisms operate in other industries. For example, do state-owned banks, oil and gas companies, and insurance firms exhibit higher rates of regulatory non-compliance for similar reasons?

Conclusions

While the global shift to the private operation of port terminals has brought many advantages, the intersection of public and private interests has created new challenges for port governance. One such challenge relates to customs enforcement, where profit-driven PTOs' desire for speed and efficiency is sometimes thwarted by the slow and intrusive scrutiny of customs enforcement agencies. PTOs have two general strategies for relieving this burden of customs enforcement. They can 'facilitate' customs enforcement, which reduces the net disruptive effect of customs on terminal operations by improving the speed and efficiency of enforcement actions. Or they can 'obstruct' customs enforcement, which reduces the net disruptive effect of customs on terminal operations by reducing the frequency and intensity of enforcement actions. PTOs can obstruct customs enforcement through multiple mechanisms, including by restricting terminal and/or cargo access, restricting information sharing, underreporting the red flags of customs violations, failing to provide the necessary infrastructure and equipment for customs enforcement, disrupting customs-relevant information flows, and/or engaging in corruption with customs officers.

Our study demonstrated the ability to develop and test theories of PTO-customs relations within this conceptual framework. Through a case study of Chinese PTOs that utilized sentiment analysis through natural language processing, we observed tentative support for our theory that state-owned PTOs are more likely than their privately owned counterparts to obstruct customs enforcement, specifically because they might be compelled by their controlling government to protect sensitive trade data,

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or because they believe that their controlling government will intervene to prevent sanctions in the event of a dispute with local customs.

Recognizing that PTOs will strategically choose to either facilitate or obstruct customs enforcement requires that port states manipulate the calculus of PTO strategic decision making to favor facilitation. Strategies to this end include reducing barriers to PTOs cooperating with customs enforcement agencies; developing customs enforcement activities that target PTOs and the mechanisms through which they might obstruct customs enforcement; and implementing investment screening for PTOs that incorporates into decision making assessments of risk regarding the obstruction of customs enforcement.