NBER WORKING PAPER SERIES

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Working Paper 34143
http://www.nber.org/papers/w34143

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 2025

We are particularly grateful to Jacob Carrasco, Eden Glickman, Xianru Han, Katie McDonald, Alejandra Perez, Stuti Saria, Marios Tsoukis, and Xuancheng Zhao for excellent research assistance. We are grateful to seminar participants at Cowles Trade Day, CUNY, SED, Stanford, and UC Davis, and to Miguel Acosta, Lydia Cox, Andrew Greenland, John Lopresti, and Christopher Meissner for helpful comments. This material is based upon work supported by NSF grant #2314696. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 34143
August 2025
JEL No. D82, F10, H26, N41

ABSTRACT

Evasion is a key obstacle to raising customs revenue. We study how improved administrative capacity enables governments to combat evasion by redesigning tariff codes. Using newly compiled historical records from the Early American Republic, we show that as Customs administration matured, the tariff code became more complex and more reliant on specific (quantity-based) tariffs in preference to ad valorem (value-based) ones. We develop an equilibrium model of tariff administration with costly verification of declared values that explains these twin trends: Administrative capacity allows Customs officials to disaggregate goods and assess tailored specific tariffs, obviating misvaluation while minimizing price distortions. The model successfully predicts several additional empirical patterns: Specific tariffs tend to be assessed on goods that are homogeneous, cheap, or lightly taxed.

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1 Introduction

Tariffs have historically been a key source of government revenue, accounting for around 90 percent of federal government revenue in the United States until the Civil War (Reamer, 2016; Irwin, 2020). They continue to play an important role in the public finances of developing countries (Besley and Persson, 2009; Bown and Irwin, 2019; Chalendard et al., 2023). Their popularity stems from the relative ease of observing goods entering at ports (Baunsgaard and Keen, 2010). Nevertheless, collecting import duties is challenging due to evasion: Importers may misrepresent their cargo, especially its value, in an effort to reduce assessments (Chalendard et al., 2023).

In this paper, we study how state capacity shapes policymaking to solve this challenge. Theoretically, we show that the ability to administer a more nuanced tariff code allows the state to collect revenue more efficiently, in particular by using specific tariffs (charged as a function of quantities) in preference to ad valorem ones (charged as a percentage of declared value). Empirically, we illustrate how tariff codes evolve with state capacity using a new panel dataset of good-level tariffs in the Early American Republic. For our analysis, we manually harmonized tariff bills from 1789 to 1846.[1] In the interest of combating tariff evasion, the federal government made significant investments in state capacity alongside important innovations in its tariff schedule.

We document three major changes in the tariff system during our sample period. First, Customs house expenditure and imports both increased by an order of magnitude. This growth was accompanied by a ten-fold increase in the Customs house workforce, which in turn was increasingly staffed by more specialized workers. Second, as Customs administration matured, the tariff code became more complex: The number of distinct tariff rates tripled during our sample. Third, tariffs shifted from ad valorem to specific,[2] tripling the share of goods with specific tariffs. Furthermore, the latter two changes occurred in tandem, as specific tariffs tended to be applied to narrowly-defined categories. We argue that the growing complexity of the tariff code and the expanded use of specific tariffs reflect an endogenous response by policymakers to increased administrative capacity.

In the spirit of Bates et al. (1998), we build on historical narratives to develop our theory of how the Customs developed to combat evasion. We draw inspiration from the documented concerns of policymakers in the Early American Republic that ad valorem

[1] This was an intensive data collection effort, requiring not only reading the tariff bills, but also creating manual concordances, as modern classifications did not yet exist. The resulting dataset complements efforts by Acosta and Cox (2024), Greenland and Lopresti (2024), and Klein and Meissner (2025) in an effort to create a unified database of tariffs, encompassing the entire history of the US tariff schedule.

[2] In practice, some tariffs are a mix of both types, or have other features. We focus on specific and ad valorem, which comprise the vast majority of all tariffs, both historically and currently.

tariffs were preferable to specific tariffs "theoretically," but not "practically," given their susceptibility to "deception" (Burrows, 1894).[3] We validate these concerns with a simple difference-in-differences exercise: In 1846, the Polk administration, which considered specific tariffs "oppressive" (Falvey, 1979), replaced all specific tariffs with ad valorem ones (Walker, 1847). We find that this policy change led to a large decline in reported import prices for tariff lines that switched.[4]

In our model, the government's objective is to minimize distortions to consumer prices while reaching a revenue target (Smith, 1776). In the absence of evasion, a uniform ad valorem tariff achieves this goal. However, ad valorem tariffs are vulnerable to importer misvaluation, necessitating costly verification (Bhagwati, 1964). We model the assessment of ad valorem tariffs as a game played by Customs officials and importers. Importers may attempt to evade tariffs by underreporting values, while officials may audit shipments and fine importers who are caught lying. This game has a unique outcome within a natural class of equilibria utilizing monotone reporting strategies. We compare the outcome of this game to an alternative regime involving specific tariffs, which are perfectly enforced but distort consumer prices.

In principle, tailored specific tariffs on narrowly-defined goods can mitigate price distortions, making them an attractive alternative to ad valorem tariffs. In practice, drawing fine distinctions between goods requires state capacity. We build on the historical context, where disaggregation entailed costly investment in Customs capacity. For example, Jones (1835) describes how British rolling mills could produce iron bars that mimicked hammered iron in order to evade tariffs. Detecting such evasion required the Customs official overseeing iron imports to be a "skillful artist who has a knowledge of chemistry," capable of distinguishing between rolled and hammered iron bars based on their oxide content. Officers had to be trained to make many such subtle distinctions in order to determine the appropriate tariff rate.

We model state capacity as the ability to successfully disaggregate the universe of imports into distinguishable categories. We consider a tariff code "complex" to the extent that it tailors tariffs across many different categories. We characterize the optimal tariff code under a finite set of disaggregated categories, and we study how the optimal code changes as state capacity increases and categories are refined. Our model yields several testable predictions,

[3] A plausible alternative form of capacity is investment in verification technologies which directly improve the collection of ad valorem tariffs. However, this possibility was rarely discussed by historical policymakers. We further discuss the challenges of verification in Section 2.

[4] Even in the absence of evasion, switching from specific to ad valorem tariffs should lower the average unit value of imported goods, as the tariff rate falls more for cheaper goods. However, we show that the fall in unit values is much larger than what could plausibly be generated by an Alchian and Allen (1964)-style mechanism.

which we validate in our dataset. Most importantly, it successfully predicts that the tariff code becomes both more complex and more reliant on specific tariffs as the government invests in state capacity. By accounting for misvaluation, our results challenge conventional wisdom that the optimal tariff schedule should be ad valorem (Keen, 1998; Pahre, 2007) and uniform across goods (Costinot et al., 2015).

The model also correctly predicts that specific tariffs are more likely to be imposed on goods with little variation in prices, such as commodities (Rauch, 1999). This may seem surprising, since a common argument is that prices of homogeneous products are harder to falsify (Javorcik and Narciso, 2008), which would instead favor the use of ad valorem tariffs. In our framework, the key force is that specific tariffs distort relative prices, an issue which is less relevant when prices are relatively uniform; by contrast, verification costs need to be paid even when price uncertainty is small.

Furthermore, the model correctly predicts that specific tariffs are preferred when the expected customs revenue from a shipment is low, because the good is either inexpensive or its effective tariff rate is modest. Intuitively, the government wants to avoid paying verification costs that would consume most or all of the tariff revenue.[5] While we focus on the choice of specific versus ad valorem tariffs, the model also has implications for ad valorem tariff rates: The government should charge higher rates on cheaper goods in order to tilt consumption towards relatively expensive shipments, which require less enforcement per dollar of imports.

While our primary focus is the historical development of the American tariff code, the relationship between state capacity, tariff code complexity, and tariff specificity remains relevant in contemporary settings. High-capacity countries continue to invest in complex tariff schedules—for instance, Switzerland's tariff schedule contains over 1,600 distinct rates, all of which are specific, while the United States currently has over a thousand different specific rates. Conversely, many less-developed countries such as Senegal and Peru have fewer than five distinct tariff rates, all of which are ad valorem. We analyze modern tariff systems both as a robustness check, and because in the modern data we have access to information that is unavailable historically: For instance, we have direct measures of cross-country customs house capacity (Farhad et al., 2024),[6] as well as direct measures of price dispersion using disaggregated data on unit values available in American data from the early 1980s.

A growing empirical literature discusses the effects of specific tariffs in the United States

[5] As noted in a different context by Becker (1968), if the social loss from misvaluation is small, then it is optimal not to have to enforce the rules.

[6] Using different data, Betz (2019) also shows that more modern bureaucratic capacity is associated with more distinct tariffs.

(Crucini, 1994; Irwin, 1998; Acosta and Cox, 2024; Greenland and Lopresti, 2024; Greenland, Lake and Lopresti, 2025*b*; Klein and Meissner, 2025).[7] To the best of our knowledge, ours is the first work connecting state capacity, tariff code complexity, and the use of specific tariffs. The trade literature on specific tariffs has typically focused on the role of competition, uncertainty, and price and quality dispersion (Das and Donnenfeld, 1987; Helpman and Krugman, 1989; Krishna, 1990).[8] We also build on a large literature considering how heterogeneity across goods in supply, demand, or political importance can generate heterogeneous tariffs across goods (Grossman and Helpman, 1994; Grant, 2023; Lashkaripour and Lugovskyy, 2023; Bartelme et al., 2025; Hsiao, Moscona and Sastry, 2025), though we show the value of a complex tariff code even in a model with simple demand and no industrial-policy considerations.

Our research also relates to work on administrative capacity.[9] As states collect revenue and expand their bureaucracy, they develop the capacity to generate funds more effectively (Levi, 1988; Brewer, 1990; Tanzi, 1998; Besley and Persson, 2009; Moreira and Pérez, 2024). Our work demonstrates one channel through which capacity leads to improved revenue collection, contributing to a literature studying such mechanisms (Jensen, 2022; D'Arcy, Nistotskaya and Olsson, 2024; Goyal et al., 2025).

Finally, our findings complement a large literature on tax evasion (Allingham and Sandmo, 1972; Border and Sobel, 1987; Yitzhaki, 1987; Slemrod and Yitzhaki, 2002; Kleven et al., 2011; Keen and Slemrod, 2017; Basri et al., 2021). A growing empirical literature has documented tariff evasion (Fisman and Wei, 2004; Fisman, Moustakerski and Wei, 2008; Javorcik and Narciso, 2008; Mishra, Subramanian and Topalova, 2008; Jean and Mitaritonna, 2010; Ferrantino, Liu and Wang, 2012; Rotunno and Vézina, 2012; Rotunno, Vézina and Wang, 2013; Sequeira, 2016; Bussy, 2021; Iyoha et al., 2025), finding that policies to reduce evasion have had mixed success (Anson, Cadot and Olarreaga, 2006; Yang, 2008; Javorcik and Narciso, 2017; Beverelli and Ticku, 2022; Chalendard et al., 2023). Rather than focusing on improvements in valuation technology, we show that the design of the tariff regime itself can help deter evasion.

2 Historical Context

Tariffs were extremely important for the early American Republic. Indeed, a central motivation for the Constitutional Convention was the desire to impose tariffs federally (Elkins

[7] For a discussion of 19th century European tariffs, see Bairoch (1989).

[8] A companion literature in public finance also broadly comes to the conclusion that specific tariffs are, if ever, only preferable to ad valorem under narrow circumstances (Cournot, 1838; Wicksell, 1896; Suits and Musgrave, 1953; Skeath and Trandel, 1994; Keen, 1998; Wang and Wright, 2017).

[9] In particular, a large literature emphasizes the importance of observability for the state (Scott, 1998; Mastrorocco and Teso, 2025).

and McKitrick, 1993; Irwin, 2017). In this section, we discuss three historical trends that provide context for our analysis.[10]

First, we provide a short history of U.S. Customs House operations during our time period (1789-1846), with a focus on increasing capacity. Second, we review major tariff legislation in the United States. Finally, we discuss the administrative history of tariffs, focusing on the debate between ad valorem and specific tariffs, and closing with direct evidence that specific tariffs prevent evasion.

Roles and Capacity of the Customs House

The first law enacted by the Washington Administration outlined the oath of office to be taken by the President and other appointed officials. The second addressed the new republic's most pressing need: It established a tariff to generate revenue. However, revenue generation requires more than legislation, it requires bureaucrats.

The fifth law, "An Act to regulate the Collection of the Duties imposed by law on the tonnage of ships or vessels, and on goods, wares and merchandises imported into the United States," established the administrative structure of customs collection. Three federal officers were to be present in every collections district: the Collector, the Surveyor, and the Naval Officer. Collectors managed Customs house operations, bearing primary responsibility for assessing and collecting duties as well as maintaining accurate records. Naval Officers supported Collectors by verifying duty assessments and overseeing record accuracy. Surveyors conducted ship inspections and ensured precise measurements critical for duty assessments. Customs officials, while federally appointed, initially operated with considerable autonomy (Goss, 1897).

The duties of the Surveyors are the most important for our study. They oversaw inspection and quantification of cargo in order to calculate specific duties. The surveyors and those under them typically engaged in one of four tasks: *weighing* of bulk goods, *gauging* of liquid goods, *measuring* of goods where duties were calculating on dimension, and *proving* and marking of spirits.[11] These tasks were regulated by Congress, who determined official definitions of weights, measures, and proofs. For calculating ad valorem duties, inspectors and collectors would compare manifests to the cargo on board. The larger Customs houses eventually hired appraisers, but without in-house expertise, if there was a question as to the value of the good, Customs officials would hire qualified merchants to adjudicate values.

The operations of the Customs houses, and the revenue they were able to collect, grew rapidly over time. Panel A in Figure 1 plots the large increase in expenditures on Customs

[10]See Young (1877),Taussig (1910), and Irwin (2017) for more detailed descriptions of tariff policy during the period.

[11]In the original text of the 1798 bill, the task of proving was delegated to inspectors.

houses, which tracks the growth in gross imports. To further document the increasing capacity at Customs houses, we digitized the *Official Register of the United States* (Mastrorocco and Teso, 2025). The register not only contains data on all workers at the Customs house, but also reports the exact tasks they performed, including if they performed multiple tasks.

In the wake of a scandal revealing the low rate of customs collections, in 1818 Congress invested in tariff collection by hiring “well qualified” staff (Rao, 2016). Panel B of Figure 1 shows the rapid increase in Customs house employment, from around 200 in 1816 to 2000 by the 1840s.[12] As employees were added, they became more specialized. Panel C of Figure 1, shows that the fraction of workers engaged in more than one task over time declined from nearly 20 percent in 1821 to 7.5 percent by the end of our sample. Moreover, even as workers become more specialized on single tasks, more total tasks were added. In Panel D of Figure 1 we plot the number of occupation titles over time. In 1821 there were a handful of workers focusing key tasks such as weighing, measuring, gauging. By 1851, the number of distinct job titles nearly tripled. An important part of the expansion was the development of a hierarchy, with management and assistant tiers (Caliendo et al., 2020).[13]

The majority of the documented specialization is in measuring distinct goods, as workers had increasingly narrow remits. Ultimately, this is the form of state capacity we model and analyze empirically: the ability to distinguish a wider range of goods.

Tariffs and Revenue

Initially, tariffs served almost entirely a revenue generating role (Taussig, 1910). After the War of 1812, policymakers also used tariffs as a tool to protect key industries from foreign competition (Irwin, 2017). One approach was the introduction of so-called “minimum” tariffs, beginning with cotton manufactures in 1816 (Taussig, 1910). For many imports, while they nominally paid ad valorem rates, they were also subject to a statutory minimum price, protecting low-cost American producers. For instance, in 1816 the minimum price for cotton manufactures was 25 cents per square yard. Given the ad valorem rate of 25%, cheap cotton manufactures imported under the 1816 regime effectively paid a specific tariff of 6.25 cents per square yard. Over the 1820s, minimum tariffs were applied to a variety of goods, from broad categories such as woolen manufactures to narrow ones such as straw hats.

The Tariff of 1824 broadened protection for iron and wool, reflecting mounting pressure from northern producers (Taussig, 1910). Controversy deepened with the Tariff of 1828, (the

[12]Total employment in 1816 number is underestimated, as only the the Collector, the Surveyor, and the Naval Officer were recorded as federal employees.

[13]Many occupations appear in only one Customs house. In our main analysis, we only keep those occupation titles present in at least two. Figure A.2 shows a similar pattern for alternative measures of Customs house sophistication, either including all occupations or only those involving core tasks. We discuss different classifications of occupational titles in Appendix A.3.

"Tariff of Abominations") which sparked fierce objections in the South due to its high rates, culminating in the Nullification Crisis (Irwin, 2008). In response, under President Andrew Jackson, Congress passed the Compromise Tariff of 1833, gradually lowering rates to mitigate tensions (Taussig, 1910). The Tariff of 1842 (the "Black Tariff") dramatically increased rates after the economic downturn of the late 1830s, reinstating high duties (Irwin, 2017). In 1846, the Walker Tariff lowered tariff rates and simplified the tariff code. Throughout the period, there were many smaller tariff bills as well.

There was no formal classification system for goods during this period. For our analysis, we start with the individual lines in the tariff bills, which we call *labels*. We create a concordance between the labels in the bill and the *goods* that are imported. A key feature is that the labels vary in how broad they are: Some refer to very broad classes of imports (such as "all woolen manufactures"), while others are more narrow (such as "flannels not made of cotton"). There is variation within tariff bills at how many goods each label refers to, and variation across time within goods as to how many other goods share the same label. Table 1 shows, as an example, the matching between labels and goods for flannels, and Figure A.1 shows the language for woolen manufacture tariffs in 1828. We describe the exact matching process in detail in Appendix A.

Tariff legislation in the United States became increasingly complex over time. Figure 2 Panel A shows that the number of distinct tariff labels initially grew modestly, starting from 105 labels in 1789, and then stabilized through the War of 1812. However, following the Customs staffing reforms in 1818, substantial expansions in the tariff code occurred in the 1820s, 1830s, and most notably in 1842, resulting in over 800 distinct labels by the end of the sample period.

Alongside labeling more goods, the tariff code itself became increasingly complex, requiring Customs officials to track an expanding set of duties. Figure 2 Panel B shows that the number of distinct tariff rates generally increased over time, although it experienced a decline following the Tariff of Abominations (1828), before sharply rising again with the Black Tariff of 1842. By 1842, importers faced around 150 distinct tariff rates.[14]

The tariff labels were disproportionally narrow. Figure 3 Panel A shows that initially, even when there were very few labels, many targeted narrow sets of imports that would never be further disaggregated. Over subsequent decades, labels became increasingly specialized. By 1842, half of labels applied exclusively to individual goods. Panel B shows a similar pattern for tariff rates.

[14]As an alternative measure, Figure A.3 shows how the number of goods enumerated in the tariff code increased over time.

Administrative History of Tariffs

As tariffs evolved to serve both protective and fiscal purposes, administration and enforcement posed ongoing challenges. From the early days of the Republic, there were concerns over "frauds of the revenue," and calls for rigorous enforcement against smugglers and unscrupulous traders (Hamilton, 1790).

Early on, policymakers understood that to prevent evasion, tariffs should be "simple in their provisions and easily understood" (Hayes, 1877). Policymakers understood that ad valorem rates, while theoretically ideal, invited misrepresentation of goods' value (Rao, 2016). To that end, Congress instructed Customs officials to inspect a random set of packages (often a tenth), in order to partially deter evasion.[15] It was understood that the costs of collection would be non-trivial, and so Treasury reports consistently reported tariff revenue *net* of collection costs.

A popular alternative to ad valorem duties is specific duties, charged on quantities rather than values. While still requiring an extensive apparatus for classifying goods and quantifying units, counting is easier to verify than appraisal. Over the course of our sample period at least five Treasury Secretaries reported to Congress that specific duties were preferable to ad valorem in order to prevent evasion (Burrows, 1894), and President Taylor made the same argument during his only State of the Union Address (Taylor, 1849).[16]

However, policymakers understood that the cost of specific duties is that expensive varieties of goods are taxed relatively less than cheaper varieties, distorting prices. For instance, Secretary of the Treasury Walker wrote, after passage of his eponymous 1846 tariffs, that specific duties were "always imposed by the very nature of the duty, upon the articles of the lowest value, consumed by the poor, and the lower duty assessed upon the articles of higher value, used by the more wealthy, often operating as a duty of 10, 20, or 30 per cent, upon the high-priced goods, and of 100, or 200 per cent, ad valorem upon articles of lower price." Even those who broadly supported the use of specific tariffs understood that they were not "practicable" for all goods (Burrows, 1894).

Until the Walker Tariff removed all specific tariffs, they were a staple of the tariff system. Indeed, the increasing complexity of the tariff code was accompanied by a shift toward specific tariffs. Figure 4 shows that in 1789, approximately one-tenth of goods had specific tariffs, a proportion that increased notably in 1824. A notable pattern is the decline in specific tariffs during the 1830s, mirroring the reduction in the overall number of tariffs,

[15] Policymakers tried to create standardized rules for valuing all shipments. However, the proposed methods were complicated and politically contentious due to their imprecision, and were ultimately never implemented (Goss, 1897; Smith, 1948). The 1850 *Annual Report of the Treasury Secretary of the United States* discusses issues with different Customs houses valuing almost identical imports differently.

[16] They were Secretaries Hamilton, Gallatin, Dallas, Crawford, and Meredith.

followed by a sharp rise in 1842, when nearly half of all goods had specific tariffs.

Evidence of Tariff Evasion

In the aftermath of the 1846 Walker Tariff, when *all* specific tariffs were converted to ad valorem, subsequent Treasury reports and letters to Treasury officers highlighted increases in misreporting. To close this section, we illustrate that their concerns over evasion were well-founded.

For this analysis, we link two additional sources of data to the tariff bills. First, the 1849 *Annual Report of the Treasury Secretary of the United States* documented information on the 1843-1849 prices and quantities for 13 goods that initially had specific tariffs and then transitioned to ad valorem.[17] Explicitly, this information was collected to quantitatively document the decline in unit values, using what we would now call an event study design.

To show causal evidence of the decline in unit prices, we compare the imports in the *Annual Report* to imports whose tariff type was unchanged. For this, we digitized the 1843-1849 *Commerce and Navigation of the United States*, which broadly reported good-level trade statistics. We describe the data in detail in Appendix A. For this analysis, its key feature is that for a few imports with non-specific tariffs, we found information on both total imported quantities and values.[18]

Our estimating equation is a relatively standard difference-in-differences regression:

$$Y_{it} = \beta \text{Specific}_i \times \text{Post-1846}_t + \gamma_i + \gamma_t + \epsilon_{it}, \quad (1)$$

where Y_{it} is the reported unit value, Specific_i measures if good i had a specific tariff pre-1846. Each observation t is an import table. To estimate elasticities, we use Poisson Pseudo Maximum Likelihood (PPML) regressions (Silva and Tenreyro, 2006). We also estimate event study regressions, where we estimate a separate coefficient for Specific_i for each year.

Table 2 shows the effect of switching from specific to ad valorem tariffs: Unit values collapse, falling by around 50 percent. The result is robust to including the woolen goods in the control group (or not), or including all of the import tables or only the tables covering full years. Figure A.4 plots the event study, showing that relative prices were fairly stable until the policy change.[19]

[17] The goods were English beer, Scottish beer, brandy, cigars, claret, grain spirits, Madeira, other red wine, port, sherry, Sicilian wine, West India spirits, and white wine.

[18] Those imports are teas and coffees imported from their place of production (free before and after the reform), teas and coffees not imported from their place of production (20% before and after the reform), and unmanufactured wool. The tariff for unmanufactured wool was complicated. Before 1846, the tariff depended on the price: If the wool was seven cents or under per pound, the duty was 5%; otherwise the duty was of three cents per pound plus 30%. The average ad valorem equivalent tariff before 1846 was 38%. After 1846, all unmanufactured wool had an ad valorem tariff of 30%.

[19] Figure A.5 shows results for total quantities and values, where we convert both to their monthly values.

3 Model

In this section, we describe and solve a model of tariff code design in the presence of misvaluation. After setting up the model, we characterize the optimal code in several steps. First, we characterize equilibrium revenue collection and price distortions under specific and ad valorem tariffs. We then turn to optimal policy and comparative statics with a single tariff line. Afterward, we extend our results to environments in which the government has access to many tariff lines. We close by condensing our findings into a set of testable predictions which can be taken to the data.

3.1 Setup

3.1.1 Government's problem

The government of a small open economy operates a customs house with the goal of raising revenue through tariffs. Its objective is to raise an exogenously specified target revenue $R > 0$, net of any collection costs, while minimizing the impact of tariffs on consumer welfare. It has no additional motives for imposing tariffs.[20] For simplicity, we normalize consumer expenditures on imports to 1, so that R is the revenue raised *per import dollar*. It can also be interpreted as the equivalent ad valorem tariff burden (i.e., the percentage of expenditure collected by the government) in a frictionless benchmark.

The government can levy either a specific tariff, assessed as a fixed payment per unit imported; or an ad valorem tariff, charged as a percent of declared import value. It must apply the same tariff regime (specific vs. ad valorem) and rate to all goods which cannot be distinguished by the customs house. However, it has a limited ability to distinguish goods based on observable characteristics, an ability it can use to customize tariffs based on characteristics. We formally describe the categorization of goods later.

Tariff collection does not incur any direct costs. However, the government must incur a cost to verify the declarations made by importers, who are able to lie. All verification costs are deducted from Customs house revenue for purposes of determining whether the revenue

Unlike for unit values, the pre-policy movements in quantities and values are not flat, and in particular are fairly sensitive to the import tables that only cover partial years. However, it broadly appears as if quantities mostly stay on trend, while total values fall below trend, and this latter force drives the decline in unit values. A feature of the Alchian and Allen (1964) effect is that we would expect unit values to fall after switching from specific to ad valorem tariffs, as the relative tariff falls for the cheapest goods. We show in Appendix C that this effect is unlikely to quantitatively explain the observed fall in unit values. Furthermore, the Alchian and Allen (1964) effect would predict that total imported values would weakly increase, and total imported quantity would strictly increase, neither of which we observe.

[20]Our assumption of a small open economy ensures that tariffs do not impact economic outcomes beyond their direct incidence on the prices consumers face for imported goods. Real-world policymakers may additionally impose tariffs for reasons not captured by our model, as suggested by the fact that they sometimes assess heterogeneous tariffs on seemingly similar goods. In our view, these additional motives are plausibly orthogonal to the revenue-raising and consumer-welfare concerns we model.

goal R has been reached.

3.1.2 Goods, Importers, and Consumer Preferences

We assume that a representative consumer purchases a continuum of varieties of domestic and imported goods. He has nested CES preferences over these goods, with an elasticity of substitution of 1 (i.e., Cobb-Douglas preferences) at the outer nest and $\sigma > 1$ at the inner nest. As a result, consumption of domestic goods is independent of the tariff code, and total expenditure on imports is a fixed share of national income. We therefore normalize national income to 1 and drop domestic goods from our analysis.

Each variety of imported good is produced at a constant marginal cost and has an infinitely elastic supply curve. The equilibrium price of each variety is therefore its production and transportation cost, which we refer to as its *value*, plus expected tariff payments.[21] Letting $T(v)$ be the expected per-unit tariff payment for a variety of value v, the equilibrium price of such a variety is $p(v) = v + T(v)$.

Our assumption of CES preferences over imported goods implies that the consumer price index

$$P = \left(\mathbb{E}\left[p(v)^{1-\sigma}\right]\right)^{\frac{1}{1-\sigma}}$$

is a sufficient statistic for consumer welfare, where we model the value v of an imported variety as a random variable with distribution $F \in \Delta(\mathbb{R}_+)$. For technical convenience, we assume that F has full support on $\mathbb{R}_+$ and is absolutely continuous with density f. We further assume that $\mathbb{E}[v] < \infty$ and $\mathbb{E}[v^{-\sigma-1}] < \infty$.

3.1.3 Tariff Assessment and Verification

After the tariff schedule is chosen and posted by the government, importers each choose a quantity to import, following which tariffs are assessed in two stages. First, each importer declares a non-negative value for each imported unit and pays the posted tariff on the declared value. Next, the government decides whether to verify each unit's value, at a cost per unit of $c > 0$. We assume that each unit is assessed separately and units are unbundled from shipments prior to assessment. As a result, the government cannot make inferences regarding a unit's value based on the shipment in which it arrives.

Verification allows the government to perfectly observe a unit's value. Following verification, it collects any tariff revenue that an importer attempted to evade by fraudulent declaration at a penalty rate of up to $\kappa > 1$ times the scheduled rate (as in Yitzhaki 1987). We interpret the maximum penalty rate as an exogenous restriction which cannot be tailored by the government, for instance because of jurisprudential limits on civil penalties or

[21] Formally, we assume that importers agree to prices and quantities before shipping their goods. In equilibrium, importers correctly predict the expected tariff they will pay at the dock when choosing supply.

practical difficulties with collecting large fines from importers.

Consistent with goals of profit and revenue maximization, we assume that each importer acts to maximize expected profits net of tariff payments, while the government acts to maximize its expected tariff income net of verification costs from each importer. Our solution concept is perfect Bayesian equilibrium of the importation game, with no precommitment by the government to verify reports.

3.2 Equilibrium Tariff Collection

Under a specific tariff of $t > 0$ per unit, no tariff evasion is possible and the government does not need to verify reported values in equilibrium. As a result:

Proposition 1. *There exists a perfect Bayesian equilibrium of the importation game under a specific tariff. In every equilibrium, no verification takes place and the expected tariff payment on each unit is $T_s(v;t) = t$, while the government's net tariff income is*

$$\Pi_S(t) = t \cdot \frac{\mathbb{E}[(v+t)^{-\sigma}]}{\mathbb{E}[(v+t)^{1-\sigma}]}.$$

Under an ad valorem tariff of $\tau > 0$ per dollar, some verification must take place in order to deter misreporting, and some misreporting must take place to motivate verification. For tractability and plausibility, we restrict attention to *monotone* equilibria, in which the importer's equilibrium declaration policy is a pure strategy $\rho : \mathbb{R}_+ \to \mathbb{R}_+$ that is nondecreasing and (strictly) increasing whenever positive. With this notation, $\rho(v)$ is the value declared by an importer with true value v. We let $\phi : \mathbb{R}_+ \to [0,1]$ denote the government's (potentially mixed) verification policy, with $\phi(v')$ the probability that a declared value of v' is verified. (Trivially, whenever verification takes place, the maximum permissible penalty rate is levied on any evasion.)

The following proposition establishes that there is a unique equilibrium outcome within the class of monotone equilibria, and it characterizes this outcome. Let $\bar{v} \equiv \mathbb{E}[v^{1-\sigma}]/\mathbb{E}[v^{-\sigma}]$ be the *unit value of consumption* under an ad valorem tariff; i.e., the average value of a unit of imported goods. (Under an ad valorem tariff, this value is independent of the tariff rate.)

Proposition 2. *If $\tau < c/(\kappa \cdot \bar{v})$, then there exists a perfect Bayesian equilibrium of the importation game under an ad valorem tariff satisfying $\phi(v') = 0$ for every v' and $\rho(v) = 0$ for every v. In this equilibrium, the expected tariff payment on each unit is $T_{AV}(v;\tau) = 0$, while the government's net tariff income is $\Pi_{AV}(\tau) = 0$. Further, every monotone equilibrium is outcome equivalent to this one.*[22]

[22]In the knife-edge case $\tau = c/(\kappa \cdot \bar{v})$, this outcome remains an equilibrium, but there are additional

If $\tau > c/(\kappa \cdot \bar{v})$*, then there exists an equilibrium satisfying* $\phi(v') = 1/\kappa$ *for every* v' *and*

$$\rho(v) = \begin{cases} v - c/(\kappa \cdot \tau), & v \geq v^* \\ 0, & v < v^*, \end{cases}$$

where $v^* \in (c/(\kappa \cdot \tau), \infty)$ *uniquely satisfies*

$$\frac{\mathbb{E}[v^{1-\sigma} \mid v < v^*]}{\mathbb{E}[v^{-\sigma} \mid v < v^*]} = c/(\kappa \cdot \tau).$$

In this equilibrium, the expected tariff payment on each unit is $T_{AV}(v;\tau) = \tau \cdot v$*, while the government's net tariff income is*

$$\Pi_{AV}(\tau) = (1+\tau)^{-1} \cdot \left(\tau - \frac{c}{\kappa \cdot \bar{v}}\right).$$

Further, every monotone equilibrium is outcome equivalent to this one.

When the tariff rate is sufficiently high, every importer shades their value down by a fixed *absolute* amount $c/(\kappa \cdot \tau)$, except for importers with values close to zero, who shade all the way down to zero. Meanwhile, the government verifies all reports at a fixed rate. Perhaps surprisingly, importers do not gain from misreporting on average—their reports are verified just often enough that their expected tariff payment (including penalties) is the same as if they reported truthfully. While verification effectively dissipates any gains from underreporting, it also incurs costs relative to a benchmark without misreporting. These costs are substantial enough that the government cannot generate any income from an ad valorem tariff unless the tariff rate is sufficiently high.

Our result that importers shade their reports by a constant value stands in contrast to standard modeling choices in the literature on tariff evasion, where importers are usually assumed to evade a fixed *share* of value (Mishra, Subramanian and Topalova, 2008; Jean and Mitaritonna, 2010). In line with the lessons of a venerable literature on policy adaptations to strategic behaviors (Ramsey, 1927; Mirrlees, 1971; Akerlof, 1978; Björkegren, Blumenstock and Knight, 2024), if importers choose to evade a constant share of tariffs, then the government can simply increase the ad valorem rate to compensate (Haan et al., 2012). However, when importers can evade tariffs more flexibly, the possibility of evasion has non-trivial implications for the efficiency of raising revenues through ad valorem tariffs.

monotone equilibria which differ in the verification rate when $v' = 0$. Any choice of $\phi(v') \in [0, 1/\kappa]$ is consistent with equilibrium, and all choices generate the same net tariff income. The choice $\phi(v') = 0$ minimizes expected tariff payments and maximizes consumer welfare.

3.3 Optimal Tariff Regime

We now explore the tradeoff between optimal and specific tariffs as tools for raising revenue. We begin by identifying the optimal regime under a uniform tariff, which must be applied evenly to all goods. Afterward, we extend our analysis to tariff codes which may customize the tariff regime and rate across multiple identifiable categories.

For expositional simplicity and technical convenience, we restrict attention to value distributions under which revenue is globally increasing in the tariff rate. This monotonicity is automatic under an ad valorem tariff, because ad valorem tariffs do not distort relative prices. However, a rising specific tariff tilts consumption toward high-value goods, which become proportionally cheaper, reducing the total quantity of imports and counteracting the higher revenue from each unit. Going forward, we assume that this substitution effect never dominates the direct effect of a rising tariff.

Assumption 1. Π_S *is increasing in* t*.*

The following lemma identifies a simple sufficient condition on the distribution of values ensuring that this assumption holds. The condition strengthens the commonly-utilized assumption of log-concavity of the distribution function. The lemma also verifies that the condition is satisfied by a wide class of parametrized distributions.

Lemma 1. *Assumption 1 holds if* f *is differentiable and* $v \cdot f'(v)/f(v)$ *is decreasing in* v*. This condition is satisfied by the lognormal, generalized Gamma (including Gamma, Weibull, and half-normal), inverse Gamma, Lomax, and log-logistic distributions.*

The following result establishes basic properties of the specific and ad valorem tariffs required to achieve any given revenue.

Proposition 3. *For every* $R \in (0, 1)$*, there exists a unique specific tariff* $t^*(R)$ *such that* $\Pi_S(t^*(R)) = R$*. This tariff is increasing in* R *and satisfies* $t^*(0+) = 0$ *and* $t^*(1-) = \infty$*.*

For every $R \in (0, 1)$*, there exists a unique ad valorem tariff* $\tau^*(R)$ *such that* $\Pi_{AV}(\tau^*(R)) = R$*. This tariff is increasing in* R *and satisfies* $\tau^*(0+) > 0$ *and* $\tau^*(1-) = \infty$*.*

A key distinction between specific and ad valorem tariffs is that the specific tariff converges to zero as the revenue goal vanishes, while the ad valorem tariff does not. Intuitively, the ad valorem tariff must cover verification costs on every unit imported even when very little revenue is required, and these costs do not vanish in the limit of no revenue.

Let $P_S^*(R)$ and $P_{AV}^*(R)$ be the consumer price indices under, respectively, the specific and ad valorem tariffs which collect revenue R. The following result characterizes their relative growth rates and establishes a single-crossing condition.

Proposition 4. *The following relationships hold:*

- $P_S^*(0+) < P_{AV}^*(0+)$,
- $\frac{d}{dR} \log P_S^*(R) > \frac{d}{dR} \log P_{AV}^*(R)$ *for all* $R > 0$,
- *There exists a* $\bar{c} > 0$ *such that* $\lim_{R \to 1} P_S^*(1)/P_{AV}^*(1) > 1$ *iff* $c < \bar{c}$.

The first part of this result establishes that specific tariffs are less distortionary than ad valorem tariffs for small revenue goals. This result follows directly from the ad valorem verification costs discussed above. The second part establishes that the price distortion from specific tariffs grows more quickly than from ad valorem tariffs. This comparison arises because specific tariffs distort relative prices and push consumers to substitute toward higher-value goods, reducing the total quantity of goods consumed. This substitution effect reduces the rate at which revenue can be raised by increasing the specific tariff, entailing larger marginal price distortions than an ad valorem tariff, which preserves relative prices.

These two properties taken together imply that P_S^* and P_{AV}^* cross at most once. Whether they cross depends on the cost of verification. When verification costs are low, crossing occurs, and there exists a revenue goal $\bar{R} \in (0, \infty)$ such that the specific tariff is more efficient when $R < \bar{R}$, while the ad valorem tariff is more efficient otherwise. If verification costs are high, then a specific tariff is *always* more efficient no matter the revenue goal.

The behavior of the price index under specific and ad valorem tariffs is visualized in Figure 5. Panel A plots the price index distortion by revenue target for different tariff regimes. As a benchmark, we also plot the price index if the customs house had access to a perfectly-enforced ad valorem tariffs. Panel B plots the lower envelope of the price indices, tracing out the distortion under the optimal tariff.

3.4 Impact of State Capacity

We now demonstrate how increased state capacity leads to both increased tariff complexity as well as a shift toward specific tariffs. We model state capacity as the ability to disaggregate goods into multiple distinguishable categories $j = 1, 2, ..., N$, each of which can be assigned a distinct tariff rate and regime. Values in each category are distributed as $v \sim F_j$, and a fraction $\mu_j \in (0, 1)$ of goods falling into each category. The accounting identity $F = \sum_j \mu_j F_j$ ensures that the two categories aggregate up to the original distribution of goods.

We first establish that, generically, the government imposes either distinct tariff rates, distinct tariff regimes, or both across every pair of categories.

Proposition 5. *Fix an optimal tariff code. Suppose that two categories j and k are assigned an ad valorem tariff. Then the tariff rates are unequal whenever*

$$\mathbb{E}_j[v^{1-\sigma}]/\mathbb{E}_j[v^{-\sigma}] \neq \mathbb{E}_k[v^{1-\sigma}]/\mathbb{E}_k[v^{-\sigma}].$$

Suppose that two categories j and k are assigned a specific tariff. Then the tariff rates are unequal whenever

$$\mathbb{E}_j[(v+t^U)^{-\sigma}]/\mathbb{E}_j[(v+t^U)^{-\sigma-1}] \neq \mathbb{E}_k[(v+t^U)^{-\sigma}]/\mathbb{E}_k[(v+t^U)^{-\sigma-1}],$$

where t^U is the uniform specific tariff raising the desired revenue from the two categories.

This result demonstrates that, except under knife-edge conditions on the value distributions in each category, the optimal rate must vary across each pair of categories whenever the same tariff regime is used in both categories. The remaining possibility is that different regimes (specific vs. ad valorem) are used in the two categories, which also requires an increase in complexity. In other words, having the capacity to distinguish goods generically implies an increase in the optimal complexity of the tariff code.

Next, we show that disaggregation tends to favor specific tariffs. As a preliminary step, we establish that as goods become homogeneous in a single-category problem, specific tariffs become optimal no matter the revenue goal. Let $\{F_n\}_{n=1,2,...}$ be a sequence of value distributions, with $v_1, v_2, ...$ distributed as $v_j \sim F_j$. We say that values along the sequence *get homogenized* if v_j converges in probability to some known value $\bar{v}$, and if further the sequences $\{v_n\}_{n=1,2,...}$ and $\{v_n^{-\sigma}\}_{n=1,2,...}$ are each uniformly integrable.

Proposition 6. *Fix any sequence of value distributions $\{F_n\}_{n=1,2,...}$ along which values get homogenized. Then for sufficiently large n, an optimal tariff code raising any amount of revenue from a single category imposes a specific tariff when values are distributed according to F_n.*

Intuitively, in the extreme case where goods are perfectly homogeneous, specific and ad valorem tariffs with perfect costless enforcement are equivalent tools for raising revenue. Because ad valorem tariffs incur verification costs in practice, the government would prefer a specific tariff no matter the revenue goal. Proposition 6 shows that specific tariffs are optimal even when goods are sufficiently (but not perfectly) homogeneous.

We can apply this logic to forecast tariff patterns as state capacity allows goods to be increasingly disaggregated. Let Ω index the space of goods. We define a *taxonomy* of goods to be a sequence of finite partitions $\{\mathcal{P}_n\}_{n=1,2,...}$ of Ω such that each $\mathcal{P}_{n+1}$ is a strict refinement of $\mathcal{P}_n$. Each partition defines a categorization of goods, with the government able to customize tariff regimes and rates across but not within categories. As goods become disaggregated along the taxonomy, the government can design increasingly complex tariff codes. We define a *nest* of a taxonomy to be a sequence $\{\pi_n\}_{n=1,2,\ldots}$ such that $\pi_n \in \mathcal{P}_n$ and $\pi_{n+1} \subset \pi_n$ for each n. Each nest tracks a sequence of increasingly fine categories, with each category along the nest refining the previous one.

Corollary 1. *Fix any taxonomy of goods and any nest along which values get homogenized. Then the optimal tariff code eventually imposes a specific tariff on goods in the nest.*

An important implication of this result is that tariff code complexity and specific tariffs go hand-in-hand. The disaggregation which facilitates complex tariff codes also permits the creation of relatively homogeneous categories in which specific tariffs are optimal. Critically, this result holds *no matter* the amount of revenue to be raised from individual categories. Thus, although disaggregation may lead to a rebalancing of revenue across categories, specific tariffs are eventually optimal in disaggregated categories no matter the extent of rebalancing.

If policymakers can disaggregate imports according to their unit value, then homogenization is an obvious consequence of increased state capacity. In practice, policymakers often categorize imports using physical characteristics which are imperfectly correlated with price (Grant, 2023). For instance, United States government historically assigned tariffs to spirits by proof, understanding that higher proofs had higher prices. Corollary 1 shows that complexity leads to specific tariffs even when policymakers cannot directly categorize based on unit values, so long as the physical characteristics used to categorize goods are sufficiently strong predictors of unit value.

3.5 Patterns of Tariff Incidence

We now hold state capacity fixed and explore patterns of tariff incidence across the tariff code.

We first establish that the optimal tariff regime correlates with the desired tariff burden, i.e., with the percentage of consumer spending within a category which is collected as tariff income.

Proposition 7. *Under an optimal tariff code, the burden of taxation is higher in categories subject to ad valorem tariffs than in those subject to specific tariffs.*

This result is a natural multi-category analog of Proposition 4, which showed in a single-category environment that the optimal regime switches from specific to ad valorem as the revenue goal rises. That result does not directly imply Proposition 7, because different categories might have different switching points, and the revenue goal for each cateogry is furthermore endogenous. Nonetheless, it turns out that higher revenue is associated with a switch from specific to ad valorem tariffs across multiple categories.

Next, we study the pattern of tariff rates across categories subject to ad valorem tariffs. We show that the optimal tariff rate moves inversely to the cost of goods in that category. Recall that the unit value of consumption under an ad valorem tariff is $\bar{v}_j = \mathbb{E}_j[v^{1-\sigma}]/\mathbb{E}_j[v^{-\sigma}]$. It measures the quantity-weighted average value of imports in each category.

Proposition 8. *Under an optimal tariff code and across categories subject to ad valorem tariffs, the tariff rate is lower in categories with a higher unit value of consumption.*

This result contrasts with the classic finding that a *uniform* ad valorem tariff is optimal in a frictionless environment. In an environment with verification costs, total costs rise with the number of imported units that need verification. As a result, the government prefers a non-uniform ad valorem tariff in order to tilt consumption toward higher-value categories requiring less verification.

Finally, we establish that higher-value goods, appropriately defined, are more likely to receive ad valorem tariffs. Formally, we say that two categories j and k are *scale-ordered* if $F_k(v) = F_j(v/\alpha)$ for some $\alpha \in (0, \infty)$ and all v. In order words, the distribution of values in category k is a scaled version of the distribution in category j. Scale-ordered categories exhibit the same proportional dispersion around their means but may differ in their average values.

Proposition 9. *Suppose that two categories are scale-ordered. If, under an optimal tariff code, the two categories use different tariff regimes, then the low-value category uses a specific tariff.*

Intuitively, the costs of administering an ad valorem tariff rise in the number of units which require verification. Since fewer units are imported in high-value categories, administrative costs are lowest in these categories and an ad valorem tariff becomes more attractive. This force is not the only determinant of the optimal regime, because the proportional dispersion of values in a category impacts the distortion under a specific tariff. In scale-ordered categories, dispersion is held fixed and the impact of verification costs can be isolated.

3.6 Summary of Model Predictions

Our model of tariff code design is built on the assumptions that unscrupulous importers may shade down their declared values, and that increased state capacity allows the government to disaggregate goods in the tariff code. It delivers several key testable predictions.

1. As state capacity increases, the tariff code will become more complex. There will be more categories in the tariff schedule and more distinct tariff rates (Proposition 5).

2. Tariff codes which are more complex will tend toward greater usage of specific tariffs (Corollary 1).

3. Specific tariffs will be assessed on categories with relatively homogeneous value distributions (Proposition 6).

4. Specific tariffs will also be assessed on categories with relatively low tariff burdens (Proposition 7).

5. Among goods that are assessed ad valorem tariffs, cheaper goods will be assessed higher duties. (Proposition 8).

6. Specific tariffs will tend to be assessed on cheaper goods (Proposition 9).

4 Empirical Results

In this section, we use our data to test the predictions of the model. Most of the analysis in this section is at the level of a good. However, before considering the cross-good comparisons, it is worth discussing the historical justification for the connection between aggregate state capacity, tariff complexity, and specific tariffs. While we do not observe causal variation in the aggregate complexity of the historical tariff code, the predictions of the model capture the aftermath of two important historical events.

First, consistent with Proposition 5, the professionalization and expansion of Customs workers in 1818 was followed by a more than 25 percent increase in the number of goods listed. Consistent with Corollary 1, the share covered by specific tariffs nearly doubled.

Second, in the aftermath of the 1832-33 Nullification Crisis, the tariff code was simplified, lowering the number of distinct tariff rates by a sixth. Again consistent with Corollary 1, the share of specific tariffs fell by a third. In the rest of this section, we start by analyzing the evolution of the tariff code in the early United States, before turning to modern evidence.

4.1 Historical Data

For our analysis of the 19th century tariff rates, we use a variety of datasets, described in detail in Appendix A. Our primary data source is the labels and goods from the 1789-1842 tariff bills, years when some tariffs were specific.

To calculate ad valorem equivalent rates, we link the tariff bills to the the *Commerce and Navigation of the United States*. The *Commerce and Navigation of the United States* provides incomplete coverage of all goods, but, for the imports reported, we can calculate the 1842 ad valorem equivalent rates as the document reports total values and quantities for imports with specific tariffs (and values for all imports). While under the 1842 regime we have information on quantities for only five imports without specific tariffs, quantities continued to be reported for around half of the imports that switched from specific to ad valorem in 1846.

A key force in the model is the price homogeneity of the *varieties* within a particular tariff line. We do not directly observe the quantities and values by shipments in the historical data, so we cannot directly measure price dispersion. As a result, in order to proxy for within-good dispersion, we follow a large literature in the spirit of Rauch (1999) and classify goods as homogeneous if they are commodities. To create our measure of commodities, we digitized a list of commodities from the 1863-64 *Executive Documents* printed by the House of Representatives.[23]

4.2 Empirical Strategy

Our estimating equation is of the form

$$Y_{it} = \beta T_{it} + \Lambda_{it} + \gamma_t + \gamma_i + \epsilon_{it}, \tag{2}$$

where Y_{it} is the outcome for good i. In addition to the covariate of interest, T_{it}, we may include other potentially time varying controls Λ_{it}, as well as, when feasible, time or good fixed effects. Standard errors are clustered by good. For the analysis on historical tariffs, the good is defined in Appendix A, though for our analysis on imports the unit of observation is what is listed in the import tables (which typically covers multiple goods from the perspective of the tariff bills).[24]

For our country-level analysis, we estimate the following equation:

$$y_c = \beta X_c + \epsilon_c, \tag{3}$$

where y_c is the outcome for country c. X_c represents characteristic at the country level, which is the level of Customs house capacity. We calculate robust standard errors.

4.3 Empirical Results: The Early Republic

4.3.1 Homogeneity and Specific Tariffs

Table 3 shows that Proposition 6 successfully predicts that narrow tariff labels are more likely to be specific. The explanatory variable is if the label is a singleton: if the line in the

[23] We also show our results are robust to using Rauch (1999)'s modern classification for if a good is traded on an organized exchange has a reference-price. At this time, actual organized exchanges and reference prices were rare, as commodity markets were not fully developed (Taylor, 1917; Banner, 1998; Dunlavy, 2024). Nevertheless, our logic is that these goods were plausibly homogeneous enough, even if their prices were not as formally documented.

[24] Across all good-level regressions, we only include goods with specific or ad valorem tariffs, for instance, dropping those on the free list.

tariff bill only covers one good.[25] Columns 1-3 pool across all years in our data. Relative to the baseline regression in Column 1, Column 2 adds year by STIC (3 digit) fixed effects, and Column 3 uses within-good variation in the narrowness of their labels by including good fixed effects. Column 4 instead only includes 1842, the final tariff bill in the sample. Across all specifications, singleton labels are around 10 percentage points more likely to be specific (the baseline mean in the whole sample is about 10 percent, and was 50 percent in 1842).

As an alternative to using the structure of the tariff bills directly, we can also test Proposition 6 using properties of the goods themselves. Table 4 shows that homogeneous goods are also around 20 percentage points more likely to have specific tariffs. The result is stable to including year by STIC (2 digit) fixed effects, or only including 1842.[26]

Robustness Exercises We undertake a variety of robustness checks for Tables 3 and 4. First, our baseline regressions include no additional controls or weights. However, a good's tariff burden may be an important driver of its tariff type (as described in Proposition 7). In Panel A of Tables A.4 and A.5, we control for the 1842 ad valorem equivalent tariff for all goods for which we have import data.

Many of our goods are narrowly defined, and so likely reflect a small fraction of imports. In Panel B of Tables A.4 and A.5, we weight the regressions by the inverse of the number of goods within each three-digit SITC classification, so as to raise the importance of relatively more distinct goods for our analysis. Our results are robust to these changes.

The data for Tables 3 and 4 are unbalanced for two reasons. First, we exclude goods in those years in which they appear on the free list, as they have neither a specific nor ad valorem tariff in those years. Panel A of Tables A.6 and A.7 show our results are robust to only including goods which are never on the free list. Second, each observation is a good by tariff bill. However, some tariff bills are relatively minor, affecting a small share of goods. Panel B of Tables A.6 and A.7 show that our results are robust to limiting the sample to major tariff bills (those that describe at least half of the goods).[27]

As described in Appendix A, our definition of a good requires some judgment to distin-

[25]Table A.1 shows our results are similar if instead we consider labels that are no more than 5 (or 10) goods.

[26]Table A.2 shows that the results are robust to using Rauch (1999)'s modern measure of if a good is homogeneous. Broda and Weinstein (2006) point out that the Rauch (1999) classification can label a good as homogeneous even when it includes multiple distinct products with varying prices. For example, "tea" is categorized as a commodity, but in practice includes many varieties. A similar issue arises using our 19th century commodity classification: The import bills distinguish 18 types of tea, all of which are listed as commodities. However, in some years there are only two labels for tea. Table A.3 shows that while singleton labels and homogeneous goods are each more likely to receive specific tariffs, goods that meet both criteria are broadly likely to do so.

[27]Those bills are in 1789, 1790, 1792, 1794, 1816, 1824, 1832, and 1842.

guish between physically distinct imports that nevertheless share a path of tariffs. Tables A.8 and A.9 show our results are robust to alternative approaches, both a strict classification where we group together goods that are even plausibly similar, or an extremely strict classification where we group together all goods with the same path of tariffs, regardless of any physical similarity.

4.3.2 Revenue and Specific Tariffs

An important feature of our environment is that policymakers wish to avoid paying enforcement costs when the revenue from a particular shipment is low. This force leads to several distinct predictions that we can test in the historical data.

First, Proposition 8 predicts that, conditional on having an ad valorem tariff, imports with lower unit values should have higher tariff rates. We can test this prediction for the set of goods with specific tariffs in the 1842 bill, all of which were switched to ad valorem in the 1846 Walker Tariff. Table 5 shows that a one standard deviation higher unit value is associated with around a 1 percentage point lower ad valorem rate. We observe this pattern both when only considering unit values reported in years under the 1842 regime (when the goods had specific tariffs), in the years under the 1846 regime (when the goods had ad valorem tariffs), or when including all years in our analysis.[28]

Second, Proposition 7 shows that imports with lower ad valorem equivalents are more likely to be specific. For imports from 1843 through December 1846, we can calculate ad valorem equivalents for the imports with specific tariffs, and compare them to the rates for the goods with ad valorem tariffs. Table 6 Panel A shows that goods with ad valorem equivalents below 5% (roughly the fifth percentile), 15%, and 25% (roughly the median) are disproportionally more likely to be specific tariffs, as goods with the lowest burden are around 25 percentage points more likely to be specific. Table 6 Panel B shows that our result is robust to looking within labels, by including fixed effects for the good's label in 1832, the last major tariff bill before 1842. Consistent with our theory, when a label is divided, the good with the low tariff burden is the one more likely to be given a specific tariff.

Third, Proposition 9 predicts that goods with low unit values are more likely to have specific tariffs. Unfortunately, testing this prediction with regressions on 19th century data is difficult, as under the 1842 regime unit values were rarely reported for goods with ad valorem tariffs. However, it is well understood that cheaper goods within particular categories were more likely to get specific tariffs (Irwin, 2017). In particular, the minimum tariffs discussed

[28] Theoretically, we predict that unit values are not misreported under specific tariffs, and they are shaded down with ad valorem tariffs, which if anything would push against finding that cheaper goods have specific tariffs. Table A.10 shows this pattern is slightly stronger when weighting by the total value of imports by good.

in Section 2 exactly fit the logic of the model: The cheaper varieties of a particular type of import (such as cotton cloths worth less than 25 cents a square yard in 1816) paid what was understood to be effectively a specific tariff, as the tariff bill was a function only of the quantity (Taussig, 1910).

4.4 Empirical Results: The Modern Era

4.4.1 Modern Data

We supplement our historical analysis with data on current tariffs around the world. Our primary source of modern tariff information is the World Trade Organization (WTO)'s Integrated Database (IDB). We focus on the applied Most Favored Nation (MFN) rates in the most recent year available for each country.[29] Tariffs are recorded at the level of a *tariff line*. Each tariff line is a 6 to 10 digit code, with the first 6 digits harmonized across countries according to the World Customs Organization's Harmonized System (HS). The trailing digits are country specific—for example, the United States uses the HS10 system maintained by the USITC, while the EU maintains the 8 digit Combined Nomenclature. Importantly, the database provides a classification on the nature of each duty, so that we may classify duties by whether or not they are ad valorem.[30]

We obtain ad valorem equivalents for non ad valorem tariffs from UN Trade and Development's (UNCTAD's) Trade Analysis and Information System (TRAINS). Data from TRAINS are also available at the most detailed tariff line level for each country. We merge ad valorem equivalents into our primary WTO tariff data using tariff line codes.

One advantage of the modern data is that we can directly measure cross-country differences in customs house capacity. In particular, we use trade misreporting indices derived by Farhad et al. (2024). These indices quantify the extent of trade misreporting by comparing each countries' reports to their trading partners. The logic of using the data is that more capable customs houses are better at measuring trade flows. Our main analysis uses both a standardized overall trade misreporting index and an export misreporting index, where lower values indicate less misreporting. We use both measures because export misreporting is a measure of capacity that is not directly endogenous to the applied tariffs. We use the most recent year available for each country in the database as our measure of bureaucratic customs capacity.

Finally, we use data on American imports 1980-1985, from the US Census in the Annual Import Data Bank.[31] From 1980 to 1985, quantities, values, and (estimated) tariff revenue

[29]We use MFN rates in the modern data to avoid measurement issues, see Teti (2024) for more discussion of the data.

[30]There are 5 categories of tariff: Ad valorem, Specific, Compound, Mixed, and Other. Our main analysis focuses solely on tariffs that are either explicitly ad valorem or specific.

[31]See Feenstra (1996), Schott (2008), and Greenland, Lake and Lopresti (2025*a*) for more detail. To avoid

for imports were recorded by exporter at the 7-digit level of the Tariff Schedules of the United States Annotated (TSUS). The key value of this source is that we can measure unit values and ad valorem equivalents for all imports (and, unlike the cross-country data, we do not need to concord different datasets in order to merge tariffs to ad valorem equivalents). The tariff schedule was disaggregated to the 5-digit level at the time Acosta and Cox 2023; Greenland, Lake and Lopresti 2025*a*). This allows us to calculate a direct measure of dispersion of prices within a tariff label: Within each 5-digit code, we calculate the standard deviation of (ln) unit values across imports for each 7-digit code by exporter.

4.4.2 Modern Cross Country Analysis

We now turn to replicating and extending our tests of the model's predictions for the modern era. First, we show simple bivariate cross-country regressions, where the dependent variable is the measure how effectively each country keeps track of its trade flows (Farhad et al., 2024) and the outcomes are features of each country's tariff code.

Table 7 Panel A shows, consistent with Proposition 5, that countries with less capability have coarser partitions in the tariff code: They both have fewer tariffs, and have fewer HS 6-digit codes with variation in their tariffs.[32] Consistent with Corollary 1, Panel B shows that these countries have a lower share of specific tariffs, either at the level of the tariff line or grouping to HS 6-digit level. Overall, a one standard deviation increase in customs house misreporting lowers the share of tariff lines with specific tariffs by around two percentage points.[33]

We now turn to showing how tariff regimes vary across goods. For this analysis, we use the same regression specification as in the historical data, Equation (2), where the unit of observation is a good.

Table 8 Panel A tests Proposition 7 that lower ad valorem equivalent tariffs are more likely to be specific. Indeed, we find that goods with low (below 5%) burdens are around five percentage points more likely to be specific.[34]

Figure A.7 visualizes the effects of ad valorem equivalents and state capacity. The figure has two panels: one for OECD countries and one for non-OECD countries. Each panel shows histograms of ad valorem equivalent rates, separately for goods facing specific and ad valorem tariffs. In both groups, goods with the lowest ad valorem equivalent imports are

measurement issues, we use Column 1 tariffs.

[32]Figure A.6 shows that wealthier countries in terms of per capita GDP also have more distinct tariff rates.

[33]Table A.11 show our results are robust to instead using measures of Bureaucracy Quality from the International Country Risk Guide. See also Betz (2019).

[34]Table A.12 shows similar results using cutoffs of 2.5% or 10%. In current cross-country tariffs, 10% is around the median ad valorem equivalent, 5% is around the 10th percentile, and 2.5% is around the 5th percentile.

typically assigned specific tariffs. There are almost no goods with ad valorem tariffs below 5%, but many with specific tariffs below that equivalent rate.[35]

Table 8 Panel B tests Proposition 6, that price homogeneity makes specific tariffs more attractive. Homogeneous goods are about 0.8 percentage points more likely to be specific. Although the coefficient is lower than in our historical analysis, specific tariffs are also currently less common, covering around 2 percent of global tariffs.[36] While we do not observe how the tariff bills are written and therefore lack a direct modern analogue to singleton labels, we can take advantage of the modern tariff hierarchy by measuring whether an import has the same tariff rate as all other imports within its HS 4-digit category. Non-grouped imports are around one percentage point more likely to have specific tariffs. We also find that the interaction of the two, homogeneity and not being grouped, predicts specificity.

4.4.3 Analysis of the 1980s United States

A key advantage of the 1980s US import statistics is we have information on values and quantities for almost all imports, uniquely allowing us to directly test Proposition 9: that cheaper goods are more likely to have specific tariffs. Table 9 Panel A shows that doubling the unit values leads to around a two percentage point decrease in the likelihood of specific tariffs. The unit of analysis is TSUS 5-digit codes, and the results are robust to controlling for 4-digit fixed effects.[37]

Table 9 Panel B tests Proposition 7, showing that higher ad valorem equivalents are around 15 percentage points less likely to be specific tariffs. These results are robust to controlling for 4-digit fixed effects. In order to visualize these patterns, Figure A.9 shows a heatmap of prices and ad valorem equivalents. Consistent with the theory, cheap goods with low levels of protection are particularly likely to have specific tariffs.

We did not test Proposition 8 in the 1980s data, as Acosta and Cox (2024) already document that cheaper goods have higher ad valorem rates in this time period.[38]

Table 9 Panel C tests Proposition 6, that more variance makes specific tariffs less attractive. Instead of using discrete measures of homogeneity, we can use a direct measure

[35] Another pattern that likely reflects an endogenous response to state capacity is that non-OECD countries exhibit substantial heaping in their ad valorem tariff rates, especially at values ending in 5 or 0. Hamilton (1795) encouraged heaping, writing "inconvenient fractions... serve to perplex the calculation of the duties."

[36] Rauch (1999) provides both a conservative and liberal classification to account for ambiguities in product categorization. The conservative version minimizes the number of products classified as low dispersion, while the liberal one maximizes them. Our main analysis uses the conservative classifications. Table A.13 shows our results are similar using the liberal definition of homogeneous.

[37] Figure A.8 shows a lowess curves predicting the share of specific tariffs against the unit value. The share with specific tariffs monotonically falls as unit values increase.

[38] It is worth noting that Acosta and Cox (2024) have a different explanation than the theory we present: They find that in the 20th century, the negative correlation between unit values and ad valorem rates emerged in the 1950s, and they argue that protectionism was a driving force.

in this setting, the dispersion of log prices within each 5 digit TSUS code across (7 digit) varieties. A one standard deviation increase is associated with around a 10 percentage point decrease in the probability of a specific tariff across all goods, and around 2-4 percentage points within 4-digit codes.

4.5 Alternative Explanations

In this section, we discuss some alternative ways of thinking about the economic environment, and explain why we think our modeling choices are justified by the data.

An alternative justification for specific tariffs is they stabilize prices, as their ad valorem equivalent is negatively correlated with a good's unit value (Lampe, 2020). While 19th century policymakers were aware of this feature (Woodbury, 1835), it is rarely mentioned in policy documents as a motivation for specific tariffs. Furthermore, this insurance-like mechanism seems less relevant in the 19th century, as policymakers argued that Congress could hold fixed effective duties by updating specific tariffs as prices adjusted (Burrows, 1894). While we do not observe measures of price volatility over time in the 19th century, we find little evidence that this mechanism matters for policies in the 1980s: Table A.14 shows that, in the 1980s, goods with more price variation over time were not disproportionally likely to have specific tariffs.

We model state capacity as increasing the ability for customs officials to partition imports. In particular, we make the stark assumption that increased capacity does not affect c, the cost of verification. We think that modeling an unchanging c reflects the actual changes in US Customs in this time period. Even during the large expansion in Customs employment through the 1840s, there were only 24 total appraisers by the end of our sample. It remains difficult and costly to bring charges of misvaluation through the courts (United States Court of International Trade, 2018). Even for importers who were *obviously* lying, an expert and a judge still needed to be involved. Indeed, Customs officials reported that they were unable to punish importers whose submitted invoices containing prices that "no one believes" (Meredith, 1849). Furthermore, if the ability of the state to collect ad valorem tariffs increased with development, we would counterfactually observe that developed countries today would have few specific tariffs, and similarly that the US shed them as it developed its Customs capacity.

Furthermore, our model abstracts somewhat from misclassification. Though unrealistic, we assume that state capacity enables perfect enforcement of tariffs across goods.[39] Even in the modern era, firms evade tariffs by miscoding goods (Fisman and Wei, 2004).[40] In reality,

[39]Historical Customs officials acknowledged that misclassification or "false weights and measures" occurred, but argued these were easier to detect than misvaluation (Burrows, 1894).

[40]Misclassification is not limited to developing countries. In 2024, Ford paid a $365 million fine for

importers can misclassify goods with a positive probability, potentially increasing with the complexity of the tariff code. The key force we emphasize is that investments in capacity reduce this probability.

Fisman and Wei (2004) find that evasion increases with the tariff rate, a pattern that is not a clear prediction of our model. While we have limited data, we do not find evidence for this relationship in our setting. Figure A.10 plots reported unit values of unmanufactured wool in the 1840s—the sole good for which we have measures of unit prices, ad valorem duties, and a change in those duties. Even as the duty changed in 1846, there was no systematic change in its reported unit price. Table A.15 shows that, if anything, the fall in unit value in 1846 was *smaller* for goods whose ad valorem equivalent increased by relatively more. This experience is consistent with the views of contemporary Treasury officials, who thought that misvaluation was "inherent" to ad valorem tariffs, regardless of the rate (Manning, 1885).

One potential explanation for the increasing richness of the tariff code in the 19th century was the Industrial Revolution: Over time, more goods were created. There was also a rise in industrial policy motivations for tariffs, some of which were specific in order to protect relatively cheap and low quality American products (Irwin, 2017). In Tables A.16 and A.17, we show our results are robust to only including products that are less sensitive to these concerns. Panel A of the tables shows our results are robust when only considering non-manufactured goods. Many of the tariffs motivated by industrial policy charged different tariffs for similar goods of different prices (Irwin and Temin, 2001). Panel B of the tables shows our results are similar if we drop all goods that ever have a tariff that varies with their price. Panel C drops all goods whose industry was mentioned in Hamilton (1791)'s *Report on Manufactures* (Irwin, 2004; Sylla, 2024).[41]

5 Discussion

States endogenously respond to their capabilities. We show how this phenomenon generates patterns of tariff setting. In particular, high-capacity customs houses are able to have a more disaggregated tariff code. A complex tariff code is particularly suited to specific tariffs, especially for homogeneous goods and those with low levels of protection. We show that our theory both predicts the historical evolution of American tariffs and modern patterns. Tariffs are currently an issue of widespread contemporary debate, and our results have implications for these ongoing discussions.

Until recently, the United States imposed no tariffs on low-value imports intended for

allegedly misclassifying cargo vans by installing "sham rear seats and other temporary features to make the vans appear to be passenger vehicles" (Shepardson, 2024).

[41]Manufactured goods are around half of the goods, and our results are not robust to dramatically shrinking the sample by both dropping them and also only considering 1842.

consumption (Fajgelbaum and Khandelwal, 2025). Most countries maintain some form of *de minimis* exemption, as the administrative costs of collecting revenue on such shipments typically outweigh the fiscal benefits. In February 2025, the United States initially eliminated the exemption for goods originating in China, but was forced to reverse the decision shortly thereafter when Customs authorities became overwhelmed (Lawder et al., 2025). Like their 19th century counterparts, policymakers quickly recognized how to avoid wasting costly enforcement resources on low-revenue shipments. In May 2025, the exemption was permanently removed with a specific component: Importers could pay $100 per package (Tobin and Chang, 2025).

Recent technological advancements are increasing the capacity of customs houses around the world (Budimirovic et al., 2022; Chowdhary and Vomhof, 2024), and improving tax collection more broadly (Dzansi et al., 2025). These technologies are particularly effective at preventing misclassifications (Davies, McNabb and Palanský, 2024). Our results suggest that, in order to fully take advantage of these new tools, they should be paired with increasingly complex tariff schedules. Our theory makes clear how to shape these more complex schedules to minimize deadweight loss while maintaining government revenue.

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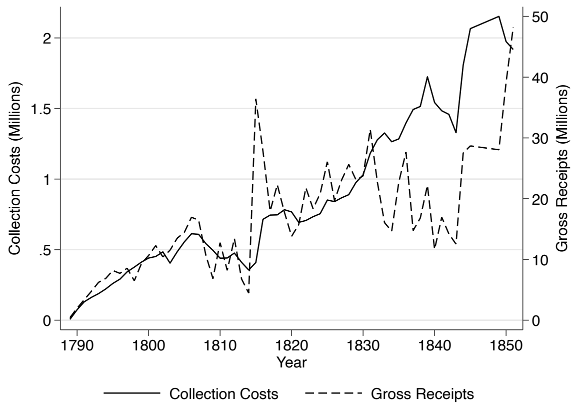
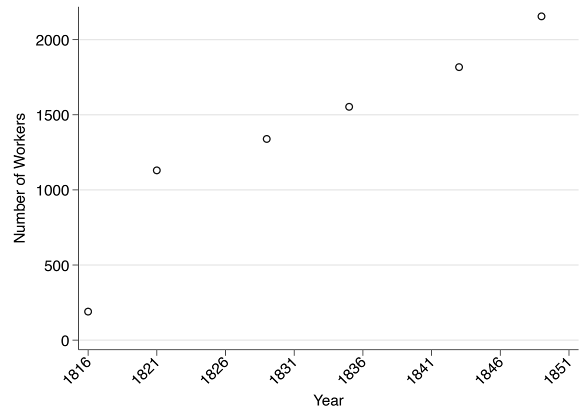
Figure 1: The Expansion of the Customs House

Panel A: Customs Over Time



Panel B: Customs Workers Over Time



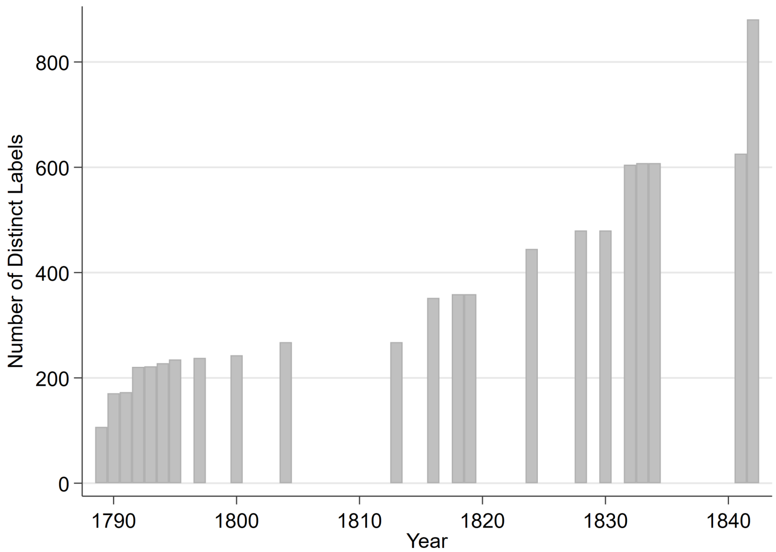
Panel C: Share of Employees with Many Jobs

Panel D: Customs Occupations Over Time

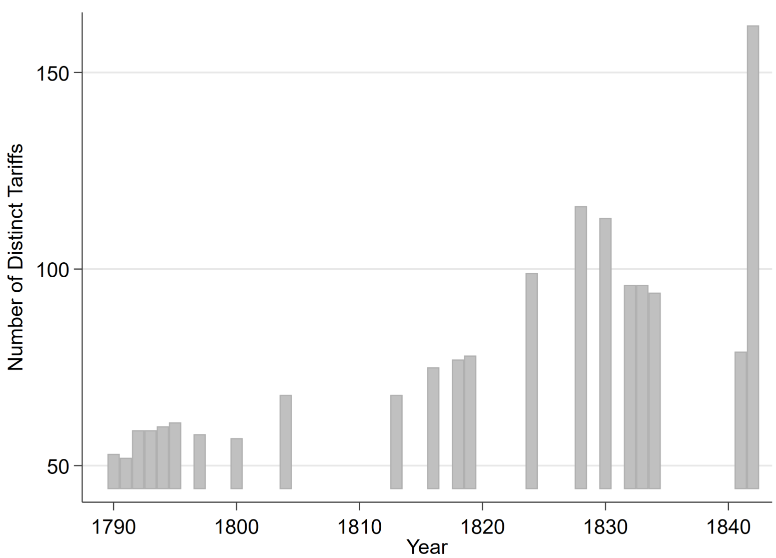
Notes: This figure shows the expansion of Customs over time. Panel A shows gross Customs revenue and collection costs (in nominal dollars). Panel B shows the number of workers at the Customs Houses. Panel C shows the share of Customs workers who are listed as having multiple distinct jobs. Panel D shows the number of distinct occupations at Customs houses over time, where we only include occupations that appear in at least two different houses. Source: *Commerce and Navigation of the United States* and *Annual Reports of the Secretary of the Treasury on the State of the Finances.*

Figure 2: Increasing Tariff Disaggregation Over Time

Panel A: Number of Labels Over Time

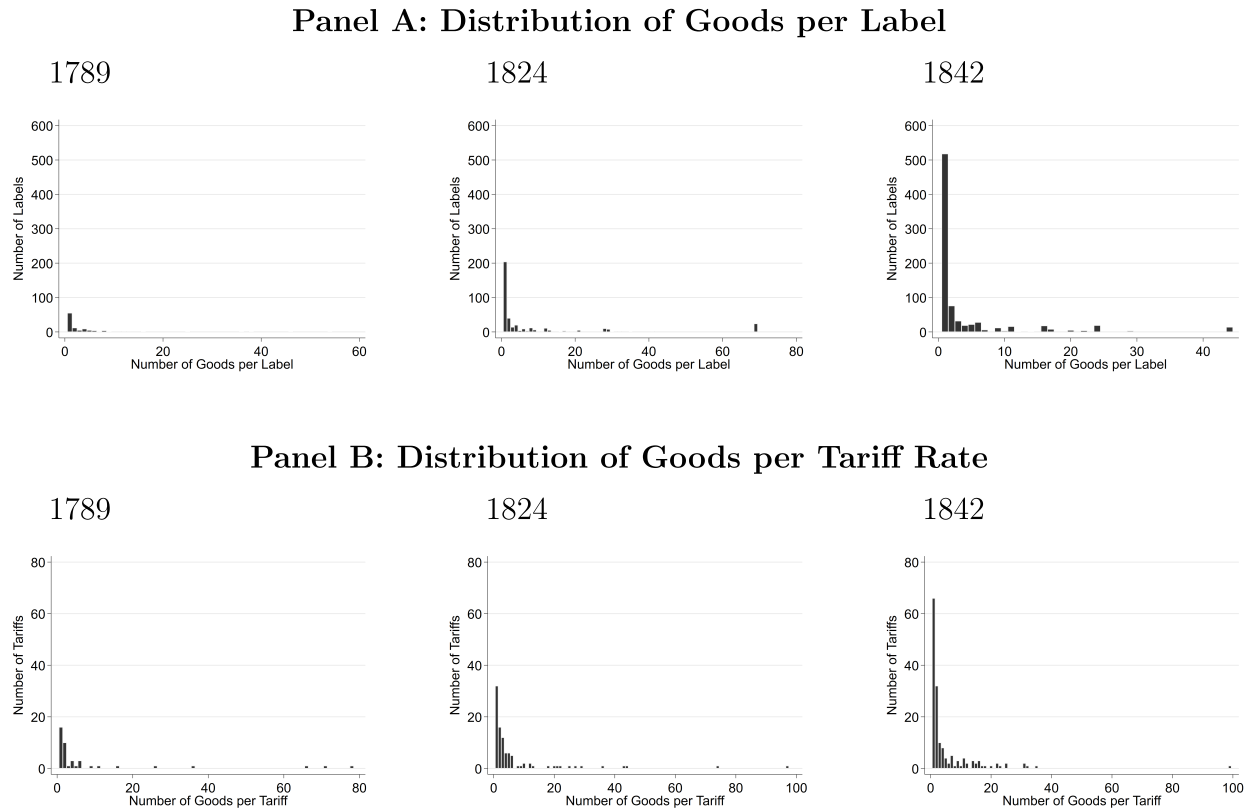


Panel B: Number of Distinct Tariffs Over Time



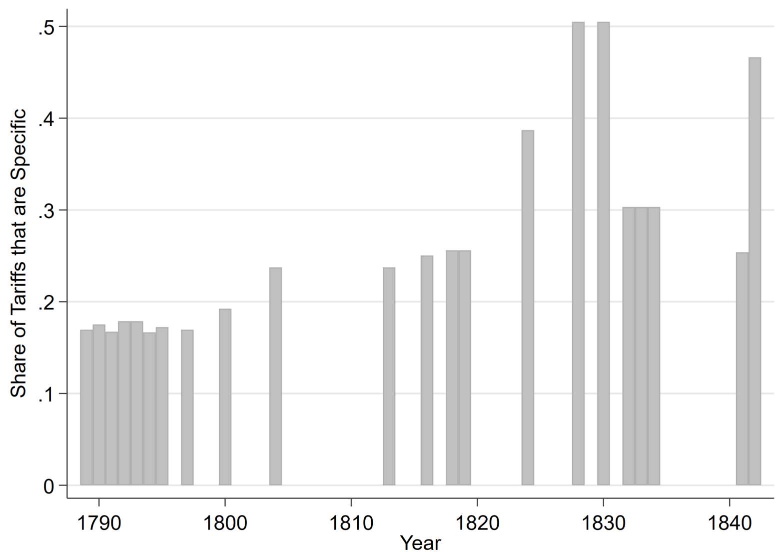
Notes: This figure plots the evolution of the complexity of the American tariff code over time. Panel A plots the number of labels that have been used in the tariff code, where a label is a group of words in the tariff code that corresponds to a set of goods (we do not double-count labels when, across tariff bills, different words are used to describe the same set of goods). Panel B plots the number of distinct tariffs that are in effect for each year. Source: *Tariff Acts of the United States.*

Figure 3: Concentration of Groupings Over Time



Notes: This figure plots the evolution of the disaggregation of the American tariff code over time, by plotting the number of goods associated with each grouping. Panel A shows the distribution of how many goods are associated with each label, and Panel B shows the distribution of how many goods are associated with each tariff rate, in 1789, 1824, and 1842. In 1789, there are 920 goods with the same label and tariff ("All other goods, wares, and merchandise," with a 5% tariff), which are not shown in the graphs. Source: *Tariff Acts of the United States.*

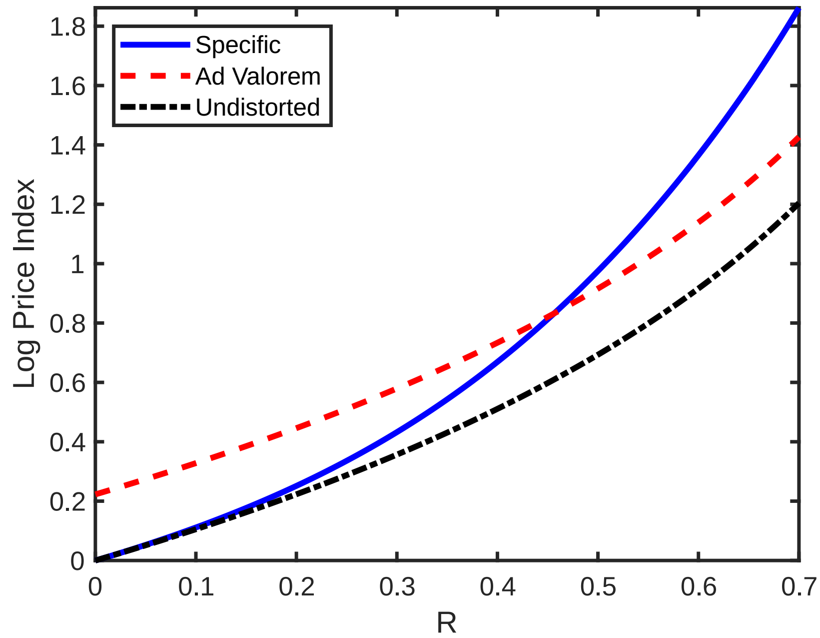
Figure 4: Share of Goods with Specific Tariffs Over Time



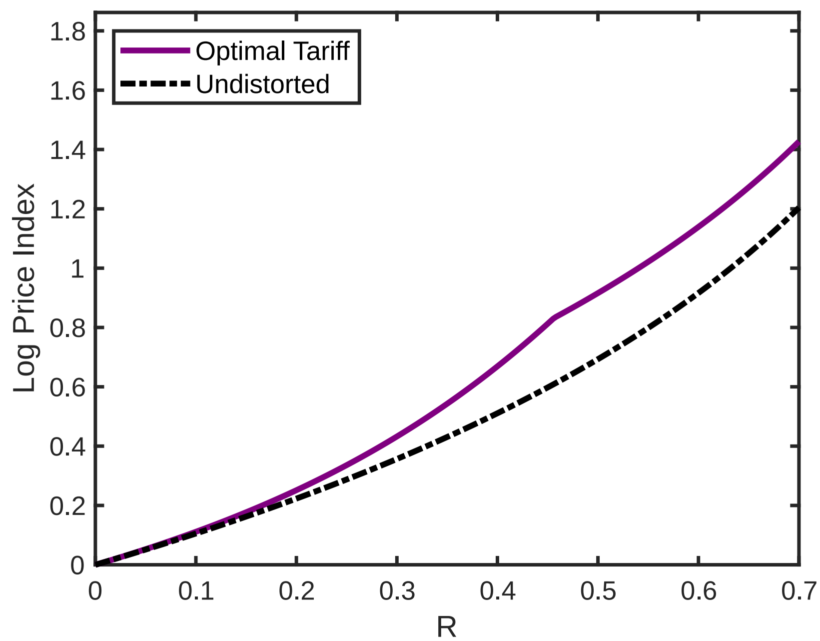
Notes: This figure plots the evolution of the American tariff code over time, by plotting the share of goods that have a specific tariff. Source: *Tariff Acts of the United States*.

Figure 5: Revenue and Price Index Distortions for Different Tariffs

Panel A: Specific, Ad Valorem, and Undistorted Ad Valorem



Panel B: Optimal Tariff and Ad Valorem



Notes: This figure shows how the price index changes with the share of expenditure collected as tariff income (net of any verification costs). The first panel plots how the price index responds with specific tariffs (in solid blue), ad valorem tariffs with enforcement costs (dashed red), and perfectly and freely enforced ad valorem tariffs (black dot dashed). The second panel compares the undistorted ad valorem to the lower envelope of specific and ad valorem tariffs with enforcement costs (in solid purple).

Table 1: Schematic of Moving from Label to Goods

Panel A. Wool Flannels

<table>
<tr><th>Year</th><th>Wool Flannels < $0.50</th><th>Wool Flannels $0.50–1.00</th><th>Wool Flannels $1.00–2.00</th><th>Wool Flannels $2.00–4.00</th><th>Wool Flannels > $4.00</th></tr>
<tr><td>1789</td><td colspan="5">All other goods</td></tr>
<tr><td>1790</td><td colspan="5">All other goods</td></tr>
<tr><td>1791</td><td colspan="5"></td></tr>
<tr><td>1794</td><td colspan="5"></td></tr>
<tr><td>1816</td><td colspan="5">Wool Manufactures</td></tr>
<tr><td>1824</td><td colspan="5">Wool Manufactures Over 33 1/3 cents a square yard and all Woolen Flannels</td></tr>
<tr><td>1828</td><td>Wool Mfg: < $0.50</td><td>$0.50–1.00</td><td>$1.00–2.00</td><td>$2.00–4.00</td><td>>$4.00</td></tr>
<tr><td>1832</td><td colspan="5">Flannels</td></tr>
<tr><td>1842</td><td colspan="5">Flannels, not cotton</td></tr>
</table>

Panel B. Cotton Flannels

<table>
<tr><th>Year</th><th>Cotton Flannel, uncolored < $0.20</th><th>Cotton Flannel, uncolored $0.20–0.25</th><th>Cotton Flannel, colored < $0.25</th><th>Cotton Flannel, uncolored $0.25–0.30</th><th>Cotton Flannel, colored $0.25–0.30</th><th>Cotton Flannel, $0.30–0.35</th><th>Cotton Flannel, ≥ $0.35</th></tr>
<tr><td>1789</td><td colspan="7">All other goods</td></tr>
<tr><td>1790</td><td colspan="7">All other goods</td></tr>
<tr><td>1791</td><td colspan="7">Cotton Manufactures</td></tr>
<tr><td>1794</td><td colspan="7">Cotton Manufactures</td></tr>
<tr><td>1816</td><td colspan="3">Cotton Manufactures < $0.25</td><td colspan="4">Cotton Manufactures</td></tr>
<tr><td>1824</td><td colspan="5">Cotton Manufactures < $0.30</td><td colspan="2">Cotton Manufactures</td></tr>
<tr><td>1828</td><td colspan="6">Cotton Cloth < $0.35</td><td></td></tr>
<tr><td>1832</td><td colspan="7">Flannels</td></tr>
<tr><td>1842</td><td>Cotton Mfg uncolored < $0.20</td><td>Cotton Mfg other</td><td>Cotton Mfg colored < $0.30</td><td>Cotton Mfg other</td><td>Cotton Mfg colored < $0.30</td><td>Cotton Mfg other</td><td>Cotton Mfg other</td></tr>
</table>

Notes: This table shows how we created eight flannel goods from the various relevant labels that appeared in the *Tariff Acts of the United States*, 1789–1842. The labels shown are broadly the text that appears in the bills themselves (though we compressed the language, for space). See Figure A.1 for examples of the labels that appeared in 1828 related to manufactures of wool. We manually link the text of the bills in order to create *intersections*: each good has a unique path of tariffs. Every label links to at least one good in every year, and every good links to no more than one tariff rate. The horizontal solid lines imply that the good is associated with a new label, while the horizontal dashed lines imply that the old label (and tariff) continues to apply. All prices refer to dollars per square yard. We only include years in which at least one flannel good is implicated.

Table 2: Tariff Type and Reported Unit Values

	(1)	(2)	(3)	(4)
Post × Specific in 1842	-0.67 (0.15)	-0.62 (0.15)	-0.67 (0.15)	-0.62 (0.15)
Include Wool		✓		✓
Full Years Only			✓	✓
Number Of Goods	17	18	17	18
Number Of Observations	133	141	133	141

Notes: This table shows the effect of switching from specific to ad valorem tariffs on reported unit values. The outcome for all regressions is reported unit values. We use the initially-specific goods listed in the 1849 Annual Report of the Secretary of the Treasury for 1843–1849, and compare them to the goods without specific tariffs for which unit values were reported (two types of coffee, two types of tea, and wool). Because pre-1846 wools of different values had different tariffs, the odd columns exclude them from the control group. Columns 3 and 4 show results only for the import statistics with 12 months of reporting (dropping 1843 and two reports for 1847, one for each tariff regime). All regressions include good and year fixed effects, and standard errors clusted by good. Source: *Commerce and Navigation of the United States* and *Annual Reports of the Secretary of the Treasury on the State of the Finances.*

Table 3: Singleton Labels Predict Specific Tariffs

	(1)	(2)	(3)	(4)
Singleton Label	0.062	0.089	0.095	0.14
	(0.0097)	(0.010)	(0.011)	(0.029)
Mean Outcome	0.11	0.11	0.11	0.50
Number of Goods	1395	1349	1384	1290
Number of Observations	28126	27237	28115	1290
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Notes: This table shows the relationship between the aggregation in the tariff code and if a good has a specific tariff. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the label for the good is a singleton (only covers one good). All regressions control for year. Column 2 additionally controls for year interacted with three digit SITC classifications. Column 3 controls for good fixed effects. Column 4 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States*.

Table 4: Homogeneity Predicts Specific Tariffs

	(1)	(2)	(3)
Homogeneous	0.12	0.22	0.27
	(0.0092)	(0.046)	(0.033)
Mean Outcome	0.11	0.11	0.50
Number of Goods	1395	1387	1290
Number of Observations	28126	27944	1290
Specification	Year FE	Year × SITC FE	Only 1842

Notes: This table shows the relationship between price dispersion across varieties of a good and if it has a specific tariff. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the good was listed as a commodity by *The Executive Documents* of the House of Representatives. All regressions control for year. Column 2 additionally controls for year interacted with two digit SITC classifications. Column 3 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States.*

Table 5: Lower Unit Values Predict Higher Ad Valorem Tariffs

	(1)	(2)	(3)
Unit Value (Standardized)	-1.32	-0.61	-0.88
	(0.32)	(0.28)	(0.28)
Mean Outcome	28.285	28.018	28.179
Number of Goods	854	405	1163
Number of Observations	1069	605	1674
Tariff Regime	1842	1846	Both

Notes: This table shows the relationship between unit values and ad valorem duties. The outcome in all regressions is the ad valorem rate for the import after 1846. The sample is the goods with specific tariffs in the 1842 tariff bill. All regressions additionally control as each good's 1842 ad valorem equivalent. Column 1 includes only observations from the 1842 tariff regime, Column 2 only from the 1846 tariff regime, and Column 3 includes all observations. Results clustered by good. Source: *Commerce and Navigation of the United States* and *Tariff Acts of the United States*.

Table 6: Low AVEs Predict Specific Tariffs

Panel A. Baseline Specification

	(1)	(2)	(3)
AVE < 5	0.25	0.22	0.24
	(0.074)	(0.11)	(0.076)
5 < AVE < 15	0.18	0.11	0.15
	(0.064)	(0.085)	(0.059)
15 < AVE < 25	0.081	0.017	0.054
	(0.046)	(0.059)	(0.039)
Mean Outcome	0.680	0.420	0.569
Number of Goods	759	522	1210
Number of Observations	969	728	1697
Tariff Regime	1842	1846	Both

Panel B. Within 1832 Labels

	(1)	(2)	(3)
AVE < 5	0.15	0.17	0.17
	(0.087)	(0.13)	(0.056)
5 < AVE < 15	0.14	0.13	0.12
	(0.064)	(0.088)	(0.051)
15 < AVE < 25	0.062	-0.11	0.011
	(0.047)	(0.051)	(0.033)
Mean Outcome	0.750	0.612	0.694
Number of Goods	711	469	1169
Number of Observations	917	662	1650
Tariff Regime	1842	1846	Both

Notes: This table shows the share of imports with specific tariffs, below each ad valorem equivalent. Across all columns the outcome is whether the good had a specific tariff in 1842, and the key independent variables are dummies for the ad valorem equivalent level. Panel A presents the baseline specification, while Panel B adds fixed effects for the 1832 classification label of the good (and only includes imports that share an 1832 classification label with another import). Regressions are clustered by good and include year fixed effects. The sample is restricted to goods below the maximum ad valorem rate in 1842 (50 percent). Source: *Commerce and Navigation of the United States* and *Tariff Acts of the United States*.

Table 7: Modern Customs House Capacity Predicts More Complicated Tariffs and More Specific Tariffs

Panel A. Tariff Complexity

	ln(Number of Distinct Tariff Rates)		Share of HS 6-digit Codes with Variation in Tariffs	
	(1)	(2)	(3)	(4)
Overall Trade Misreporting Index	-0.46		-0.014	
	(0.10)		(0.0060)	
Overall Export Misreporting Index		-0.41		-0.012
		(0.094)		(0.0055)
Mean Outcome	3.04	3.04	0.073	0.073
Number of Observations	125	125	125	125

Panel B. Specific Tariffs

	Share of Tariff Lines with Specific Tariffs		Average of HS 6-digit Share with Specific Tariffs	
	(1)	(2)	(3)	(4)
Overall Trade Misreporting Index	-0.019		-0.017	
	(0.0091)		(0.0091)	
Overall Export Misreporting Index		-0.018		-0.016
		(0.0079)		(0.0079)
Mean Outcome	0.035	0.035	0.029	0.029
Number of Observations	125	125	125	125

Notes: This table shows the relationship between modern Customs house capacity and the tariff code. Customs house capacity is measured with an (normalized) index of each country's agreement with its trading partners, following Farhad et al. (2024), where the first row considers all trade flows and the second row considers only exports. Panel A considers measures of the complexity of the tariff code: the (ln) number of distinct tariff rates, and the share of HS 6-digit codes with variation in tariffs. Panel B considers the specificity of the tariff code. The outcome in Columns 1 and 2 is the share of tariff lines that are specific. Columns 3 and 4 take the unweighted average tariff lines within each HS-6 that are specific, and then take the average across all HS-6 codes. Each observation is a country in its most recently available data, and we consider MFN tariff rates. Robust standard errors reported in parenthesis. Source: WTO Integrated Database.

Table 8: Modern Low AVEs and Homogeneous Goods Predict Specificity

Panel A. Ad Valorem Equivalents

	Specific Tariff		
	(1)	(2)	(3)
AVE < 5	0.045	0.044	0.033
	(0.003)	(0.003)	(0.004)
Homogeneous		0.0071	0.0052
		(0.001)	(0.001)
AVE < 5 × Homogeneous			0.023
			(0.005)
Mean Outcome	0.017	0.017	0.017
Number of Observations	801016	801016	801016

Panel B. Homogeneity

	Specific Tariff			
	(1)	(2)	(3)	(4)
Homogeneous	0.0079		0.0083	0.0022
	(0.001)		(0.001)	(0.001)
Non-Grouped		0.011	0.011	0.0044
		(0.001)	(0.001)	(0.001)
Homogeneous × Non-Grouped				0.017
				(0.003)
Mean Outcome	0.017	0.017	0.017	0.017
Number of Observations	801016	801016	801016	801016

Notes: This table shows modern predictors of specific tariffs. Each panel includes coefficients from three explanatory variables, one of which is always if the good is homogeneous. Panel A also considers the tariff burden, calculated as an indictor for the ad valorem equivalent being below 5% and Panel B considers if the good is non-grouped. Each panel also shows the interaction of the two variables shown. Each observation is a tariff line, and the outcome is if the tariff is specific. Homogeneous goods are those that are sold on an organized exchange or have a reference price, following the conservative classification of Rauch (1999). Non-grouped goods are those that do not share the same tariff with all of the other tariff lines within the same HS 4-digit code. All regressions include importer fixed effects, and standard errors are clustered by HS 6-digit code. We use the most recently available data for each country. Source: WTO Integrated Database and UN Trade Analysis Information System.

Table 9: 1980s American Imports: Drivers of Specificity

Panel A. Unit Values

	(1)	(2)	(3)	(4)
ln(Unit Values)	-0.028	-0.011	-0.031	-0.014
	(0.0020)	(0.0025)	(0.0019)	(0.0039)
Constant	0.25	0.22	0.25	0.22
	(0.0081)	(0.0052)	(0.0079)	(0.0081)
Mean Outcome	0.20	0.20	0.20	0.20
Number of Goods	4248	4217	4248	3537
Number of Observations	18459	18428	4288	3577
4-Digit FEs		✓		✓
Sample	Annual	Annual	Pooled	Pooled

Panel B. Ad Valorem Equivalents

	(1)	(2)	(3)	(4)
ln(Ad Valorem Equivalent)	-0.15	-0.10	-0.15	-0.11
	(0.0060)	(0.0076)	(0.0067)	(0.012)
Constant	-0.27	-0.13	-0.25	-0.14
	(0.017)	(0.022)	(0.019)	(0.033)
Mean Outcome	0.17	0.17	0.17	0.17
Number of Goods	4872	4842	4872	4147
Number of Observations	21419	21389	4910	4185
4-Digit FEs		✓		✓
Sample	Annual	Annual	Pooled	Pooled

Panel C. Price Dispersion Across Exporters

	(1)	(2)	(3)	(4)
Price Dispersion	-0.12	-0.016	-0.14	-0.038
	(0.0081)	(0.0047)	(0.010)	(0.011)
Constant	0.32	0.21	0.36	0.24
	(0.013)	(0.0061)	(0.015)	(0.014)
Mean Outcome	0.19	0.19	0.19	0.19
Number of Goods	4109	4071	4183	3470
Number of Observations	17442	17404	4219	3506
4-Digit FEs		✓		✓
Sample	Annual	Annual	Pooled	Pooled

Notes: The outcome in this table is if the import has a specific tariff. Each observation is a TSUS 5-digit import, Columns 1 and 2 include each good by year separately, and columns 3 and 4 average across years within goods. Columns 2 and 4 additionally include fixed effects for each 4-digit TSUS code. All regressions clustered by 5 digit TSUS code. Panel A considers the unit values of the goods (the value divided by the quantity). Panel B considers the ad valorem equivalents (the tariff revenue divided by the value). Panel C considers the dispersion of unit values across shipments, as described in the text. Source: US Census Annual Import Data Bank (IDB).

Appendices for Tariffs and State Capacity: A Specific Example

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August 2025

A Data

In this section, we describe in detail how we cleaned the data sources used in the paper.

A.1 Historical Tariff Bills

Our primary source of data is the 1789-1846 tariff bills themselves, which we harmonize over time. Creating and applying concordances is an inescapable aspect of modern empirical research for trade economists (Pierce and Schott, 2012; Fort and Klimek, 2018).[42]

Because there was no formal classification system for goods during this period, these tariff bills present additional challenges for data construction: In addition to concording tariffs over time, we also need to define our unit of observation. In particular, we define a *good* as the set of shipments that (a) in any particular year have exactly one tariff; and (b) across all years have different tariffs from any potentially observationally similar shipments.

To define the set of goods, we first parse the tariff bills into *labels*, where a label is the individual string that is attached to a tariff line. We match labels across years. Matching labels is complicated by the fact that it is many-to-many: Each label potentially matches with many goods, and while each good only has one label in a given year, over time its label may change (though not every good is mentioned in every tariff bill). In order to define a consistent set of goods with unique tariff lines, we take the finest *intersection* across labels.

We think that this notion of a good is the correct unit of analysis. Broadly, it reflects a current line in a tariff code: It is the unit of observation which describes a tariff within a broad category of object. Second, the tariff code even kept track of imports once they had been disaggregated, even if their tariffs were later combined. For instance, in 1842 there are three different tariffs for different kinds of olive oil. The 1846 tariff bill explicitly includes

[42] Matching physical goods to their tariff classification is also difficult in practice. For instance, the Customs Broker License Examination has a pass rate of around 10-25 percent (Customs and Protection, 2024). Bilateral tariff rates are also often measured with error (Teti, 2024).

"olive oil in casks, other than salad oil, olive salad oil, and all other olive oil, not otherwise provided for," even though they all get given the same tariff rate.

It is important to emphasize that, while a good is the smallest object that appears in the tariff code, each good is nevertheless comprised of many latent *varieties*, the distinct physical shipments which comprise a good. Some differences across varieties within a good may be anodyne, such as blue and red flannels. The key force for tariff policy is that the varieties within a good may have different prices. For instance, in 1846 the three different types of olive oils presumably had different prices, though they broadly shared a label. [43]

Table 1 illustrates how we match labels to create goods, using the example of cotton and wool flannels. Ultimately, there are twelve different flannel goods, distinguished by their material, price, and coloring. Panel A shows the dynamics for wool flannels. In 1789 and 1790, they are not disaggregated at all, and are covered by the label "all other goods." In 1791 and 1794, there are no labels that would cover woolen flannels, so their tariffs remain unchanged. In 1816, there is a tariff for all "wool manufactures." In 1824, there is a tariff for woolen manufactures that is somewhat complicated, but flannels are exempt from the complications so they all pay the same rate. The 1828 bill splits woolen manufactures into five groups by their price per square yard. Had we stopped our analysis in 1828, we would not consider there to be any woolen flannel goods in particular, as any woolen flannel import would have the same history of tariffs as many other woolen manufactures. But that would obscure further developments. In 1832 (and 1842) all woolen flannels received the same tariff. This change means that, starting from 1832, the woolen flannels all have a different path of tariffs from the other woolen manufacturers. Ultimately, in our dataset we have five different woolen flannel goods.

Panel B shows the process for cotton flannels, which has a similar logic. The linking for the cotton flannels was complicated by the minimum tariffs, which imposed a minimum price. As the minimum cutoff changed (and 1842 introduced different tariffs for colored and uncolored cotton manufactures), new partitions were effectively created. For instance, the cutoff was 20 cents a square yard in 1816, and 25 cents a square yard in 1824. This creates three groups: less than 20 cents, over 25 cents, and between 20 and 25 cents.

Note that linking the cotton and flannel labels requires external knowledge. There is never a tariff for "cotton flannels:" the reason why we link the "flannels" and "cotton manufacturers" labels is that we know what flannels are. Ultimately, there are are seven cotton flannel goods.

[43] Another example is all "refined sugars," which have a common tariff in our time period. While we therefore consider them to be one good, refined sugars with different "Dutch Standard" color classifications had different prices. Indeed, in 1862 (after our sample ends), the tariff code introduced four distinct tariffs for different types of refined sugars.

We repeat a similar process for all labels in all of the tariff bills. For each label, we find its matches in the other tariff bills. While most labels get more disaggregated over time, the flannels example shows that the process can be nonlinear. In our analysis, when we consider if a good is a singleton or not, we use the number of goods that currently are sharing the same label.

Process of Linking All of the matches we created were done by hand. We describe the process below.

Broadly, we split the labels into three types. First, there are *everything* tariffs, which apply to all imports that are not explicitly enumerated in a tariff bill. Second, there are *general* tariffs, which apply to a broad set of imports (such as all "cotton manufactures"). Finally, there are *narrow* labels, which broadly apply to a small number of goods (such as "flannels"). The distinction between general and narrow labels is not important for any of our final analysis. Many narrow labels do affect more than one good, for instance we classify the 1832 "flannels" tariff as narrow even though there are many flannel goods. The distinction is relevant only because it affects how we process and harmonize the tariff lines.

We started with a list of all goods provided in the appendix to the 1832 tariff bill. We then merged all of the narrow labels in each year to the goods in the list. Some narrow labels had no match, as the 1832 list was not complete. If a label had no matches, we added new goods to the list. For our regression analysis on the tariff bills we completed this analysis through 1842, though we also linked the 1846 tariffs. This process required many passes: Every time we added a new entry because of a novel label, we needed to match it to any potential labels in previous years.

The language in the bills was inconsistent - multiple different labels mean the same thing, and the language was sometimes anachronistic. We were not surprised by tariffs for "quicksilver" or "brimstone," but we admit that we were all a little surprised to find a tariff in 1846 for "dragon's blood." We did many passes of the list, in order to make sure that we consistently linked synonyms.

Once we had the full preliminary set of goods through 1842, we turned to the general tariffs. First, we categorized the general tariffs. The general tariffs fell into the following categories: brass; bronze; carpet; copper; cotton; dye; flax; fruits; all glass; framed glass; silvered glass; gold; grass, straw, etc.; hemp; iron; iron and brass wire; lead; leather; linen; marble; millinery; nuts; oil; other; paper; pastes, tinctures, etc.; pearl; pewter; plants; raisins; raw hides, furs, and skins; salt; silk; silver; steel; tin; wood; wool; and worsted. The general tariffs sometimes had exemptions (such as woolen manufactures other than flannel), which we also kept track of.

One complication with the general tariffs is that they sometimes were associated with particular prices (such as the minimum tariffs, for instance the cotton manufactures less than 25 cents a square yard). For instance, Figure A.1 shows that there were five different tariffs for wool manufactures, depending on their price. We kept track of these prices separately. Ultimately, our list of general tariffs was defined by category, price, and year. Unfortunately, we could only keep track of nominal prices, not real prices.

For our preliminary list of goods, we then noted if they fell into any of those categories. Many of the goods matched to multiple categories, which required further processing.

When goods matched to multiple categories, sometimes there was a clear hierarchy, where one category was the default. In particular, when headings intersect, the more targeted (use-based) category is chosen over broader material-based labels. For instance, consider cotton bonnets. In a year with both a general tariff for "millinery" and "cotton manufactures", only the former would apply: There is no such thing as a cotton manufactured bonnet that is not millinery. But some years would have a cotton manufactures tariff but not a millinery tariff, in which case the cotton general tariff would apply. Thankfully, no good had more than one potential high-priority label. For each good, we created a list of high-priority categories and low-priority categories.

Other times when a good matched to multiple categories, we would consider both of them as equally important. For instance flannels could be either cotton or wool. As a result, we split the "flannel" entry in our preliminary set of goods into two: cotton flannels and woolen flannels. We then further split the flannel categories by price, as described in Table 1.[44]

We then merged the lists. First, we took a many-to-many merge between the preliminary list of goods and the general tariffs (many to many because some preliminary goods matched to multiple categories, and all of the general tariffs matched to multiple preliminary goods). This created a long list of goods.

We then undertook the following steps for all of the labels in each tariff bill:

1. If a good was associated with a narrow label, then that was its assigned label and tariff for that bill.

2. If a good was not yet associated with a tariff, we then checked if it had a high-priority general match (making sure that it was not exempt). If so, we assigned the good that label and tariff.

[44] Another example of unranked categories are for carpets. Some carpets, such as "Wilton carpets" are definitely made of wool. Others, such as "Aubusson carpets," though typically wool, could also be made of silk, for example `https://archive.md/WhuXk`. As a result, we have one good for Wilton carpets in our final dataset, and two for Aubusson carpets.

3. If a good was still not yet associated with a tariff, we then checked if it had a low-priority general match (again making sure that it was not exempt). If so, we assigned the good that label and tariff.

4. If the good was still not yet associated with a tariff, and the bill had an everything tariff, then we assigned the good that label and tariff.[45]

When harmonizing the goods to the labels, there are two main concerns: making a false match or missing a valid one. False matches are relatively straightforward to identify: We constructed a comprehensive two-column list of every good–label pair and manually verified that each combination was sensible. Incomplete matches are more difficult to detect, since the space of potential matches is large. To address this, we merged the list of goods to SITC Revision 2 codes. For each tariff bill, we then identified all labels that matched any good within each 3-digit SITC heading. We then verified that we had not missed any additional potential matches between these labels and any other good within the same heading.

Deduplication Another complication arises because multiple labels in the same tariff bill may refer to what we ultimately consider to be one good, because the labels are not very different. For instance, ales, beers, ciders, and porters (in bottles) are often all explicitly and separately mentioned in the tariff bills, so for many tariff bills we parse four distinct labels, one for each drink. However, they all always have the same tariff rate. Because we think they are also physically similar, we consider them to jointly be one good. This deduplication approach requires some judgment calls. For instance, while we group ales and beers, we do not group "mats of straw and grass" and "milk of roses" (a cosmetic product made from rosewater and almond oil), even though the latter two always share a tariff. This is because we consider them to be physically different.[46]

For our main dataset, we merge labels if we think that a reasonable person would consider the labels to capture similar concepts. In robustness exercises, we consider stricter approaches.

[45] We had to do these steps in chronological order, as some everything tariffs applied to all goods that currently were paying a particular rate. For instance, the 1832 tariff bill had an everything tariff of 15 percent for "articles, all not herein specified either as free - or as liable to a different duty, and which, by the existing laws, pay an ad valorem duty higher than 15." So first we had to determine what each good's tariff was until 1832, and if it was not explicitly mentioned in the 1832 bill and otherwise would have had a high ad valorem duty, we knew that its rate was lowered to 15 percent.

[46] The nature of what exactly distinguishes goods is a philosophical question (for instance, beers are brewed but ciders are not, so it might be defensible to consider them different goods, and indeed they do not share an HS code in the modern classification.). The set of goods is likely a function of the economic environment (Grant, 2023). We think that a principled approach is to consider goods as distinguished by their nature and by their tariff.

Other deduplication was more straightforward. When we merged goods to their categories, sometimes those categories were not binding, for instance if the good had a narrow label in every tariff bill. As a result, while conceptually the good could be made of different things, its construction was not relevant for tariffs, and so we dropped those essentially duplicated goods. Ultimately, for our baseline analysis we consider 1,395 goods.

A.1.1 Classification of Commodities

For our main analysis, our notion of if a good is a commodity comes from a table in the 1864 *The Executive Documents* of the House of Representatives, which in the Report on the Finances includes prices for a range of goods in New York.[47] From our perspective, the list appears incomplete, even by 19th century standards. For instance, it includes several but not all kinds of sugar, some but not all kinds of tea, and entries for wheat, rye, oats, and corn but not barley (which was also widely traded on the Chicago Board of Trade by the 1850s). As a result, we classify a good as a commodity if it is similar to an entry explicitly enumerated in the Congressional list.[48]

We also use Rauch (1999)'s classification. In order to merge the historical goods to the modern classification, we hand-link the historical tariffs to the SITC Revision 2 classification, which is typically possible at the 3 or 4 digit level. Rauch (1999)'s measure is available for that classification, so no further concordances were needed. A few goods link to different SITC codes. When goods can plausibly match to multiple SITC codes, we treat them as homogeneous if any of the codes are labeled as homogeneous.

In addition to classifying if the goods were commodities, we also manually kept track of if a good was manufactured, which we use for robustness checks.

A.1.2 Alternative Panels of Tariffs

Over the 19th century, the US government created several tables covering the tariffs during our sample period (U.S. Congress, 1832; Walker, 1845; United States Treasury Department, 1888). These government documents highlight the difficulties of keeping track of goods, and for several reasons we cannot use them for our primary analysis. First, the documents have mistakes, where the actual bill imposes one import duty but the later-compiled list records something else. Second, these retrospective documents are often incomplete: They do not report the duty for every enumerated good. The incompleteness is probably due to a mix of error and the fact that it is difficult to list all the imports, since there are many and some are

[47]Congress does not use the word "commodity" to describe the goods contained in the list, but the *The Merchants & Bankers' Almanac* includes a similar list and does call the entries commodities. We use the goods reported for 1842.

[48]The categories are breadstuffs, candles, coal, coffee, copper, cotton, fish, fruit, furs, glass, gunpowder, hides, hops, indigo, iron, lead, leather, liquors, molasses, nails, naval stores, oils, paints, provisions, rice, salt, seeds, sheetings, soap, spices, spirits, sugars, tallow, teas, tobacco, whalebone, wine, wool, and zinc.

relatively complicated. We found that they were particularly likely to incompletely describe the minimum tariffs, and rarely did a good job with the general tariffs such as "manufactures of wool".

The heart of our model is that policymakers understood the difficulty of keeping track of, and implementing, a complex tariff code. Indeed, the authors of the 1888 Treasury report discuss the "great labor in its preparation" in the *Foreign Commerce and Navigation of the United States*, noting themselves that it was "almost" accurate.

Occasionally, Customs officials would compile the set of current tariffs, as this was not typically a document officially provided by the government (Jones, 1835, 1854). These lists were much more user-friendly than the tariff bills (for instance, they listed goods in alphabetical order), but unfortunately they do not provide the complete linking of tariffs across years.

A.2 Statistics on Imports

Beginning in the early 1820s, import data by good became available in the *Commerce and Navigation of the United States*, published by the U.S. Treasury Department (initially titled the *Annual Report on Commerce and Navigation*). We digitized the editions from 1843 through 1849.[49] Most of the tables cover full years (ending on June 30), though 1843 covers nine months, and 1847 is split in two, one for imports under the 1842 regime (until December 1846) and the other for imports under the 1846 regime (until June 30, 1847).

We merged the import statistics to the tariff bills by hand. The import statistics were typically more aggregated than the bills, so most observations linked the multiple goods.

In addition to using this resource for checking our work,[50] we also use the resource to calculate ad valorem equivalents for the specific tariffs. First, we calculate the implied tariff revenue by multiplying the total imported quantity by the imports specific tariff (calculated as the unweighted average of the goods that match to each import). We then divide the implied tariff revenue by the total value of imports.[51] Total import values are always reported. Quantities, and therefore unit values, are consistently available for goods with specific tariffs

[49]The coverage of the *Commerce and Navigation of the United States* improved over time (though even in the 1840s, it only covered imports for around half of the goods).

[50]While the reports do not include the tariff rate, they do say if a good had a specific, ad valorem, or free tariff.

[51]Calculated ad valorem equivalents for specific tariffs can be difficult to interpret, as the ex-ante rate (as a function of all potential imports) and the ex-post rate (as a function of the goods that are actually imported) are typically different (Bouët et al., 2008; Greenland, Lake and Lopresti, 2025*a*). In our setting, the theoretically correct object to measure is the ex-post measure, which is what can be calculated in the data. As in modern data, we find some ad valorem equivalents that are extremely high (Teti, 2020). For all of our analysis, we drop goods with burdens higher than the highest ad valorem tariff. It is an interesting question as to why there are such high specific tariffs, be it mismeasurement, political economy forces, or something else, which we leave to future research as it is outside the scope of our model.

and for some goods with ad valorem tariffs that historically had specific tariffs. Important for our purposes, around half of the goods with specific tariffs in 1842 continue to have import quantities reported after they switched to ad valorem tariffs in 1846. We collected additional data on tariff collections, Customs costs, and other government revenues from the *Annual Reports of the Treasury Secretary of the United States*.

We tried to create a panel from the import data, but unfortunately the imports were broadly inconsistently defined and incompletely reported. While in each year we can match imports to goods, matching the imports to each other did not work well: Creating time-consistent observations required a lot of aggregation, due to the inconsistent reporting. The resulting observations did not seem very reliable, for instance there was a lot of price variation within most import groupings within a given tariff regime. Due to these data quality issues, we mostly focus on cross-sectional analysis. Indeed, for the analysis on unit values in the 1849 *Annual Report*, Treasury officials went directly to Customs houses in order to compile their data, instead of relying only on the *Commerce and Navigation of the United States*.

A.3 Statistics on Customs House Operations

Beginning in 1816, Congress mandated the Secretary of State to construct a list "containing correct lists of all the officers and agents, civil, military, and naval, in the service of the United States, made up to the last day of September, of each year in which a new Congress is to assemble, [to] be compiled and printed." These lists became *The Official Register of the United States*. We digitized records for Customs, the Light Houses, the Revenue Cutters, and the Marine Hospital for 1816, 1821, 1829, 1835, 1843, and 1849 editions.[52]

The organization of each book changes slightly over time. For example, in 1816, officials are separated by their title (e.g., all Collectors are listed, followed by Surveyors, and so forth). Later employees are organized by Customs districts, and then by districts and department (e.g., collections, appraisal, etc.). Despite these small changes, the information is consistent: name, occupation(s), port and district, place of birth, and compensation. Figure A.11 provides an example of how the data is organized.

The only change we make from the raw data is cleaning occupational titles. In order to economize on space, the publishers of the The Register made use of shorthand that was neither consistent within years nor across years. We decoded this short hand manually. For example we replace, "W." "We'r", "Wr." with Weigher.[53]

[52] In early editions, all of these operations were listed under Customs. The original Customs houses were also involved in the operations of the Revenue Cutters, the predecessor to the Coast Guard, which acted to prevent smuggling, the Light Houses, and the Marine Hospital. These tasks were separated from the Customs houses over time, and are not closely related to duties collection, so we do not focus on these departments though we still digitized their worker registers to ensure comparability over time.

[53] The other change is the string 'do' was used for ditto. With multiple job titles, it is difficult to interpret

In presenting our results on occupational titles, we rely on several different classifications for robustness. In the raw data, the number of occupational titles rises dramatically over time. Much of this is driven by the New York Customs House giving particularly narrow titles. For our main analysis, we only include occupation titles mentioned by at least two houses. We present two robust sets of occupation titles. In the first, we take a more lenient classification and keep all titles. In the second, we only focus on core tasks and remove all clerks, bookkeepers, etc. Here the expansion is driven by the introduction of appraisers, examiners, a separation of proving and marking, as well as the growth of hierarchy in these roles (e.g., "assistant appraisers").

A.4 Modern Cross-Country Tariff Data

We use the WTO's IDB tariff data to construct four country-level measures. First, we measure the (ln) number of distinct tariff rates for each country. A tariff rate is considered distinct if it differs from others, regardless of whether it is ad valorem or specific. For example, 4 percent and 10 percent (both ad valorem) and 1.4 cents/kg and 4.4 cents/kg (both specific) represent four distinct tariff rates. Second, we compute the share of HS six-digit codes with variation in tariff duties for each country. If all tariff lines within an HS six-digit category (i.e., tariff lines sharing the same first six digits) have the same tariff rate, then the category has no variation. If at least two distinct tariff rates exist within the category, we classify it as having variation. We use these two measures to capture tariff complexity.

We also have two measures of specificity. The first is a direct average across tariff lines: the share of tariff lines with a specific tariff in each country. The second is the average across HS6 codes: For each HS six-digit category, we compute the share of lines with a specific tariff, and then take the average of these shares across categories within each country. The two measures are related: The latter downweights categories with many tariff lines and gives equal weight to each HS6 group.

For our analysis at the tariff line level, we construct four indicators. These include whether: (a) a tariff line has a specific tariff; (b) its ad valorem equivalent (or the duty rate, if ad valorem) falls below a certain threshold – 5 percent in the main analysis; (c) it is classified as homogeneous according to the Rauch (1999)'s classification; and (d) it is "non-grouped." The non-grouped indicator equals one if not all products within the HS four-digit category to which the tariff line belongs in that country share the same duty rate.

what is shared across workers. Typically "do" was written multiple times, presumably when multiple job titles were shared. As a result, we followed the rule that we copied all job titles that were in alignment with the "do" (or, if only one "do" was used and it was unaligned, we assumed that also meant to copy the whole title.

A.5 American Imports, 1981-1985

The data in the IDB include (estimates) of total duties collected, the rate provision, as well as quantities and values. We are grateful to Andrew Greenland for pointing us to this source, and we followed the approach in Greenland, Lake and Lopresti (2025*a*) as much as possible.[54] We only include imports where the rate provision has a second digit of 1, which implies that the tariff is MFN normal trade relations. We further consider specific tariffs (first digit of the rate provision code is 2) and ad valorem tariffs (first digit of 3).

Each observation in the resulting data is the triplet of a year by seven digit TSUS code by exporter. One complication for calculating the unit values is that many products report different types of units across different exporters. For each row, we calculate unit values by dividing the value by the quantity, assuming that the unit reported in the data corresponds to the size of the package that would be inspected for each shipment in the model. We then calculate the total value weighted average unit value, either within each year or for the entire dataset. We calculate ad valorem equivalents by dividing total (estimated) tariff revenue by the total value.

B Proofs

B.1 Proof of Proposition 1

Existence and form of the equilibrium is immediate from the fact that reports do not impact payments. In equilibrium, the consumption of imports of each value is proportional to $(v+t)^{-\sigma}$ under CES preferences. Since we have normalized the total income of the consumer to 1, equilibrium consumptions must be

$$q_S(v;t) = \frac{(v+t)^{-\sigma}}{\mathbb{E}[(v+t)^{1-\sigma}]}.$$

Net tariff income is therefore $\Pi_S(t) = t \cdot \mathbb{E}[q_S(v;t)]$, which is the expression in the proposition statement.

B.2 Proof of Proposition 2

Suppose first that $\tau < c/(\kappa \cdot \bar{v})$. In any monotone equilibrium, there must exist a threshold $v^* \in \mathbb{R}_+ \cup \{\infty\}$ such that $\rho(v) = 0$ iff $v < v^*$. (Whether v^* is included is immaterial except when $v^* = 0$. In that case, condition on $v \leq v^*$.) Since all importers reporting zero face the same net ad valorem tariff rate $\kappa \cdot \phi(0)$, relative prices for goods with values on $[0, v^*]$ are undistorted. The government therefore believes that the conditional density of values is

[54] One reason for starting in 1981 is that Greenland, Lake and Lopresti (2025*a*) note that the data quality in 1980 was particularly low.

$q(v \mid 0)$ on $[0, v^*]$ and 0 elsewhere, where

$$q(v \mid 0) = \frac{v^{-\sigma} \cdot f(v)}{\int_0^{v^*} v^{-\sigma} \, dF(v)}$$

is the fraction of imported goods of value below v^* which have value v. Hence the government's expected payoff from verifying a report of 0 is

$$\kappa \cdot \tau \cdot \int_0^{v^*} v \cdot q(v \mid 0) \, dv - c = \kappa \cdot \tau \cdot \frac{\mathbb{E}[v^{1-\sigma} \mid v < v^*]}{\mathbb{E}[v^{-\sigma} \mid v < v^*]} - c.$$

This expression must be negative, since the right-hand size is increasing in v^* and equals $\kappa \cdot \tau \cdot \bar{v} - c < 0$ when $v^* = \infty$. It is therefore uniquely optimal for the government not to verify a report of zero no matter the value of v^*. It must then be uniquely optimal for all importers to report zero value, since any other report incurs a positive expected tariff payment. Hence, $\phi(0) = 0$ and $\rho(v) = 0$ for all v in any monotone equilibrium. Further, there exists an equilibrium with the property that $\phi(v') = 0$ for all v', which can be supported by the off-path belief that $v' = v$ whenever $v' > 0$.

Now suppose that $\tau > c/(\kappa \cdot \bar{v})$. We first verify that the stated strategies can be supported as an equilibrium. For off-path reports $v' \in (0, v^*)$, let the government believe that $v = v' + c/(\kappa \cdot \tau)$ with probability 1. In that case, for each report $v' > 0$ the government believes that the importer's value is v, and its payoff is $\tau \cdot v - c/\kappa$ whether it verifies or not. Meanwhile, for the report $v' = 0$ the government believes that the conditional density of values is $q(v \mid 0)$ on $[0, v^*]$ and 0 elsewhere, where $q(v \mid 0)$ is as defined above. Hence the government's expected payoff from verifying the importer's report is

$$\kappa \cdot \tau \cdot \int_0^{v^*} v \cdot q(v \mid 0) \, dv - c = \kappa \cdot \tau \cdot \frac{\mathbb{E}[v^{1-\sigma} \mid v < v^*]}{\mathbb{E}[v^{-\sigma} \mid v < v^*]} - c = 0.$$

For every report v', the government is therefore indifferent regarding verification and willing to choose $\phi(v') = 1/\kappa$. Meanwhile, for any value v and report v', the importer's expected tariff payment is $T(v, v') = \tau \cdot v$, and so the importer is indifferent over all reports. In particular, the stated reporting policy is optimal.

Since each importer is indifferent over all reports, their expected tariff payment can be calculated assuming no underreporting, yielding $T_{AV}(v; \tau) = \tau \cdot v$. Meanwhile, since the government is indifferent over verification following every report, its net income can be calculated assuming it never verifies reports, yielding

$$\Pi_{AV}(\tau) = \int_{v^*}^{\infty} (\tau \cdot v - c/\kappa) \cdot Q(v; \tau) \, dF(v),$$

where

$$Q(v;\tau) \equiv (1+\tau)^{-1} \cdot \frac{v^{-\sigma}}{\mathbb{E}[v^{1-\sigma}]}$$

is the quantity of imports of each value. Now, the equation characterizing v^* can be rearranged to read

$$\int_0^{v^*} (\tau \cdot v - c/\kappa) \cdot Q(v;\tau)\, dF(v) = 0.$$

Hence

$$\Pi_{AV}(\tau) = \int_0^{\infty} (\tau \cdot v - c/\kappa) \cdot Q(v;\tau)\, dF(v),$$

which simplifies to the expression in the proposition statement.

We now establish on-path uniqueness within the class of monotone equilibria. Fix a monotone equilibrium (ρ, ϕ). We first show that $\phi(\rho(v)) < 1$ for every v. Suppose by way of contradiction that $\phi(\rho(v)) = 1$ for some v. Let $v' = \rho(v)$. Then $T(v, v') < T(v, v)$ unless $v' = v$. Equilibrium therefore requires that $\rho(v) = v$, and further that $\rho(v'') \neq v$ for every $v'' \neq v$. But in that case, the government places probability 1 on the importer's report being truthful following a report of v, in which case verification is not optimal, contradicting $\phi(\rho(v)) = \phi(v) = 1$.

We next establish that $\phi(v') > 0$ for every v'. Suppose by way of contradiction that $\phi(v') = 0$ for some v'. Then $T(v, v') < T(v, v'')$ for every $v \geq v'' > v'$, implying that $\rho(v) \leq v'$ for every v. Now, if $\rho(\infty) = 0$, then every importer reports no value and the effective ad valorem tariff on each unit is $\kappa \cdot \tau \cdot \phi(0)$. Relative prices are therefore undistorted, and so the expected value of an imported unit is $\mathbb{E}[v^{1-\sigma}]/\mathbb{E}[v^{-\sigma}] > c/(\kappa \cdot \tau)$. In other words, verification is strictly optimal when $v' = 0$, contradicting $\phi(\rho(v)) < 1$ for every v. So $\rho(\infty) > 0$, meaning that $\rho(v) > 0$ for sufficiently large v. Monotonicity of the equilibrium implies that, for all such v, in equilibrium the importer places probability 1 on the importer's value being v following a report of $\rho(v)$. Since further $\rho(v) \leq v'$ for all v, we eventually have

$$\kappa \cdot \tau \cdot (v - \rho(v)) > c$$

for sufficiently large v. In other words, verification is strictly optimal for the reports of importers with large values, contradicting $\phi(\rho(v)) < 1$ for all v.

Since $\phi(\rho(v)) \in (0, 1)$ for every v, it must be that the government is indifferent over verification whenever $\rho(v) > 0$. Additionally, monotonicity of the equilibrium implies that the government believes that the importer's value is v with probability 1 whenever $v' = \rho(v) > 0$. In other words,

$$\kappa \cdot \tau \cdot (v - \rho(v)) = c$$

must hold whenever $\rho(v) > 0$. Equivalently,

$$\rho(v) = v - c/(\kappa \cdot \tau)$$

whenever $\rho(v) > 0$. Monotonicity of the equilibrium therefore implies existence of a cutoff v^* such that

$$\rho(v) = \begin{cases} 0, & v < v^* \\ v - c/(\kappa \cdot \tau), & v \geq v^* \end{cases}$$

Since the government must additionally be indifferent over verification when $\rho(v) = 0$, and since the conditional density of values given a report of 0 is $q(v \mid 0)$ no matter the choice of v^* and $\phi(0)$, the cutoff v^* is uniquely pinned down by the condition reported in the proposition statement.

Finally, we establish that $\phi(\rho(v)) = 1/\kappa$ for each v. (For $v' \in (0, v^*)$ the choice of $\phi(v')$ is off-path and does not impact outcomes.) If $\phi(\rho(v)) > 1/\kappa$ for some $v > 0$, then $T(v, \rho(v)) < \tau \cdot v$, contradicting the optimality of $v' = \rho(v)$. Hence $\phi(\rho(v)) \leq 1/\kappa$ for every $v > 0$. And since $\rho(0) = \rho(v^*/2)$, this inequality also holds at $v = 0$. Now, suppose that $\phi(\rho(v)) < 1/\kappa$ for some v. Then for every $v' > \max\{v^*, \rho(v)\}$ we have

$$T(v', \rho(v)) = \tau \cdot \Big(\rho(v) + \phi(\rho(v)) \cdot \kappa \cdot (v' - \rho(v))\Big) = \tau \cdot \Big(v' - (1 - \phi(\rho(v)) \cdot \kappa) \cdot (v' - \rho(v))\Big)$$

while

$$T(v', \rho(v')) = \tau \cdot \left(v' - (1 - \phi(\rho(v')) \cdot \kappa) \cdot \frac{c}{\kappa \cdot \tau}\right).$$

Hence

$$T(v', \rho(v')) - T(v', \rho(v)) = \tau \cdot (1 - \phi(\rho(v)) \cdot \kappa) \cdot (v' - \rho(v)) - (\phi(\rho(v')) \cdot \kappa - 1) \cdot \frac{c}{\kappa}.$$

Since $\phi(\rho(v')) \leq 1/\kappa$ for all v' and $1 - \phi(\rho(v)) \cdot \kappa > 0$, this expression is positive for sufficiently large v', contradicting the optimality of $v' = \rho(v')$. So it must be that $\phi(\rho(v)) = 1/\kappa$ for every v.

B.3 Proof of Lemma 1

The expression for net tariff income obtained in Proposition 1 can be rearranged to read

$$\Pi_S(t)^{-1} = 1 + \int \frac{v}{t} \cdot \frac{(v/t + 1)^{-\sigma} f(v)}{\int (v'/t + 1)^{-\sigma} f(v')\, dv'}\, dv.$$

Making the substitution $v = t \cdot \hat{v}$ in the integrals appearing in this expression yields

$$\Pi_S(t)^{-1} = 1 + \int \hat{v}\, dG(\hat{v}; t),$$

where $G(\hat{v}; t)$ is the distribution function defined by the density

$$g(\hat{v}; t) \equiv \frac{(\hat{v}+1)^{-\sigma} f(t \cdot \hat{v})}{\int (\hat{v}'+1)^{-\sigma} f(t \cdot \hat{v}')\, d\hat{v}'}.$$

Suppose that g exhibits the strict monotone likelihood ratio property (SMLRP) in $\hat{v}$ with respect to $-t$. Then $G(\cdot; t')$ strictly first-order stochastically dominates $G(\cdot; t)$ for $t' < t$, implying that $\Pi_S(t')^{-1} < \Pi_s(t)^{-1}$ for $t' < t$. In other words, Π_S is increasing and Assumption 1 holds.

The SMLRP property requires that

$$\frac{g(\hat{v}'; t')}{g(\hat{v}; t')} > \frac{g(\hat{v}'; t)}{g(\hat{v}; t)}$$

for every $\hat{v}' > \hat{v}$ and $t' < t$. Since

$$\frac{g(\hat{v}'; t)}{g(\hat{v}; t)} = \left(\frac{\hat{v}'+1}{\hat{v}+1}\right)^{\sigma} \cdot \frac{f(t \cdot \hat{v}')}{f(t \cdot \hat{v})},$$

it is sufficient that

$$\frac{\partial}{\partial t} \log\left(\frac{f(t \cdot \hat{v}')}{f(t \cdot \hat{v})}\right) = t^{-1} \cdot (\zeta(t \cdot \hat{v}') - \zeta(t \cdot \hat{v})) < 0$$

for all t and $\hat{v}' > \hat{v}$, where $\zeta(v) = v \cdot f'(v)/f(v)$. The desired result therefore follows if ζ is decreasing everywhere.

For the lognormal distribution,

$$\zeta(v) = \frac{\mu - \log v}{\sigma^2} - 1.$$

For the generalized Gamma distribution with scale parameter $\alpha > 0$ and shape parameters $\beta > 0$ and $\gamma > 0$,

$$\zeta(v) = \beta - 1 - \gamma \cdot \left(\frac{v}{\alpha}\right)^{\gamma}.$$

For the inverse Gamma distribution with shape parameter $\alpha > 0$ and scale parameter $\beta > 0$,

$$\zeta(v) = -1 - \alpha + \frac{\beta}{v}.$$

For the Lomax distribution with shape parameter $\alpha > 0$ and scale parameter $\lambda > 0$,

$$\zeta(v) = -(\alpha + 1) \cdot \frac{v}{v + \lambda}.$$

For the log-logistic distribution with shape parameter $\gamma > 0$ and scale parameter $\sigma > 0$,

$$\zeta(v) = -1 - \gamma + \frac{2\gamma}{1 + (v/\sigma)^{\gamma}}.$$

In all of these cases, ζ is everywhere decreasing in v.

B.4 Proof of Proposition 3

Consider first a specific tariff. Since $\mathbb{E}[v] < \infty$ and $\mathbb{E}[v^{-\sigma-1}] < \infty$, it must be that $\mathbb{E}[v^{-\sigma}] < \infty$ and $\mathbb{E}[v^{1-\sigma}] < \infty$. The dominated convergence theorem therefore ensures that $\mathbb{E}[(v+t)^{-\sigma}]$ and $\mathbb{E}[(v+t)^{1-\sigma}]$ are continuous in t, and hence so is $\Pi_S(t)$. Assumption 1 further ensures that Π_S is monotone. And $\Pi_S(0) = 0$ while

$$\lim_{t\to\infty} \Pi_S(t) = \lim_{t\to\infty} \frac{\mathbb{E}[(v/t+1)^{-\sigma}]}{\mathbb{E}[(v/t+1)^{1-\sigma}]} = 1$$

by the monotone convergence theorem. The stated properties of t^* follow immediately.

Now consider an ad valorem tariff. Then for each $R \in (0, 1)$, the tariff $\tau^*(R)$ which satisfies $\Pi_{AV}(\tau^*(R)) = R$ can be characterized by solving

$$R = \frac{\tau}{1+\tau} - \frac{c/(\kappa \cdot \bar{v})}{1+\tau},$$

yielding the unique solution

$$\tau^*(R) = \frac{R + c/(\kappa \cdot \bar{v})}{1 - R}.$$

It is immediate that this solution satisfies the stated properties.

B.5 Proof of Proposition 4

The price indices under a specific and ad valorem tariff are

$$P_S(t) = \left(\mathbb{E}\left[(v+t)^{1-\sigma}\right]\right)^{1/(1-\sigma)}, \quad P_{AV}(t) = (1+\tau) \cdot \left(\mathbb{E}[v^{1-\sigma}]\right)^{1/(1-\sigma)}.$$

Hence $P_S^*(R) = P_S(t^*(R))$ while $P_{AV}^*(R) = P_{AV}(\tau^*(R))$ for every $R \in (0, 1)$. The dominated convergence theorem ensures that P_S is continuous in t, and it is immediate that P_{AV} is continuous in τ. The first result of the proposition then follows immediately the fact that $t^*(0+) = 0$ while $\tau^*(0+) > 0$.

We next establish that τ^* and t^* are differentiable and obtain implicit expressions for their derivatives. The explicit expression for τ^* obtained in the proof of Proposition 3 verifies that it is differentiable with derivative

$$\frac{d\tau^*}{dR} = \frac{1 + c/(\kappa \cdot \bar{v})}{(1-R)^2}.$$

Meanwhile, t^* solves the equation $\Pi_S(t^*(R)) = R$. In other words, t^* is the inverse of Π_S. We wish to invoke the inverse function theorem, which requires establishing that Π_S is continuously differentiable. The assumptions $\mathbb{E}[v^{-\sigma-1}] < \infty$ and $\mathbb{E}[v^{-\sigma}] < \infty$ ensure that the Leibniz integral rule applies and

$$\frac{d}{dt}\mathbb{E}[(v+t)^{-\sigma}] = -\sigma \cdot \mathbb{E}[(v+t)^{-\sigma-1}], \quad \frac{d}{dt}\mathbb{E}[(v+t)^{1-\sigma}] = (1-\sigma) \cdot \mathbb{E}[(v+t)^{-\sigma}].$$

Hence Π_S is differentiable and

$$\Pi_S'(t) = \frac{\Pi_S(t)}{t} \cdot \left(1 - \sigma \cdot W(t) + (\sigma - 1) \cdot \Pi_S(t)\right),$$

where

$$W(t) \equiv t \cdot \frac{\mathbb{E}[(v+t)^{-\sigma-1}]}{\mathbb{E}[(v+t)^{-\sigma}]}.$$

The dominated convergence theorem ensures that Π_S' is continuous. Assumption 1 ensures further that $\Pi_S'(t) \geq 0$. Whenever the derivative is positive, the inverse function theorem implies that t^* is differentiable and

$$\frac{dt^*}{dR} = \frac{1}{\Pi_S'(t^*(R))}.$$

Meanwhile, whenever $\Pi_S'(t^*(R)) = 0$, the identity $\Pi_S(t^*(R)) = R$ combined with the monotonicity of t^* require that $dt^*/dR = \infty$.

We next obtain expressions for the derivatives of P_S^* and P_{AV}^*. By similar arguments to those used to establish differentaibility of Π_S, it can be shown that P_S is differentiable everywhere and

$$P_S'(t) = P_S(t) \cdot \frac{\mathbb{E}[(v+t)^{-\sigma}]}{\mathbb{E}[(v+t)^{1-\sigma}]} = P_S(t) \cdot \frac{\Pi_S(t)}{t}.$$

Then by the chain rule,

$$\frac{dP_S^*}{dR} = P_S'(t^*(R)) \cdot \frac{dt^*}{dR} = \frac{P_S^*(R)}{1 - \sigma \cdot W^*(R) + (\sigma - 1) \cdot R},$$

where $W^*(R) \equiv W(t^*(R))$. This expression remains valid when $\Pi'_S(t^*(R)) = 0$, i.e., whenever $W^*(R) = \sigma^{-1} + (1-\sigma^{-1}) \cdot R$, if it is taken to be ∞ at such points. Meanwhile, we have straightforwardly

$$\frac{dP^*_{AV}}{dR} = P'_{AV}(\tau^*(R)) \cdot \frac{d\tau^*}{dR} = \frac{P^*_{AV}(R)}{1+\tau^*(R)} \cdot \frac{1 + c/(\kappa \cdot \bar{v})}{(1-R)^2} = \frac{P^*_{AV}(R)}{1-R}.$$

We now compare these two derivatives. The Cauchy-Schwarz inequality implies that

$$\mathbb{E}[(v+t)^{-\sigma-1}] \cdot \mathbb{E}[(v+t)^{1-\sigma}] > \left(\mathbb{E}[(v+t)^{-\sigma}]\right)^2$$

and therefore

$$W(t) > t \cdot \frac{\mathbb{E}[(v+t)^{-\sigma}]}{\mathbb{E}[(v+t)^{1-\sigma}]} = \Pi_S(t)$$

for all $t > 0$. Hence $W^*(R) > R$ and

$$\frac{1}{P^*_S(R)} \frac{dP^*_S}{dR} > \frac{1}{P^*_{AV}(R)} \frac{dP^*_{AV}}{dR}$$

for all $R > 0$, establishing the second result from the proposition statement.

The results so far establish that the ratio P^*_S/P^*_R is increasing in R and initially below 1. It remains only to establish whether it crosses 1. Write the ratio as

$$\frac{P^*_S(R)}{P^*_{AV}(R)} = \frac{(\mathbb{E}[(v+t^*(R))^{1-\sigma}])^{1/(1-\sigma)} \cdot (1-R)}{(1 + c/(\kappa \cdot \bar{v})) \cdot (\mathbb{E}[v^{1-\sigma}])^{1/(1-\sigma)}}.$$

Letting

$$\Phi(t) \equiv (\mathbb{E}[(v+t)^{1-\sigma}])^{1/(1-\sigma)} \cdot (1 - \Pi_s(t)),$$

the ratio may be equivalently written

$$\frac{P^*_S(R)}{P^*_{AV}(R)} = \frac{\Phi(t^*(R))}{(1 + c/(\kappa \cdot \bar{v})) \cdot (\mathbb{E}[v^{1-\sigma}])^{1/(1-\sigma)}}.$$

Since t^* is increasing, it must be that Φ is as well, and so the ratio crosses 1 for some R iff

$$\Phi(\infty) > (1 + c/(\kappa \cdot \bar{v})) \cdot (\mathbb{E}[v^{1-\sigma}])^{1/(1-\sigma)}.$$

Writing Φ as

$$\Phi(t) = (\mathbb{E}[(v/t+1)^{1-\sigma}])^{\sigma/(1-\sigma)} \cdot \mathbb{E}[v(v/t+1)^{-\sigma}]$$

allows the limit $t \to \infty$ to be evaluated using the monotone convergence theorem, yielding

$\Phi(\infty) = \mathbb{E}[v]$. Hence a crossing point exists iff

$$\mathbb{E}[v] > (1 + c/(\kappa \cdot \bar{v})) \cdot (\mathbb{E}[v^{1-\sigma}])^{1/(1-\sigma)}.$$

This condition holds iff c is sufficiently small.

B.6 Optimal tariff codes in the multi-category problem

As a preamble to the proofs of results in Sections 3.4-3.5, we establish several basic facts about the optimal tariff code in the multi-category problem.

In the problem with multiple categories, the aggregate price index is

$$P^{1-\sigma} = \sum_j \mu_j P_j^{1-\sigma}$$

and aggregate tariff income is

$$\Pi = \frac{\sum_j \mu_j T_j}{\sum_j \mu_j P_j^{1-\sigma}},$$

where

$$P_j^{1-\sigma} = \mathbb{E}_j[(v + t_j)^{1-\sigma}], \quad T_j = t_j \cdot \mathbb{E}_j[(v + t_j)^{-\sigma}]$$

for every category which is assigned a specific tariff t_j, while

$$P_j^{1-\sigma} = (1 + \tau_j)^{1-\sigma} \cdot \mathbb{E}_j[v^{1-\sigma}], \quad T_j = \frac{\tau_j \cdot \mathbb{E}_j[v^{1-\sigma}] - \mathbf{1}\{\tau_j > 0\} \cdot \frac{c}{\kappa} \cdot \mathbb{E}_j[v^{-\sigma}]}{(1 + \tau_j)^{\sigma}}$$

for every category which is assigned an ad valorem tariff τ_j. Since $\sigma > 1$, the optimal tariff code solves

$$\max \sum_j \mu_j P_j^{1-\sigma} \quad \text{s.t.} \quad \sum_j \mu_j P_j^{1-\sigma} \cdot (R_j - R) \geq 0,$$

where the maximum is over tariff structures and rates for each category and $R_j \equiv T_j / P_j^{1-\sigma}$ is the *quasi-revenue* in each category.

To simplify the analysis, we pass to the modified problem in which T_j is continuous at $\tau_j = 0$ under an ad valorem tariff. This modification is innocuous: If a zero ad valorem tariff were optimal in some category, there would exist another optimal tariff code involving a zero specific tariff in that category. Hence, if there exists an optimal tariff code in the original problem, there exists an optimal code which remains optimal in the modified problem. Further, as we establish below in Lemma B.2, optimal tariff rates are positive in all categories in the modified problem. It follows that no optimal codes are excluded by passing to the modified problem.

As established in Proposition 3, for each category and tariff regime there exists a unique tariff rate inducing any quasi-revenue in $[0, 1)$. We may therefore optimize over quasi-revenues rather than rates, passing to the problem

$$\max \sum_j \mu_j P_j^*(R_j)^{1-\sigma} \quad \text{s.t.} \quad \sum_j \mu_j P_j^*(R_j)^{1-\sigma} \cdot (R_j - R) \geq 0,$$

where $P_j^*(R_j)$ is the price index induced by the quasi-revenue R_j under the chosen tariff regime. To compactify the problem, we allow $R_j = 1$ to be chosen by setting $(P_j^*(1))^{1-\sigma} = 0$.

Lemma B.1. *There exists an optimal tariff code. Further, $R_j^* < 1$ for every category under every optimal code.*

Proof. It suffices to show that, conditional on the pattern of tariff regimes, there exists an optimal set of quasi-revenues. In that case, an optimal tariff code is one which minimizes the price index among the (finite) set of tariff regimes coupled with a set of optimal quasi-revenues.

Fixing tariff regimes, the objective and constraint are both continuous in the vector of quasi-revenues under the convention $P_j^*(1)^{1-\sigma} = 0$ and given that T_j is continuous at $\tau_j = 0$ in the modified problem. The feasible set is additionally non-empty, since the choice of $R_j = R$ for all j satisfies the constraint. Since each quasi-revenue must lie in $[0, 1]$, the feasible set is therefore compact. Hence there must exist an optimal vector of quasi-revenues.

Now, suppose that some $R_j^* = 1$ under an optimal code. That choice corresponds to $P_j(R_j^*)^{1-\sigma} = 0$. Modifying the tariff code so that $R_j = R$ leaves the constraint function unchanged and raises the objective, contradicting the presumed optimality of the original code. □

For each category, let $W_j^*(R_j) = R_j$ if the category uses an ad valorem tariff, and otherwise let $W_j^*(R_j)$ be as defined in the prooff of Proposition 4.

Lemma B.2. *Under any optimal tariff code, all quasi-revenues are positive and W_j^* is equalized across all categories.*

Proof. Fix an optimal tariff code with quasi-revenues $\boldsymbol{R}^* \ll 1$. Suppose first that some category j is assigned a specific tax and $\frac{dP_j^*}{dR_j}(R_j^*) = \infty$. This choice is consistent with optimality only if the same is true for all other categories; for otherwise a reduction in the price index could be achieved at no cost to revenue by slightly reducing the quasi-revenue in that category and increasing the quasi-revenue in some category satisfying $\frac{dP_j^*}{dR_j}(R_j^*) < \infty$. Hence $W_j^* = \infty$ for all categories. Further, $\Pi_S'(0) = 1/\bar{v} > 0$, and so $R_j^* > 0$ in all categories.

Going forward, we suppose that $\frac{dP_j^*}{dR_j}(R_j^*) < \infty$ for all categories. In that case, the objective and constraints are locally smooth in the quasi-revenues around the optimum. Holding fixed the pattern of tariff regimes, the optimal quasi-revenues must minimize the price index subject to the revenue constraint. Since the gradient of the constraint function is nonvanishing everywhere, there must therefore exist a Lagrange multiplier $\lambda > 0$ such that the optimal quasi-revenues $\boldsymbol{R}^*$ are a stationary point of the Lagrangian

$$\mathscr{L}(\boldsymbol{R}) \equiv \sum_j \mu_j \mathscr{L}_j(R_j),$$

where

$$\mathscr{L}_j(R_j) \equiv P_j^*(R_j)^{1-\sigma} \cdot \Big(1 + \lambda \cdot (R_j - R)\Big).$$

Differentiating $\mathscr{L}_j$ and using the expressions for dP_j^*/dR_j obtained in the proof of Proposition 4, we obtain

$$\frac{d\mathscr{L}_j}{dR_j} = \lambda \cdot P_j^*(R_j)^{1-\sigma} \cdot \frac{(\sigma - 1) \cdot (R - \lambda^{-1}) + 1 - \sigma \cdot W_j^*(R_j)}{1 - R_j - \sigma \cdot (W_j^*(R_j) - R_j)}$$

for every $R_j < 1$. (Recall that $R_j = 1$ cannot arise under an optimal tariff code.) The proof of Proposition 4 establishes that for a specific category, W_j^* is increasing, continuous, and unbounded in R_j and vanishes when $R_j = 0$. The same is trivially true for any ad valorem category. It follows that each derivative vanishes for at most one value of $R_j < 1$.

If $\lambda \leq 1/(R + 1/(1 - \sigma))$, then these derivatives are negative for each category and every $R_j \in (0, 1)$, yielding a unique stationary point at $R_j = 0$ for all j. These quasi-revenues violate the constraint and so cannot correspond to an optimal code. It must therefore be that $\lambda > 1/(R + 1/(1 - \sigma))$. In that case, there exists a unique $R_j \in (0, 1)$ at which each $d\mathscr{L}_j/dR_j$ crosses zero, characterized by

$$W_j^*(R_j) = \sigma^{-1} + (1 - \sigma^{-1}) \cdot (R - \lambda^{-1}).$$

Since this stationary point is unique, the quasi-revenues $\boldsymbol{R}^*$ must satisfy this identity. In particular, all quasi-revenues are positive, and W_j^* is equalized across categories. □

Lemma B.3. *Under an optimal tariff code with quasi-revenues $\boldsymbol{R}^*$, the tariff regime in each category j must be optimal in the single-category problem with value distribution F_j and revenue goal R_j^*.*

Proof. The government's net tariff income may be written

$$\Pi = \sum_j E_j R_j,$$

where

$$E_j \equiv \frac{\mu_j P_j^*(R_j)^{1-\sigma}}{\sum_k \mu_k P_k^*(R_k)^{1-\sigma}}$$

is the representative consumer's expenditure share on goods in category j.

Fix an optimal tariff code, and suppose that the claimed property does not hold in some category j. Then in that category, the tariff code could be modified in order to lower P_j^* while achieving the same quasi-revenue R_j^*. Consider a further modification to the code which raises R_j to return P_j^* to its level under the original code. The resulting code preserves the original aggregate price index and expenditure shares, while raising quasi-revenue in one category. Aggregate tariff income must therefore rise, relaxing the constraint. Finally, modify the code further by slightly lowering the quasi-revenue in category j. This modification lowers the aggregate price index while continuing to satisfy the revenue goal, contradicting the presumed optimality of the optimal code. □

B.7 Proof of Proposition 5

Fix an optimal tariff code and any two categories, which for concreteness we refer to as 1 and 2. If the tariff regime is ad valorem in each category, then Lemma B.2 implies that $R_1^* = R_2^*$ i.e., quasi-revenues are equalized across categories. Since tariff rates and quasi-revenues are related via the expression

$$\tau_j^*(R_j) = \frac{R_j + c/(\kappa \cdot \bar{v}_j)}{1 - R_j},$$

it follows that optimal tariff rates cannot be equal if $\bar{v}_1 \neq \bar{v}_2$, which is the expression in the proposition statement.

Suppose instead that the tariff regime is specific in each category. An argument closely analogous to the proof of Lemma B.3 can be used to establish that the quasi-revenues in these categories must also be optimal in the 2-category problem involving categories 1 and 2, with shares $\mu_j/(\mu_1 + \mu_2)$ in each category and revenue goal

$$R^{12} = \frac{\sum_{j=1}^{2} E_j^* R_j^*}{\sum_{j=1}^{2} E_j^*},$$

where E_j^* are the expenditure shares in each category under the optimal code. Let t^U be the uniform specific tariff which achieves the revenue goal in the 2-category problem. Then if the two categories are optimally assigned the same tariff, it must be that $R_1^* = R_1^U$ and $R_2^* = R_2^U$, where R_1^U and R_2^U are the quasi-revenues induced by tariff t^U. Lemma B.2 implies that these these quasi-revenues cannot be optimal unless $W_1^*(R_1^U) = W_2^*(R_2^U)$. Recalling the definition of W in the proof of Proposition 4, this condition may be equivalently written $W_1(t^U) = W_2(t^U)$, where

$$W_j(t) = t \cdot \frac{\mathbb{E}_j\left[(v+t)^{-\sigma-1}\right]}{\mathbb{E}_j\left[(v+t)^{-\sigma}\right]}.$$

Rearranging the condition $W_1(t^U) \neq W_2(t^U)$ yields the expression in the proposition statement.

B.8 Proof of Proposition 6

The proof of Proposition 4 established that it is optimal to impose a specific tariff for all revenue goals iff

$$\frac{\mathbb{E}[v_n]}{\left(\mathbb{E}[v_n^{1-\sigma}]\right)^{1/(1-\sigma)}} \leq 1 + \frac{c}{\kappa} \cdot \frac{\mathbb{E}[v_n^{-\sigma}]}{\mathbb{E}[v_n^{1-\sigma}]}.$$

The uniform integrability conditions of homogenization ensure that the Vitali convergence theorem apply to each expectation, so that

$$\mathbb{E}[v_n] \to \bar{v}, \quad \mathbb{E}[v_n^{1-\sigma}] \to \bar{v}^{1-\sigma}, \quad \mathbb{E}[v_n^{-\sigma}] \to \bar{v}^{-\sigma}.$$

The lhs of the previous inequality therefore converges to 1, while the rhs converges to $1 + c/(\kappa \cdot \bar{v}) > 1$. The inequality therefore holds for sufficiently large n.

B.9 Proof of Corollary 1

This result follows from Proposition 5 combined with Lemma B.3.

B.10 Proof of Proposition 7

Lemma B.2 established that W_j^* is equalized across categories under an optimal tariff code. Since $W_j^*(R_j) = R_j$ within an ad valorem category, while the proof of Proposition 4 established that $W_j^*(R_j) > R_j$ within a specific category. As a result, quasi-revenues must be higher in ad valorem categories than specific categories. Since the quasi-revenue is precisely the burden of taxation within a category, the result follows.

B.11 Proof of Proposition 8

Lemma B.2 established that W_j^* is equalized across categories under an optimal tariff code. Since $W_j^*(R_j) = R_j$ within an ad valorem category, quasi-revenues are optimally equalized across ad valorem categories. In such a category, the tariff rate can be related to the quasi-revenue via the expression

$$\tau_j^*(R_j) = \frac{R_j + c/(\kappa \cdot \bar{v}_j)}{1 - R_j}.$$

As a result, tariff rates are lower the higher is the unit value of consumption.

B.12 Proof of Proposition 9

Fix an optimal tariff code with quasi-revenues $\boldsymbol{R}^*$. Suppose that categories j and k are scale-ordered, with k the higher-value category. Suppose by way of contradiction that category j uses an ad valorem tariff while k uses a specific tariff under the optimal tariff code. Proposition 7 then implies that $R_j^* > R_k^*$. Additionally, Lemma B.3 implies that an ad valorem tariff must minimize P_j subject to $R_j \geq R_j^*$, while a specific tariff minimizes P_k subject to $R_k \geq R_k^*$.

To reach a contradiction, we establish that the (single-category) revenue threshold at which an ad valorem tariff becomes optimal is falling in the scale factor α. Fixing a baseline value distribution F and letting $v \sim F$, it is straightforward that the price index and tariff income under scale factor α and specific tariff $t = \alpha \cdot \bar{t}$ are

$$P_S(\bar{t}; \alpha) = \alpha \cdot \left(\mathbb{E}[(v + \bar{t})^{1-\sigma}]\right)^{1/(1-\sigma)}, \quad \Pi_S(t; \alpha) = \bar{t} \cdot \frac{\mathbb{E}[(v + \bar{t})^{-\sigma}]}{\mathbb{E}[(v + \bar{t})^{1-\sigma}]}.$$

It follows immediately that $P_S^*(R; \alpha) = \alpha \cdot P_S^*(R; 1)$. Meanwhile, the same expressions under an ad valorem tariff $\tau > 0$ are

$$P_{AV}(\tau; \alpha) = \alpha \cdot (1 + \tau) \cdot \left(\mathbb{E}[v^{1-\sigma}]\right)^{1/(1-\sigma)}, \quad \Pi_{AV}(\tau; \alpha) = \frac{\tau}{1 + \tau} - \alpha^{-1} \cdot \frac{c/(\kappa \cdot \bar{v})}{1 + \tau},$$

where $\bar{v} = \mathbb{E}[v^{1-\sigma}]/\mathbb{E}[v^{-\sigma}]$ is the unit value of consumption when $\alpha = 1$. Hence

$$P_{AV}^*(R; \alpha) = \alpha \cdot \frac{1 + \alpha^{-1} \cdot c/(\kappa \cdot \bar{v})}{1 - R} \cdot \left(\mathbb{E}[v^{1-\sigma}]\right)^{1/(1-\sigma)}.$$

Thus $P_{AV}^*/(R; \alpha)/P_S^*(R; \alpha)$ is declining in α, implying that the threshold $\overline{R}$ at which an ad valorem tariff is optimal declines in α as well.

C Bounding Alchian and Allen (1964) Effects

Lacking direct data on the distribution of prices of varieties, it is not possible to verify directly that the change in unit values between specific and ad valorem regimes is not driven by consumers shifting expenditure from higher priced varieties to lower priced ones(Alchian and Allen, 1964). However, given a common price index in trade, the CES price index, and given common price distributions in the trade literature—the Fréchet and the Pareto—we can assess the plausibility of this mechanism in explaining the severe decline in unit values.

In particular, *if* there were no shading in value, then one can show that under an ad valorem regime, the reported unit value is the correct unit value,

$$uv_{AV} = \frac{Ev^{1-\sigma}}{Ev^{-\sigma}}.$$

Moreover, under specific tariffs one can show that,

$$uv_S = \frac{E(v+t)^{1-\sigma}}{E(v+t)^{-\sigma}} \times (1-R),$$

where t is the level of tariff and R is the ad valorem equivalent. Thus, given data on R, the unit values, and a functional form for $f(v)$, we can estimate what the Alchian-Allen effect would be under different distributions on v in the parameterized family.

To this end, Figure A.12 plots the change in the specific unit value for different values of the coefficient of variation in prices. In all cases, the elasticity of substitution is set to 3.1 based on the median across alcoholic products from Broda and Weinstein (2006). In neither case can the change in unit values that we observe be rationalized for any finite coefficient of variation. From Conlon and Rao (2024), the coefficient of variation of wholesale prices of alcohol in modern data is approximately 63%. This is likely an upper bound given that tariffs were set at much finer partitions of alcohol. Either way, it does not seem likely that substitution across varieties alone can explain the large decline in observed unit values.

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Figure A.1: Manufactured Wool Tariffs, 1828

Second. On manufactures of wool, or of which wool shall be a component part, (except carpetings, blankets, worsted stuff goods, bombazines, hosiery, mits, gloves, caps, and bindings,) the actual value of which, at the place whence imported, shall not exceed fifty cents the square yard, shall be deemed to have cost fifty cents the square yard and be charged thereon with a duty of forty per centum ad valorem, until the thirtieth day of June, eighteen hundred and twenty-nine, and from that time a duty of forty-five per centum ad valorem: *Provided*, That on all manufactures of wool, except flannels and baizes, the actual value of which, at the place whence imported, shall not exceed thirty-three and one third cents per square yard, shall pay fourteen cents per square yard.

Third. On all manufactures of wool, or of which wool shall be a component part, except as aforesaid, the actual value of which, at the place whence imported, shall exceed fifty cents the square yard, and shall not exceed one dollar the square yard, shall be deemed to have cost one dollar the square yard, and be charged thereon with a duty of forty per centum ad valorem, until the thirtieth day of June, eighteen hundred and twenty-nine, and from that time a duty of forty-five per centum ad valorem.

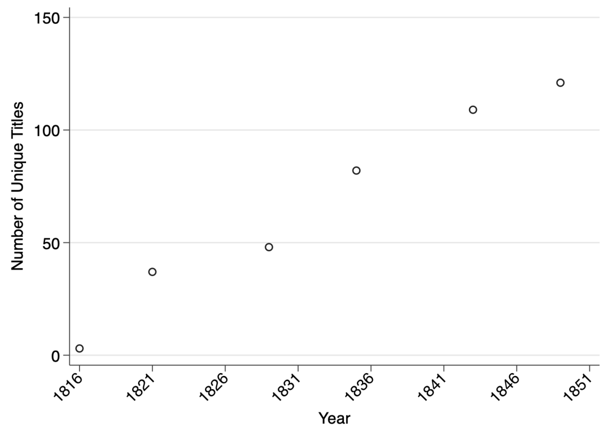
Fourth. On all manufactures of wool, or of which wool shall be a component part, except as aforesaid, the actual value of which, at the place whence imported, shall exceed one dollar the square yard, and shall not exceed two dollars and fifty cents the square yard, shall be deemed to have cost two dollars and fifty cents the square yard, and be charged with a duty thereon of forty per centum ad valorem, until the thirtieth day of June, eighteen hundred and twenty-nine, and from that time a duty of forty-five per centum ad valorem.

Fifth. All manufactures of wool, or of which wool shall be a component part, except as aforesaid, the actual value of which, at the place whence imported, shall exceed two dollars and fifty cents the square yard, and shall not exceed four dollars the square yard, shall be deemed to have cost, at the place whence imported, four dollars the square yard, and a duty of forty per cent. ad valorem, shall be levied, collected, and paid, on such valuation, until the thirtieth day of June, one thousand eight hundred and twenty-nine, and from that time a duty of forty-five per centum ad valorem.

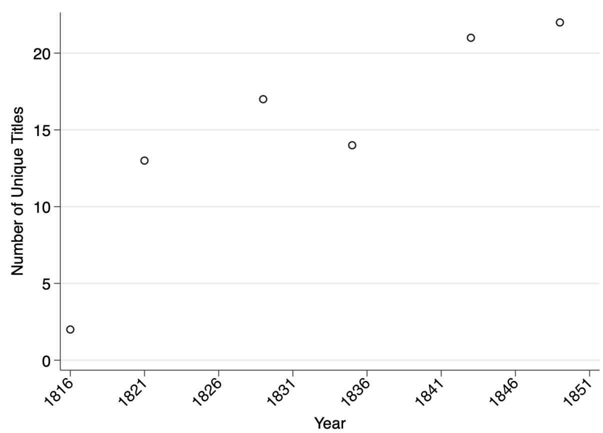
Notes: This figure shows the language of the May 19, 1828 Tariff bill, relating to manufactured wool.

Figure A.2: Alternative Measures of Customs House Expansion

Panel A: All Customs Occupations Over Time

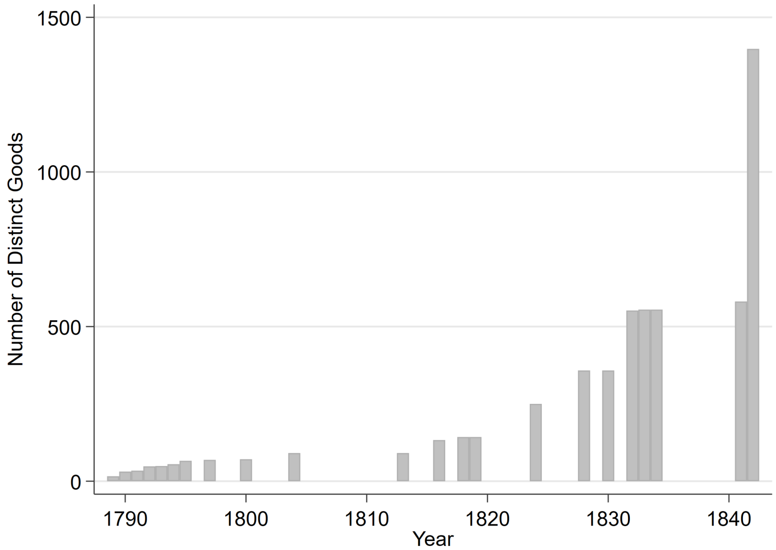


Panel B: Core Customs Occupations Over Time



Notes: This figure plot the number of distinct occupational titles at the Customs house. Panel A includes any distinct occupational title. Panel B only focuses on core tasks: those engaged in collections, inspections, quantification, appraisal/examination, marking, and proving.

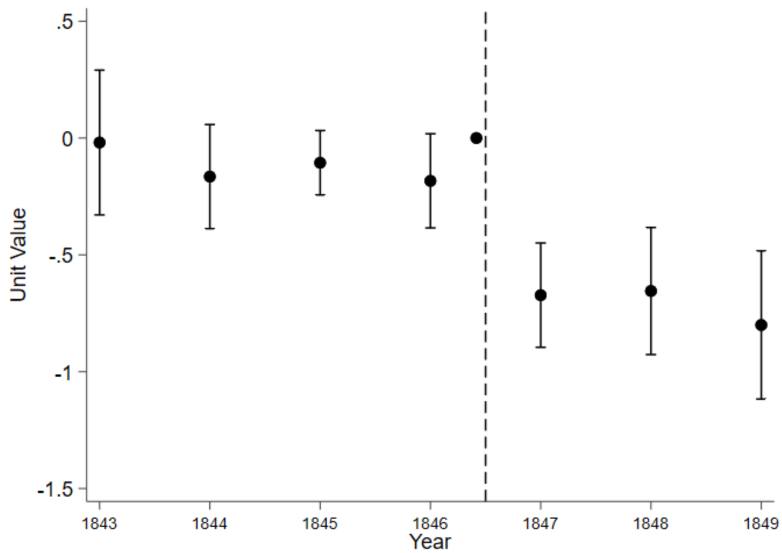
Figure A.3: Number of Goods Over Time



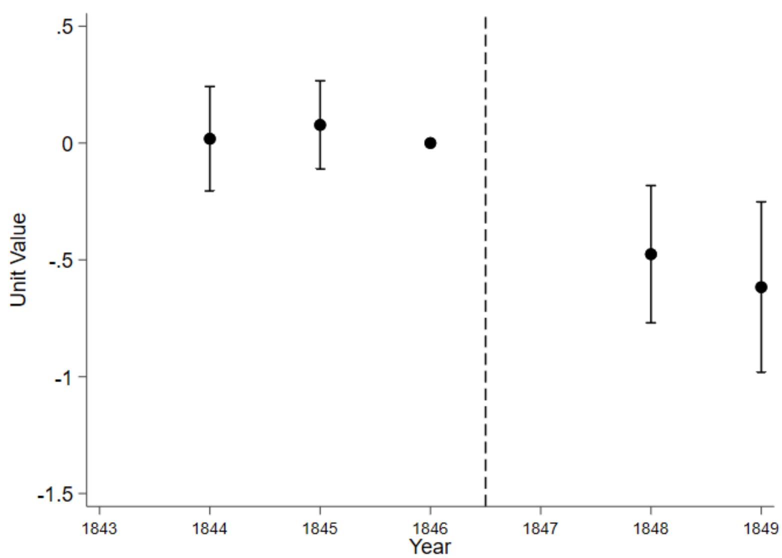
Notes: This figure plots the evolution of the disaggregation of the American tariff code over time, by plotting the number of goods that have been created by the tariff bills. As described in the text, a good is a basket of imports with a unique tariff in any given year, and which is physically distinct from any other basket that has the same path of tariffs over time. Source: *Tariff Acts of the United States*.

Figure A.4: Unit Values: Event Study Around Removing All Specific Tariffs

Panel A: Full Sample



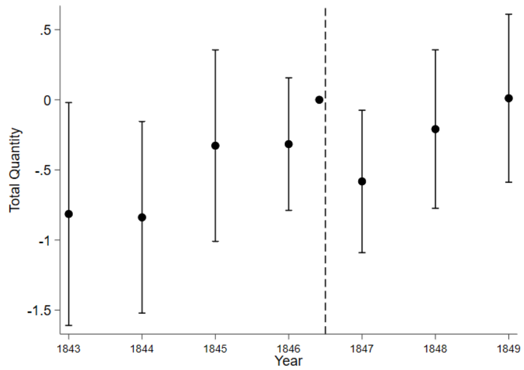
Panel B: Full Years Only



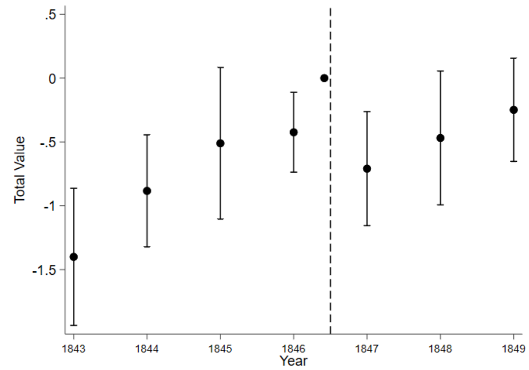
Notes: This figure plots the coefficients of a regression comparing the unit values for the initially-specific goods listed in the 1849 Annual Report of the Treasury of the Secretary for 1843–1849 relative to the goods without specific tariffs for which unit values were consistently reported (two types of coffee, two types of tea, and wool). The vertical line represents the implementation of the Walker Tariff in 1846, which removed all specific tariffs. Panel A shows data from all of the import statistics 1843–1849, and Panel B shows data only for the import statistics with 12 months of reporting (dropping 1843 and two reports for 1847, one for each tariff regime). Results clustered by good. Data: *Commerce and Navigation of the United States.*

Figure A.5: Quantities and Values: Event Study Around Removing All Specific Tariffs

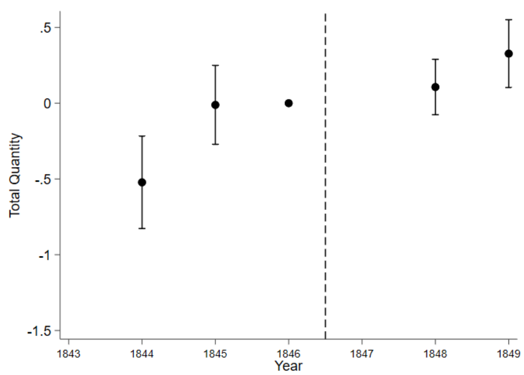
Panel A: Quantities, Full Sample



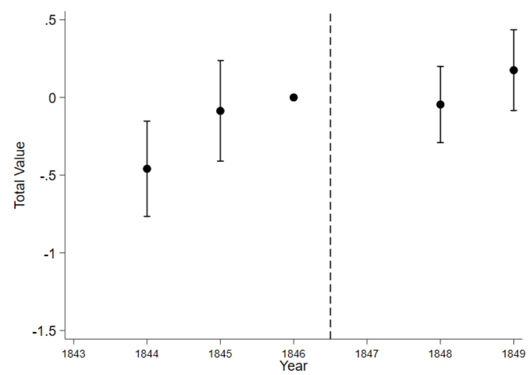
Panel B: Values, Full Sample



Panel C: Quantities, Full Years Only

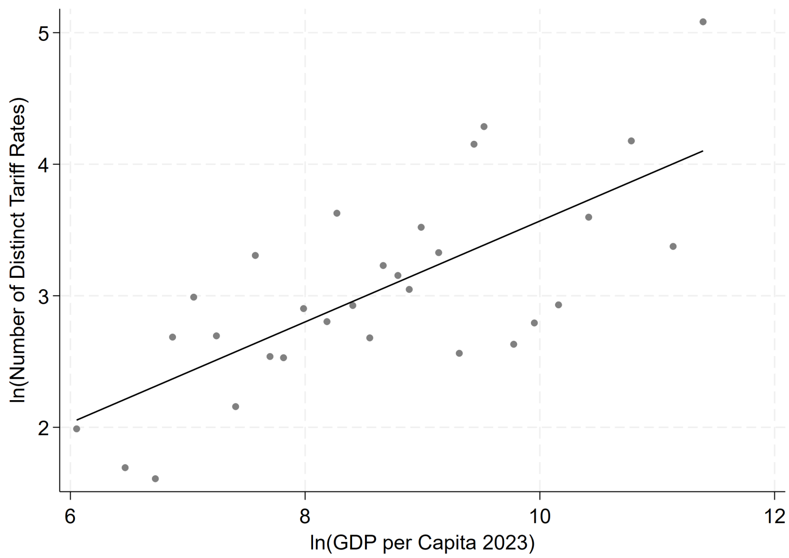


Panel D: Values, Full Years Only



Notes: This figure plots the coefficients of the average monthly quantities and values for the initially-specific goods listed in the 1849 Annual Report of the Treasury of the Secretary for 1843–1849 relative to the goods without specific tariffs for which unit values were reported (two types of coffee, two types of tea, and wool). The vertical line represents the implementation of the Walker Tariff in 1846, which removed all specific tariffs. Panel A shows data from all of the import statistics 1843–1849, and Panel B shows results only for the import statistics with 12 months of reporting (dropping 1843 and two reports for 1847, one for each tariff regime). Results clustered by good. Data: *Commerce and Navigation of the United States.*

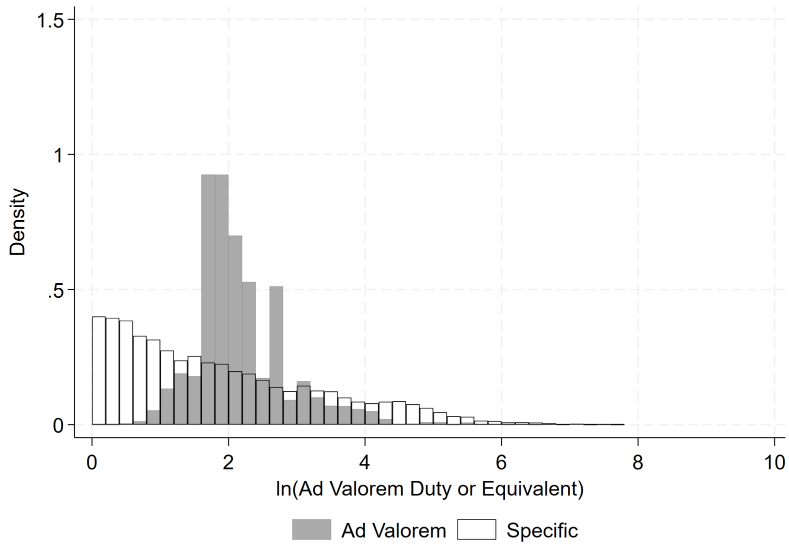
Figure A.6: Development and Distinct Tariff Rates



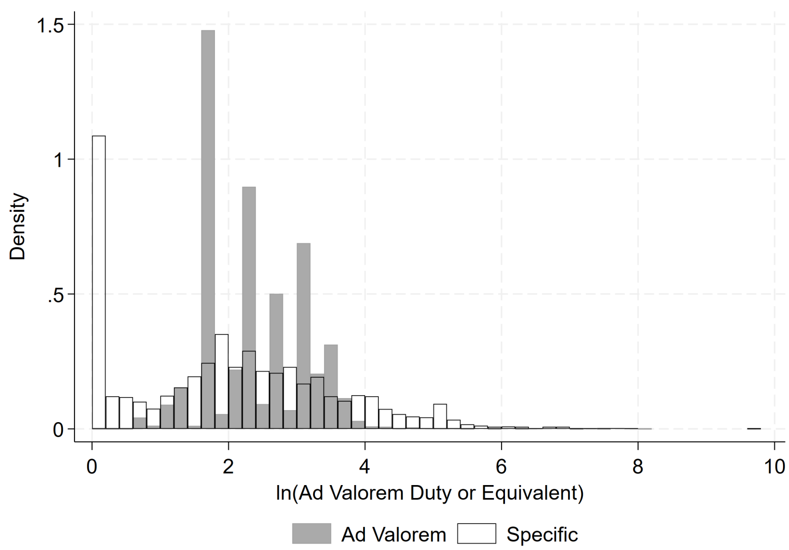
Notes: This figure shows a binscatter of the relationship between modern development and the complexity of the tariff code. Source: WTO Integrated Database and WDI.

Figure A.7: Modern Distribution of Tariff Rates by Tariff Type

Panel A: OECD

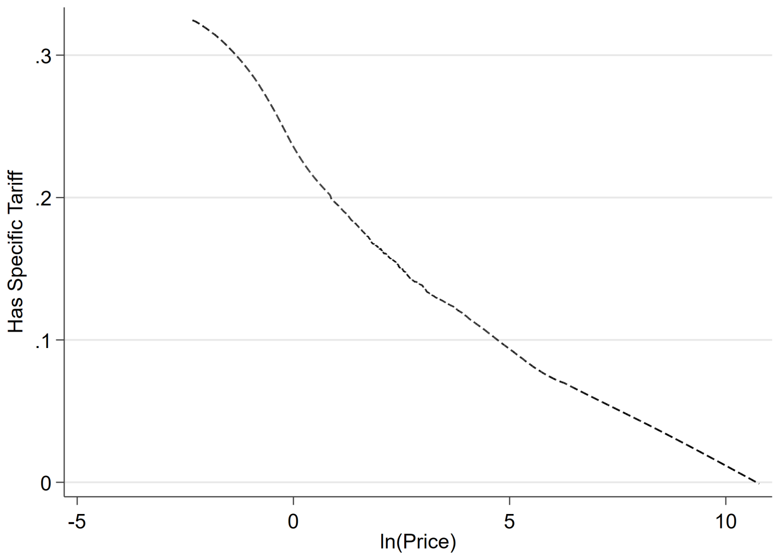


Panel B: Non-OECD



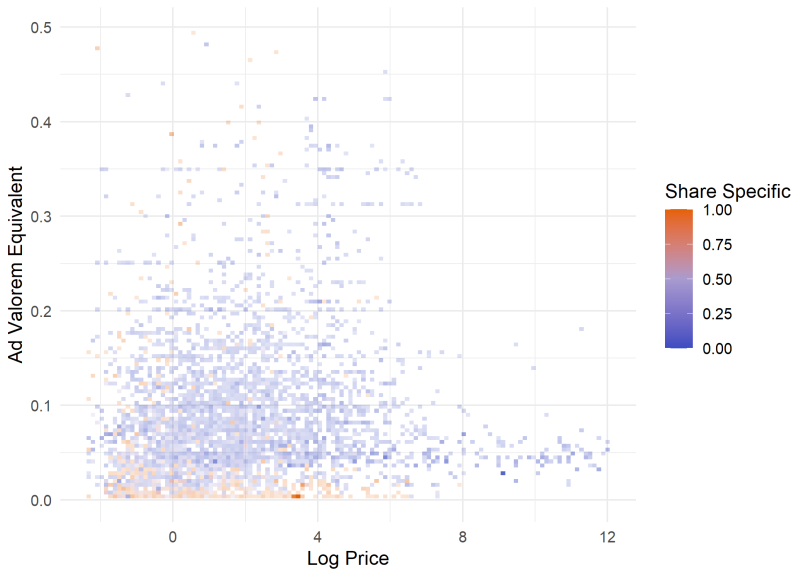
Notes: This figure plots distribution of ad valorem equivalent tariff rates by specific and ad valorem tariffs. Panel A plots the distributions for countries in the OECD, and Panel B plots the distributions for countries not in the OECD. We only consider specific and ad valorem tariffs (dropping goods on the free list). All countries are included in their most recent year. Source: WTO Integrated Database and UN Trade Analysis Information System.

Figure A.8: 1980s American Imports: Lowess of Unit Values and Specificity



Notes: This figure shows the relationship between unit values, ad valorem equivalents, and specific in American imports 1980-1985. The independent variable is ln(Price) and the outcome is if an import has a specific tariff. We only include imports whose ad valorem equivalent tariff is below the maximum ad valorem rate, and we trim unit values at the 1% extremes. Ad valorem equivalents are imputed using the Census' estimated collected tariffs. Each observation is a TSUS 5-digit import, averaged across all years. Source: US Census Annual Import Data Bank (IDB).

Figure A.9: 1980s American Imports: Heatmap of Unit Values, Ad Valorem Equivalents, and Specificity



Notes: This figure shows the relationship between unit values, ad valorem equivalents, and specificity in American imports 1980-1985. Ad valorem equivalents are imputed using the Census' estimated collected tariffs. Each observation is a TSUS 5-digit import, averaged across all years. Orange bins have a higher share of specific tariffs, blue bins have a higher share of ad valorem tariffs, and more opaque bins have more imports (in dollars). Source: US Census Annual Import Data Bank (IDB).

Figure A.10: Unit Values for Wool

Notes: This figure plots the average reported unit values for unmanufactured wool. Before 1846, there were two tariffs, depending on the price: if the wool was seven cents or under per pound, the duy was 5%; otherwise the duty was of three cents per pound plus 30%. The average ad valorem equivalent tariff was 38%. After 1846, all unmanufactured wool had an ad valorem tariff of 30%. Data: *Commerce and Navigation of the United States* and *Tariff Acts of the United States*

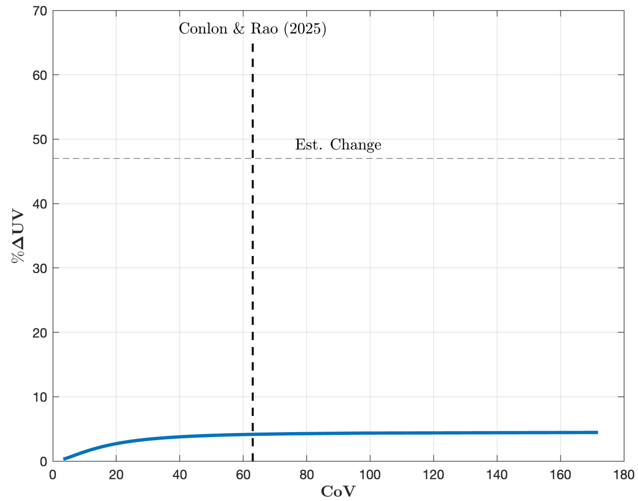
Figure A.11: Directory of Customs Officials in Boston, 1839

Names and Offices.	Where Employed.	Where born.	Compensation.
Boston and Charlestown.			
George Bancroft...Collector & Sup't of Light Houses.	Boston..........	Mass.	4400 00
Adams Bailey, Dept. Collector	.......do.......	..do..	1500 00
E. L. Frothingham, Cash Clerk and Book keeper..	.......do.......	..do..	1300 00
John Bingham..Bond Acc'ant	.......do.......	Conn.	1300 00
W. A. Wellman Clearance Cl'k	.......do.......	Mass.	1000 00
R. M. Gay....Debenture Cl'k	.......do.......	Maine	1000 00
S. Andrews......Marine Cl'k	.......do.......	Mass.	900 00
J. T. Prince.......Bond Cl'k	.......do.......	Maine	800 00
W. Alline........Impost Cl'k	.......do.......	Mass.	750 00
H. D. Clary, Ass't Impost Cl'k	.......do.......	..do..	700 00
N. M. Cutler..Ass't Deb. Cl'k	.......do.......	Maine	700 00
G. B. Wellman Coastwise Cl'k	.......do.......	Mass.	700 00
W. Palfrey..Ass't Clear. Cl'k	.......do.......	..do..	704 00
S. Draper, Statistical B'k k'per	.......do.......	..do..	704 00
R. Abell.....Temporary Cl'k	.......do.......	N. H.	184 00
A. H. Ward, Weig'r & Gauger	.......do.......	Mass.	1500 00
John Champney.........do..	.......do.......	..do..	1500 00
S. Ward.. Weigher & Gauger	Boston..........	Mass.	1500 00
Luther Hamilton........do..	.......do.......	..do..	1500 00
Samuel Walker ....do..	.......do.......	..do..	1500 00
Chauncey Clark ....do..	.......do.......	..do..	1500 00
Fred. Robinson.........do..	.......do.......	N. H.	1500 00
J. Grafton, Measurer of Salt, Coal, &c................	.......do.......	Mass.	1500 00
Andrew Green..........do..	.......do.......	..do..	1500 00
Joseph Hall............do..	.......do.......	..do..	1500 00
Wm. B. Pike...........do..	.......do.......	..do..	1500 00
N. Hawthorne..........do..	.......do.......	..do..	1500 00

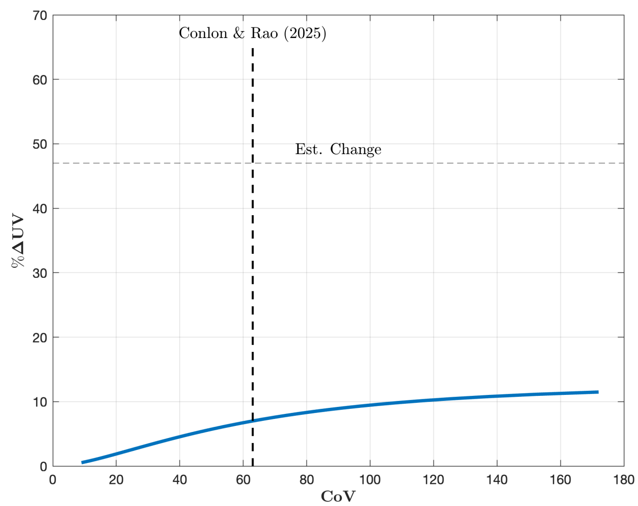
Notes: This figure shows excerpted scans from the 1839 *Official Register of the United States*, showing some of the officials in the Boston Customs House. Many had prominent careers beyond Customs. George Bancroft, the Collector and Superintendent of Light Houses, was also a historian and politician. Nathaniel Hawthorne, a Measurer of Salt & Coal, was also a writer.

Figure A.12: Alchian and Allen (1964) Effects for Different Distributions

Panel A: Pareto



Panel B: Fréchet



Notes: This figure plots the value of difference between the specific and ad valorem price indices for different values of the coefficient of variation in the Pareto and Fréchet distributions. In both cases, $\sigma = 3.1$, based on Errico and Lashkari (2024). The horizontal line reflects the estimated unit value change in Table 2 from replacing specific tariffs with ad valorem in 1846.

Table A.1: Narrow Labels Predict Specific Tariffs

Panel A. ≤ 5 goods in Label

	(1)	(2)	(3)	(4)
≤ 5 goods in Label	0.091	0.082	0.088	0.067
	(0.0070)	(0.0067)	(0.0077)	(0.028)
Mean Outcome	0.11	0.11	0.11	0.50
Number of Goods	1395	1349	1384	1290
Number of Observations	28126	27237	28115	1290
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Panel B. ≤ 10 goods in Label

	(1)	(2)	(3)	(4)
≤ 10 goods in Label	0.098	0.087	0.088	0.17
	(0.0062)	(0.0057)	(0.0065)	(0.030)
Mean Outcome	0.11	0.11	0.11	0.50
Number of Goods	1395	1349	1384	1290
Number of Observations	28126	27237	28115	1290
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Notes: This table shows the relationship between the aggregation in the tariff code and if a good has a specific tariff. Panel A considers labels covering 5 or fewer goods, and Panel B considers labels covering 10 or fewer goods. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the label for the good is relatively disaggregated, as defined in the panel heading. All regressions control for year. Column 2 additionally controls for year interacted with three digit SITC classifications. Column 3 controls for good fixed effects. Column 4 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States* and *Commerce and Navigation of the United States*.

Table A.2: Homogeneity Predicts Specific Tariffs, Alternative Definition of Homogeneous

	(1)	(2)	(3)
Homogeneous	0.081	0.13	0.12
	(0.0086)	(0.031)	(0.032)
Mean Outcome	0.11	0.11	0.50
Number of Goods	1395	1387	1290
Number of Observations	28126	27944	1290
Specification	Year FE	Year × SITC FE	Only 1842

Notes: This table shows the relationship between price dispersion across varieties of a good and if it has a specific tariff. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the good (in the modern era) is sold on an organized exchange or has a reference price, following the classification of Rauch (1999). All regressions control for year. Column 2 additionally controls for year interacted with two digit SITC classifications. Column 3 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States.*

Table A.3: Singleton & Homogeneous Labels Predict Specific Tariffs

	(1)	(2)	(3)
Singleton Label	0.037	0.18	0.12
	(0.012)	(0.033)	(0.033)
Homogeneous	0.12	0.10	0.28
	(0.011)	(0.040)	(0.046)
Homogeneous & Singleton Label	-0.0086	0.24	-0.061
	(0.019)	(0.052)	(0.067)
Mean Outcome	0.11	0.11	0.50
Number of Goods	1395	1387	1290
Number of Observations	28126	27944	1290
Specification	Year FE	Year × SITC FE	Only 1842

Notes: This table shows the relationship between the aggregation in the tariff code, price dispersion across varieties of a good, and if a good has a specific tariff. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variables are if the label for the good is a singleton (only covers one good), if the good is listed as a commodity in the *The Executive Documents* of the House of Representatives, and their interaction. All regressions control for year. Column 2 additionally controls for year interacted with two digit SITC classifications. Column 3 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States.*

Table A.4: Singleton Labels Predict Specific Tariffs, Robustness to Specification

Panel A. Controlling for 1842 Ad Valorem Equivalent

	(1)	(2)	(3)	(4)
Singleton Label	0.065	0.077	0.14	0.17
	(0.012)	(0.015)	(0.015)	(0.033)
Mean Outcome	0.15	0.15	0.15	0.87
Number of Goods	680	635	674	650
Number of Observations	13957	13025	13951	650
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Panel B. Weighting by SITC

	(1)	(2)	(3)	(4)
Singleton Label	0.12	0.099	0.14	0.32
	(0.017)	(0.011)	(0.016)	(0.049)
Mean Outcome	0.081	0.081	0.081	0.44
Number of Goods	1395	1349	1384	1290
Number of Observations	28126	27237	28115	1290
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Notes: This table shows the relationship between the aggregation in the tariff code and if a good has a specific tariff. Panel A additionally controls for the 1842 ad valorem equivalent, for the goods reported in the import statistics. Panel B weights by the inverse of the number of goods within each three-digit SITC classification. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the label for the good is a singleton (only covers one good). All regressions control for year. Column 2 additionally controls for year interacted with three digit SITC classifications. Column 3 controls for good fixed effects. Column 4 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States* and *Commerce and Navigation of the United States*.

Table A.5: Homogeneity Predicts Specific Tariffs, Robustness to Specification

Panel A. Controlling for 1842 Ad Valorem Equivalent

	(1)	(2)	(3)
Homogeneous	0.12	0.27	0.26
	(0.011)	(0.067)	(0.026)
Mean Outcome	0.15	0.20	0.87
Number of Goods	680	665	650
Number of Observations	13957	13618	650
Specification	Year FE	Year × SITC FE	Only 1842

Panel B. Weighting by SITC

	(1)	(2)	(3)
Homogeneous	0.082	0.30	0.40
	(0.013)	(0.054)	(0.055)
Mean Outcome	0.081	0.081	0.44
Number of Goods	1395	1387	1290
Number of Observations	28126	27944	1290
Specification	Year FE	Year × SITC FE	Only 1842

Notes: This table shows the relationship between price dispersion across varieties of a good and if it has a specific tariff. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the good is listed as a commodity in the *The Executive Documents* of the House of Representatives. Panel A additionally controls for the 1842 ad valorem equivalent, for the goods reported in the import statistics. Panel B weights by the inverse of the number of goods within each three-digit SITC classification. All regressions control for year. Column 2 additionally controls for year interacted with two digit SITC classifications. Column 3 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States.*

Table A.6: Singleton Labels Predict Specific Tariffs, Robustness to Sample

Panel A. Goods That Are Never Free

	(1)	(2)	(3)	(4)
Singleton Label	0.048	0.085	0.096	0.16
	(0.012)	(0.012)	(0.013)	(0.033)
Mean Outcome	0.12	0.12	0.12	0.54
Number of Goods	1016	984	1016	1016
Number of Observations	22352	21648	22352	1016
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Panel B. Major Bills Only

	(1)	(2)	(3)	(4)
Singleton Label	0.17	0.22	0.22	0.14
	(0.021)	(0.021)	(0.020)	(0.029)
Mean Outcome	0.22	0.22	0.22	0.50
Number of Goods	1395	1349	1382	1290
Number of Observations	10298	9971	10285	1290
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Notes: This table shows the relationship between the aggregation in the tariff code and if a good has a specific tariff. Panel A drops all goods that are ever free. Panel B only includes the major bills (in which at least half of the goods are covered: 1789, 1790, 1792, 1794, 1816, 1824, 1832, and 1842). Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the label for the good is a singleton (only covers one good). All regressions control for year. Column 2 additionally controls for year interacted with three digit SITC classifications. Column 3 controls for good fixed effects. Column 4 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States.*

Table A.7: Homogeneity Predicts Specific Tariffs, Robustness to Sample

Panel A. Goods That Are Never Free

	(1)	(2)	(3)
Homogeneous	0.17	0.32	0.42
	(0.011)	(0.074)	(0.030)
Mean Outcome	0.12	0.12	0.54
Number of Goods	1016	1006	1016
Number of Observations	22352	22132	1016
Specification	Year FE	Year × SITC FE	Only 1842

Panel B. Major Bills Only

	(1)	(2)	(3)
Homogeneous	0.20	0.22	0.27
	(0.016)	(0.044)	(0.033)
Mean Outcome	0.22	0.22	0.50
Number of Goods	1395	1387	1290
Number of Observations	10298	10231	1290
Specification	Year FE	Year × SITC FE	Only 1842

Notes: This table shows the relationship between price dispersion across varieties of a good and if it has a specific tariff. Panel A drops all goods that are ever free. Panel B only includes the major bills (in which at least half of the goods are covered: 1789, 1790, 1792, 1794, 1816, 1824, 1832, and 1842). Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the good is listed as a commodity in the *The Executive Documents* of the House of Representatives. All regressions control for year. Column 2 additionally controls for year interacted with two digit SITC classifications. Column 3 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States*.

Table A.8: Singleton Labels Predict Specific Tariffs, Robustness to Definition of a Good

Panel A. Strict Deduplication

	(1)	(2)	(3)	(4)
Singleton Label	0.060	0.084	0.096	0.14
	(0.0097)	(0.011)	(0.011)	(0.030)
Mean Outcome	0.11	0.11	0.11	0.50
Number of Goods	1304	1256	1296	1234
Number of Observations	26693	25790	26685	1234
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Panel B. Extremely Strict Deduplication

	(1)	(2)	(3)	(4)
Singleton Label	0.055	0.081	0.097	0.14
	(0.011)	(0.011)	(0.013)	(0.032)
Mean Outcome	0.12	0.12	0.12	0.54
Number of Goods	1106	1084	1099	1065
Number of Observations	22922	22467	22915	1065
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Notes: This table shows the relationship between the aggregation in the tariff code and if a good has a specific tariff. Our definition of a good is imports which are physically distinct than all other imports with the same path of tariffs. This necessitates some judgment calls. In Panel A, we are stricter than in our baseline specification, dropping all plausibly similar objects. In Panel B, we pick one random good from each path of tariffs, dropping all others regardless of physical similarity. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the label for the good is a singleton (only covers one good). All regressions control for year. Column 2 additionally controls for year interacted with three digit SITC classifications. Column 3 controls for good fixed effects. Column 4 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States.*

Table A.9: Homogeneity Predicts Specific Tariffs, Robustness to Definition of a Good

Panel A. Strict Deduplication

	(1)	(2)	(3)
Homogeneous	0.13	0.26	0.30
	(0.0094)	(0.049)	(0.033)
Mean Outcome	0.11	0.11	0.50
Number of Goods	1304	1295	1234
Number of Observations	26693	26500	1234
Specification	Year FE	Year × SITC FE	Only 1842

Panel B. Extremely Strict Deduplication

	(1)	(2)	(3)
Homogeneous	0.14	0.24	0.27
	(0.0100)	(0.058)	(0.035)
Mean Outcome	0.12	0.12	0.54
Number of Goods	1106	1102	1065
Number of Observations	22922	22833	1065
Specification	Year FE	Year × SITC FE	Only 1842

Notes: This table shows the relationship between price dispersion across varieties of a good and if it has a specific tariff. Our definition of a good is imports which are physically distinct than all other imports with the same path of tariffs. This necessitates some judgment calls. In Panel A, we are stricter than in our baseline specification, dropping all plausibly similar objects. In Panel B, we pick one random good from each path of tariffs, dropping all others regardless of physical similarity. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the good is listed as a commodity in the *The Executive Documents* of the House of Representatives. All regressions control for year. Column 2 additionally controls for year interacted with two digit SITC classifications. Column 3 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States.*

Table A.10: Lower Unit Values Predict Higher Ad Valorem Tariffs (Weighted)

	(1)	(2)	(3)
Unit Value (Standardized)	-2.28	-1.11	-1.87
	(0.54)	(0.65)	(0.55)
Mean Outcome	30.074	29.377	29.763
Number of Goods	854	405	1163
Number of Observations	1069	605	1674
Tariff Regime	1842	1846	Both

Notes: This table shows the relationship between unit values and ad valorem duties. The outcome in all regressions is the ad valorem rate for the import after 1846. The sample is the goods with specific tariffs in the 1842 tariff bill. All regressions additionally control as each good's 1842 ad valorem equivalent, and we weight by the good's share of the total value of imports in each year. Column 1 includes only observations from years where the 1842 tariff applied, Column 2 only from the years where the 1846 tariff applied, and Column 3 includes all observations. Results clustered by good. Source: *Commerce and Navigation of the United States* and *Tariff Acts of the United States.*

Table A.11: Modern Customs House Capacity Predicts More Complicated Tariffs and More Specific Tariffs, Robustness

	ln(Number of Distinct Tariff Rates)	Share of HS 6-digit Codes with Variation in Tariffs	Share of Tariff Lines with Specific Tariffs	Average of HS 6-digit Share with Specific Tariffs
	(1)	(2)	(3)	(4)
Bureaucracy Quality	0.53	0.015	0.057	0.054
	(0.15)	(0.0068)	(0.026)	(0.026)
Mean Outcome	3.05	0.078	0.038	0.035
Number of Observations	99	99	99	99

Notes: This table shows the relationship between modern Customs house capacity and the tariff code. Customs house capacity is measured with an (normalized) index of each country's Bureaucracy Quality index from the International Country Risk Guide. Columns 1 and 2 consider measures of the complexity of the tariff code: the (ln) number of distinct tariff rates, and the share of HS 6-digit codes with variation in tariffs. Columns 3 and 4 consider the specificity of the tariff code. The outcome in Column 3 is the share of tariff lines that are specific. Column 4 takes the unweighted average tariff lines within each HS-6 that are specific, and then take the average across all HS-6 codes. Each observation is a country in its most recently available data, and we consider MFN tariff rates. Robust standard errors reported in parenthesis. Source: WTO Integrated Database and International Country Risk Guide.

Table A.12: Modern AVEs Predict Specificity, Robustness

Panel A. Ad Valorem Equivalents Below 2.5%

	Specific Tariff		
	(1)	(2)	(3)
AVE < 2.5	0.085	0.085	0.062
	(0.006)	(0.006)	(0.006)
Homogeneous		0.0068	0.0053
		(0.001)	(0.001)
AVE < 2.5 × Homogeneous			0.042
			(0.009)
Mean Outcome	0.017	0.017	0.017
Number of Observations	801016	801016	801016

Panel B. Ad Valorem Equivalents Below 10%

	Specific Tariff		
	(1)	(2)	(3)
AVE < 10	0.0038	0.0031	0.0050
	(0.001)	(0.001)	(0.001)
Homogeneous		0.0076	0.0096
		(0.001)	(0.001)
AVE < 10 × Homogeneous			-0.0044
			(0.002)
Mean Outcome	0.017	0.017	0.017
Number of Observations	801016	801016	801016

Notes: This table shows the relationship between modern tariff line price variation, ad valorem equivalents, and specific tariffs. Panel A considers the tariff burden calculated as an indictor for the ad valorem equivalent being below 2.5% and Panel B uses an indictor for the ad valorem equivalent being below 10%. Each observation is a tariff line, and the outcome is if the tariff is specific. Homogeneous goods are those that are sold on an organized exchange or have a reference price, following the conservative classification of Rauch (1999). All regressions include importer fixed effects, and standard errors are clustered by HS 6-digit code. We use the most recently available data for each country. Source: WTO Integrated Database and UN Trade Analysis Information System.

Table A.13: Modern Homogeneous Goods Predict Specificity, Robustness

	Specific Tariff				
	(1)	(2)	(3)	(4)	(5)
Homogeneous	0.0073	0.0065	0.0049	0.0077	0.0023
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
AVE < 5		0.044	0.033		
		(0.003)	(0.004)		
AVE < 5 × Homogeneous			0.020		
			(0.005)		
Non-Grouped				0.011	0.0046
				(0.001)	(0.001)
Homogeneous × Non-Grouped					0.015
					(0.003)
Mean Outcome	0.017	0.017	0.017	0.017	0.017
Number of Observations	801016	801016	801016	801016	801016

Notes: This table shows the relationship between modern tariff line price variation and specific tariffs. Each observation is a tariff line, and the outcome is if the tariff is specific. Homogeneous goods are those that are sold on an organized exchange or have a reference price, following the liberal classification of Rauch (1999). Non-grouped goods are those that do not share the same tariff with all of the other tariff lines within the same HS 4-digit code. All regressions include importer fixed effects, and standard errors are clustered by HS 6-digit code. We use the most recently available data for each country. Source: WTO Integrated Database and UN Trade Analysis Information System.

Table A.14: 1980s American Imports: Specificity and Price Dispersion Across Time

	(1)	(2)
Price Dispersion Over Time	-0.032	0.0035
	(0.011)	(0.0099)
Constant	0.21	0.20
	(0.0087)	(0.0061)
Mean Outcome	0.20	0.20
Number of Goods	3908	3194
Number of Observations	3917	3203
4-Digit FEs		✓
Sample	Pooled	Pooled

Notes: This table shows the relationship between price dispersion across time in American imports 1980-1985 and tariff specificity. Each observation is a TSUS 5-digit import, and the outcome is if it has a specific tariff. Price dispersion is calculated as the dispersion of the log (within-year-average) price of the good across time. Columns 2 additionally includes fixed effects for each 4-digit TSUS code. All regressions clustered by 5 digit TSUS code. Source: US Census Annual Import Data Bank (IDB).

Table A.15: Tariff Type, Ad Valorem Equivalents and Reported Unit Values

	(1)	(2)	(3)	(4)
Post ×	-0.48	-0.38	-0.48	-0.38
Specific in 1842	(0.14)	(0.12)	(0.14)	(0.12)
Post × Change	0.48	0.63	0.48	0.63
in AVE	(0.32)	(0.35)	(0.32)	(0.35)
Include Wool		✓		✓
Full Years Only			✓	✓
Number Of Goods	17	18	17	18
Number Of Observations	133	141	133	141

Notes: This table shows the effect of switching from specific to ad valorem tariffs, and on changing the ad valorem equivalent, on reported unit values. The outcome for all regressions is reported unit values. We use the initially-specific goods listed in the 1849 Annual Report of the Secretary of the Treasury for 1843–1849, and compare them to the goods without specific tariffs for which unit values were reported (two types of coffee, two types of tea, and wool). Because pre-1846 wools of different values had different tariffs, the odd columns exclude them from the control group. Columns 3 and 4 show results only for the import statistics with 12 months of reporting (dropping 1843 and two reports for 1847, one for each tariff regime). The change in the ad valorem equivalent for each good-year is calculated as its ad valorem tariff under 1846 regime minus the ad valorem equivalent that the good would have faced under the 1842 tariff bill. All regressions include good and year fixed effects, and standard errors clusted by good. Source: *Commerce and Navigation of the United States* and *Annual Reports of the Secretary of the Treasury on the State of the Finances.*

Table A.16: Singleton Labels Predict Specific Tariffs, Robustness to Potential Industrial Policy

Panel A. Non-Manufactured Goods

	(1)	(2)	(3)	(4)
Singleton Label	0.067	0.080	0.11	0.066
	(0.013)	(0.014)	(0.014)	(0.045)
Mean Outcome	0.12	0.12	0.12	0.49
Number of Goods	584	531	573	491
Number of Observations	10530	9471	10519	491
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Panel B. Goods Without Splits By Price

	(1)	(2)	(3)	(4)
Singleton Label	0.078	0.087	0.11	0.25
	(0.010)	(0.010)	(0.011)	(0.034)
Mean Outcome	0.11	0.11	0.11	0.48
Number of Goods	901	856	890	802
Number of Observations	17346	16413	17335	802
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Panel C. Industries Not Mentioned in Hamilton (1791)

	(1)	(2)	(3)	(4)
Singleton Label	0.033	0.072	0.085	-0.0015
	(0.014)	(0.013)	(0.013)	(0.046)
Mean Outcome	0.11	0.11	0.11	0.42
Number of Goods	543	505	540	456
Number of Observations	10161	9369	10158	456
Specification	Year FE	Year × SITC FE	Year & Good FE	Only 1842

Notes: This table shows the relationship between the aggregation in the tariff code and if a good has a specific tariff. The sample in Panel A is only goods that are not manufactured. Panel B drops all goods that ever have a different tariff as a function of their price (such as unmanufactured wool in 1842, which has a different tariff depending on if it is valued at above or below seven cents a pound). Panel C drops all goods whose industry was mentioned in Hamilton (1791) *Report on Manufactures*. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the label for the good is a singleton (only covers one good). All regressions control for year. Column 2 additionally controls for year interacted with three digit SITC classifications. Column 3 controls for good fixed effects. Column 4 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States* and *Commerce and Navigation of the United States*.

Table A.17: Homogeneity Predicts Specific Tariffs, Robustness to Potential Industrial Policy

Panel A. Non-Manufactured Goods

	(1)	(2)	(3)
Homogeneous	0.17	0.14	0.44
	(0.010)	(0.049)	(0.041)
Mean Outcome	0.12	0.12	0.49
Number of Goods	584	575	491
Number of Observations	10530	10317	491
Specification	Year FE	Year × SITC FE	Only 1842

Panel B. Goods Without Splits By Price

	(1)	(2)	(3)
Homogeneous	0.15	0.22	0.34
	(0.0095)	(0.046)	(0.036)
Mean Outcome	0.11	0.11	0.48
Number of Goods	901	893	802
Number of Observations	17346	17153	802
Specification	Year FE	Year × SITC FE	Only 1842

Panel C. Industries Not Mentioned in Hamilton (1791)

	(1)	(2)	(3)
Homogeneous	0.18	0.15	0.52
	(0.011)	(0.060)	(0.041)
Mean Outcome	0.11	0.11	0.42
Number of Goods	543	528	456
Number of Observations	10161	9862	456
Specification	Year FE	Year × SITC FE	Only 1842

Notes: This table shows the relationship between price dispersion across varieties of a good and if it has a specific tariff. The sample in Panel A is only goods that are not manufactured. Panel B drops all goods that ever have a different tariff as a function of their price (such as unmanufactured wool in 1842, which has a different tariff depending on if it is valued at above or below seven cents a pound). Panel C drops all goods whose industry was mentioned in Hamilton (1791) *Report on Manufactures*. Each good is included only in the years in which it is covered by a tariff and it has either a specific or ad valorem tariff. Each observation is a good-by-year. The outcome for all regressions is if the good has a specific tariff, and the independent variable is if the good (in the modern era) is sold on an organized exchange or has a reference price, following the conservative classification of Rauch (1999). All regressions control for year. Column 2 additionally controls for year interacted with two digit SITC classifications. Column 3 only includes 1842. All regressions cluster by good. Source: *Tariff Acts of the United States*.