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TRADE AND STRUCTURAL CHANGE: FOCUSING ON THE SPECIFICS

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ABSTRACT

Using a newly digitized database encompassing the universe of tariff lines across five US trade policy regimes between 1900 and 1940, we show that price dynamics combine with industry reliance on specific tariffs to generate large swings in average tariff levels. Intra-policy variation in tariffs is strongly predictive of import growth throughout our sample. Using linked Census data, we quantify the effects of imports on structural change in this era. We find that import growth decreases labor force participation and inhibits the transition into the expanding manufacturing and service sectors, especially among the young.

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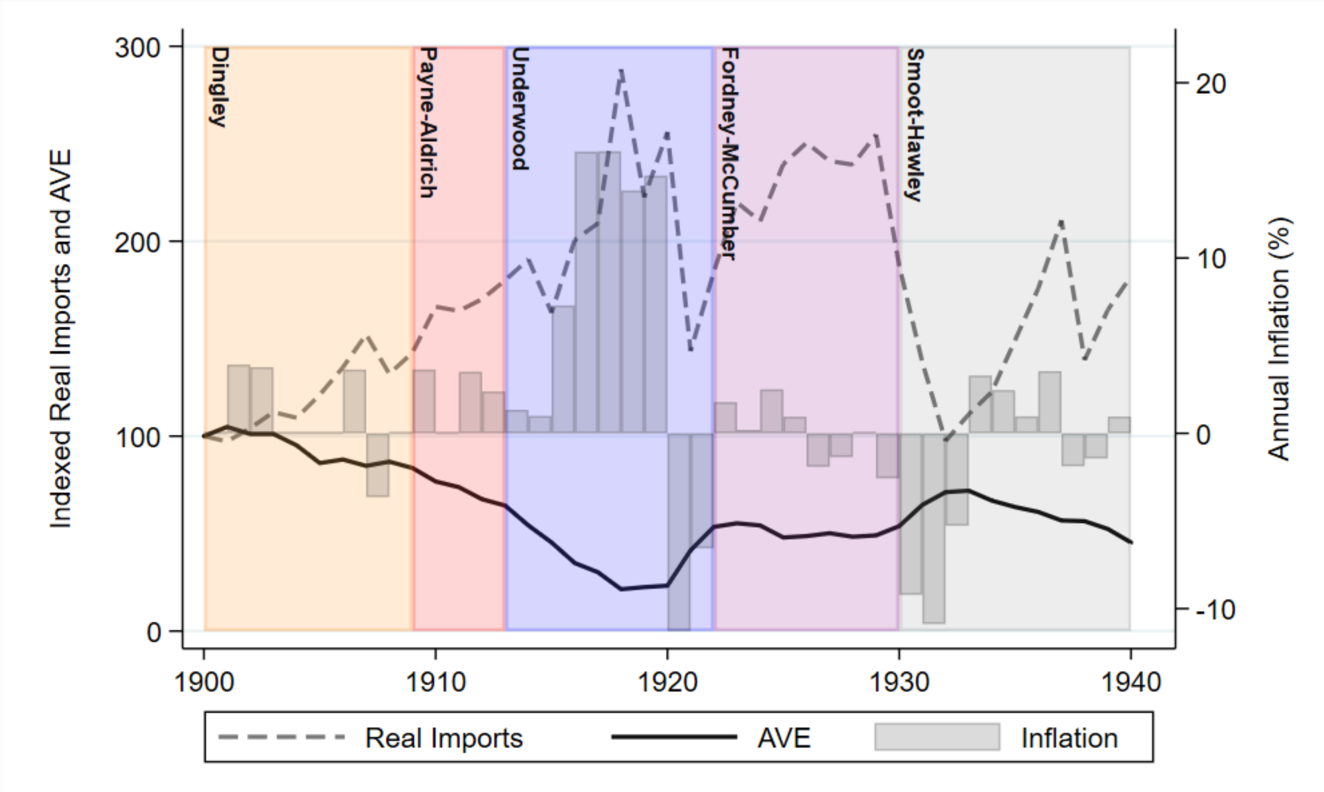
1 Introduction

The explosion of work in recent years on the distributional effects of trade has dramatically improved our understanding of the ways in which individuals and labor markets are affected by trade shocks. However, the near-total focus of this research on the past 50 years can give the impression that trade has only recently emerged as a force shaping the distribution of economic activity – particularly in the US. This is not the case. In this paper we show that trade played an important role in governing the structural change of the United States in the early twentieth century, decades prior to the years emphasized by most recent work.

In particular, we focus on the years between 1900 and 1940, a period of rapid manufacturing expansion in the United States (Irwin, 2003). This era offers several advantages to researchers, including the availability of linked individual-level full count Census data and large swings in tariff protection. However, work on this period has been limited by both a paucity of historical trade data and the inherent difficulty in establishing causality in the face of endogenous tariff setting. We address both of these limitations. After constructing a novel data set of import tariffs, we propose a new instrument for changes in tariff protection that does not rely on endogenous changes to legislated tariff rates. We use these data and identification strategy to shed new light on the role of trade in labor market transitions throughout this important period in US economic history. Most notably, we show that import competition inhibited the transition out of the agricultural sector into the expanding manufacturing sector.

As is generally the case, ours is a setting in which tariff levels are endogenously linked to trade flows via their expected effects on domestic outcomes. Leveraging insights from the work of Crucini (1994) and Irwin (1998a,b), we propose an identification strategy for such settings that exploits unexpected changes in protection that occur conditional on a specified trade policy regime. When a new tariff regime is instituted, identical levels of protection can be achieved with either specific – that is, nominal per-unit – tariffs or ad valorem – percent – tariffs. However, the restrictiveness of specific tariffs varies inversely with the price level; inflation erodes protection while deflation enhances it. By contrast, the protection afforded by ad valorem tariffs is unaffected by price variation. Thus, pre-existing differences in the prevalence of specific tariffs across industries in conjunction with subsequent price movements generate variation in realized protection over time *within* a trade policy regime. Due to the unpredictability of price movements, such changes are plausibly independent of the demand for protection.

Figure 1: Real Imports, AVE, and Inflation: 1900-1940



Notes: AVE and import values from the USITC. Annual inflation reported in percent and calculated from the Jordà et al. (2017) Macrohistory Database. Real imports and AVE have been indexed to 100 in 1900. Vertical bands indicate the years encompassed by Dingley Tariff of 1897, the Payne-Aldrich Tariff of 1909, the Underwood-Simmons Tariff of 1913, the Fordney-McCumber Tariff of 1922, and the Smoot-Hawley Tariff of 1930, respectively.

We present visual evidence of the mechanism employed in the paper in Figure 1. Here, each of the five U.S. trade policy regimes of the early 20^{th} century is represented by a distinct colored vertical band.[1] The dashed line represents annual real imports indexed to the year 1900, while the solid black line depicts the ad valorem equivalent (AVE) tariff rate, defined as the ratio of total duties to total import values. Naturally, across policy regimes we observe considerable changes in both average tariff levels and trade flows. This type of cross-regime variation is the source of identification exploited in the vast majority of the literature on trade policy and economic outcomes. However, if trade barriers reflect the demand for protection, such variation is not suitable for identifying the effects of tariffs on trade or of trade on economic outcomes.[2] Instead, our identification

[1]These regimes correspond to the Dingley Tariff of 1897, the Payne-Aldrich Tariff of 1909, the Underwood-Simmons Tariff of 1913, the Fordney-McCumber Tariff of 1922, and the Smoot-Hawley Tariff of 1930.

[2]For an alternative approach, see Trefler (1993), who deals with endogenous trade policy directly by simultaneously estimating the demand for protection in conjunction with the effects of protection on imports.

relies on non-policy variation in the *AVE* tariff rate across years conditional on the pre-existing policy regime. This variation is strongly and negatively correlated with inflation, depicted by gray bars. Periods with high inflation tend to be periods with low average tariff rates and high import growth even within a given tariff regime. We argue that the relationship is causal: in the presence of specific tariffs, inflation erodes the protective capacity of the existing tariff schedule, resulting in increased imports and attendant effects on other economic outcomes.

We rigorously explore this relationship in this era with the aid of a novel database derived from annual editions of *Foreign Commerce and Navigation of the United States*, which we digitize every five years between 1900 and 1930. In order to facilitate a mapping to labor market outcomes, we manually concord tariff lines – approximately 3300 annually – to their two-digit Standard International Trade Classification (SITC) Revision 2 counterpart. This yields an industry-level data set of tariffs covering the universe of US imports in our sample, spanning each of the distinct tariff regimes. We then derive an industry-level measure of intra-policy changes in "realized protection" that depends both on cross-industry differences in the reliance on specific tariffs and time-series variation in aggregate prices. Though they are used most frequently in the agricultural sector, specific tariffs are ubiquitous in our sample.[3] They account for nearly 70% of all duties collected in the first year of the data, dropping to 38% in the 1910s and returning to nearly 60% with the Smoot-Hawley tariff in 1930.

When combined with price movements, specific tariffs generate substantial variation in *AVE* tariff levels over time. For example, between 1915 and 1920, when inflation reaches its in-sample peak, the erosion of protection afforded by specific tariffs leads to a 5.3 percentage point reduction in the *AVE* level – approximately 40% of the initial *AVE* value. While not all periods in our sample are characterized by such large changes, the overall variation we document is large: across our 40-year sample, the standard deviation of annualized five-year changes in realized protection is equal to approximately a one percentage point change in *AVE* levels. We estimate the effect of price-driven changes in realized protection on US industry import growth in our sample over five- and 10-year intervals. We find that a one standard deviation increase in protection decreases relative industry import growth by approximately one-third of a standard deviation. These effects are roughly 20% smaller over five-year windows than over 10 years, though they are

[3]See Harrison (2018) for a detailed discussion of the differential use of specific tariffs across industries in the Smoot-Hawley era in particular.

always statistically significant and economically meaningful.[4] These results obtain even after accounting for initial levels of protection and the initial industry reliance on specific tariffs.

We then turn to the effects of import growth on US labor markets from 1900 to 1940 using linked individual-level data from the full count US Census. We construct county-level measures of changes in realized protection and import growth using an employment-weighted average of industry-level changes and estimate the effects of import growth on labor market outcomes for nearly 30 million individual-by-decade observations. The nature of the Census data – both its broad coverage and the ability to follow individuals over time – allows us to explore the transition of the US economy along multiple novel dimensions. First, we explore heterogeneity in the response to trade shocks throughout the age distribution. We find that import growth reduces labor force attachment among the youngest and oldest groups in our sample and reduce incomes especially among those under 30. Second, we exploit the linked nature of the data to estimate the effect of local import growth on the probability of individuals transitioning between sectors. This allows us to identify, for instance, whether reductions in industry employment growth are driven by job displacement or reduced entry. While we find a role for both mechanisms, the latter effect is dominant: import growth reduces incomes in large part by impeding the mobility of workers out of agricultural and into the expanding manufacturing and service sectors. To the best of our knowledge this is the first analysis linking trade and economy wide structural change in the US during this era.

Our empirical strategy relies on a combination of random price shocks and potentially non-random exposure to these shocks as a function of pre-existing tariff policy. This strategy faces three primary identification concerns. The first is that industries and labor markets with greater reliance on specific tariffs might differ systematically from other industries and labor markets. To partially address this concern, we control directly for the initial level of specific tariffs and ad valorem equivalent in our baseline specifications. Thus, our analysis identifies the differential changes among industries and locations with greater exposure to price movements – that is, those with higher specific tariff reliance – relative to less-exposed industries and regions, in periods of larger price changes relative to periods with stable prices.[5]

[4]Such differences in the responsiveness of trade flows to trade costs over time have been noted previously. See, for example, Ruhl (2008) and Boehm et al. (2023).

[5]This is similar in spirit to the approach of Borusyak and Hull (2022), who recommend controlling for the mean of a counterfactual distribution of potential shocks, such that identification comes from deviations from that average.

A second, related concern is that our results may reflect other channels through which changing price levels differentially affect economic outcomes. If demand increases disproportionately during expansionary periods for goods relying on specific tariffs, for instance, this would mimic the mechanism we have in mind but would not be causally linked to changing tariff protection. To evaluate this concern, we conduct two placebo exercises. First, we construct an analogous data set for UK industry trade flows to examine the relationship between changes in US tariff protection and UK imports. If changes in price levels disproportionately affect goods that tend to rely on specific tariffs independent of their effect on realized protection, we would expect to see a similar relationship between price changes and imports in the UK to those that we document in the US. We find no such relationship: US specific tariffs predict the response of US imports to changing prices, but not UK imports. Second, we collect additional import and tariff data to examine trade dynamics in the US from 1848 to 1860, a period in which US trade policy featured no specific tariffs. We find that specific tariffs introduced in 1861 are predictive of the industry import response to price changes *after*, but not *before* their implementation. This, again, suggests that it is specific tariffs themselves, rather than underlying industry characteristics, that govern the differential response we observe.

The final identification concern is that the changes in realized protection are themselves a reflection of the demand for protection (Trefler, 1993; Grossman and Helpman, 1994; Hiscox, 2002; McLaren, 2016). That is, politicians may choose a particular combination of ad valorem and specific duties in anticipation of their subsequent effects on realized protection.[6] To explore this possibility, we examine changes in specific tariffs over time and find an extreme level of persistence in industry reliance on specific tariffs. As late as the Smoot-Hawley tariff in 1930, the structure of tariffs is strongly predicted by the tariff schedule under the Morrill Tariff of 1861. This suggests that reliance on specific tariffs in our sample largely reflects legislative inertia, rather than time-varying political economy concerns. As a final robustness exercise, we use this pre-Civil War reliance on specific tariffs to construct an IV to estimate the effects of changes in realized protection on US imports – it, too, predicts US import growth from 1900 to 1940.

Our approach draws heavily on the insights of Crucini (1994) and Irwin (1998a,b), who argue that intra-policy variation in the ad valorem equivalent tariff rate is considerable, and is related to both specific tariffs and inflation. These findings motivate the higher

[6] Relatedly, Irwin (1998a) notes a strong party preference for duty type. Republicans were concerned with importers intentionally undervaluing their shipments to avoid duties. Such behavior was thought to put national budget balances at risk and consequently motivated Republicans to prefer specific tariffs.

frequency analysis of the effects of specific tariffs on aggregate output and investment (Crucini and Kahn, 1996), industry-level tariff wedges and imports (Bond et al., 2013), and prices (Harrison, 2018) for a subset of products surrounding the Smoot-Hawley tariff. This paper complements and extends existing work along several important margins. First, rather than focusing on a single trade policy event or a balanced panel of a subset of goods, we evaluate the importance of specific tariffs with data that covers the universe of duties, imports, and trade policy regimes for a 40-year period.[7] By performing our analysis at higher level of aggregation, we are able to explore the effects of evolving protection among all industries during a sample spanning the first wave of globalization as well as the subsequent interwar trade collapse and rise in protectionism. Second, we provide direct evidence of the relationship between price movements and trade in the presence of specific tariffs and rule out alternative explanations via placebo analysis. Third, we trace industrial reliance on specific tariffs back to pre-Civil War trade policy. Finally, we provide evidence of the spatial effects of import competition on labor market outcomes over a 40-year period and evaluate its role in shaping the industrial composition of the early 20^{th} century American economy. Our paper contributes to this literature by providing support for the idea that trade played a role in governing the transition from agriculture to manufacturing and services (McMillan and Rodrik, 2011; Erten and Leight, 2021) during a key period of growth in US manufacturing (Irwin, 2003).

This era is attractive from an empirical standpoint due to both the prevalence of specific tariffs and the availability of linked full-count Census data, allowing us to follow millions of individuals over time. Further, as noted above, the majority of trade and labor market studies in the US focus on an era in which the manufacturing sector was already in decline. Our paper complements this work by examining structural change in a period of manufacturing expansion. We emphasize, however, that the approach we develop here is viable in a plethora of settings. In the United States, specific tariffs accounted for more than a quarter of all tariff lines in the late 1980s, at the conclusion of the phase-in of tariffs negotiated under the Tokyo Round of the GATT. Indeed, in separate work Greenland et al. (2023) we show that the combination of specific tariffs and rapid inflation in the 1970s reduced the US AVE tariff by approximately four percentage points, despite the absence of any changes in tariff policy. This erosion of protection reduced average tariff levels by more than the legislated tariff cuts negotiated under the Tokyo Round. To this

[7] Acosta and Cox (2022) highlight the regressivity of the US tariff code in the years following Smoot-Hawley. The prevalence of specific tariffs in our data is consistent with this finding and suggests that the regressive nature of the tariff code exists in the decades prior to their sample as well.

day, agricultural goods are disproportionately reliant on specific tariffs, with especially important implications for developing economies (Chowdhury, 2012).

This paper contributes to a large literature exploring the distributional consequences of trade, which has, as noted above, overwhelmingly focused on recent trade events. Trade as a source of identification is limited by both the endogenous nature of trade policy and the relative infrequency of large trade agreements. As such, the vast majority of work has focused on the era beginning in the late 20^{th} century in order to leverage once-in-a-generation supply shocks and a handful of abrupt changes to trade policy as sources of exogenous variation. For example, Autor et al. (2013) and Batistich and Bond (2023) link supply-driven variation in US import growth to US labor market outcomes. Similarly, a large number of papers (Pavcnik, 2002; Trefler, 2004; Topalova, 2007; Kovak, 2013; Hakobyan and McLaren, 2016; Pierce and Schott, 2016; Handley and Limão, 2017; McCaig and Pavcnik, 2018; Kovak and Morrow, 2022) study sweeping liberalizations in which the magnitude of the industry-level tariff change is plausibly unaffected by political lobbying.[8] We contribute to this literature by proposing a method to identify the causal effect of trade on economic outcomes in the absence of such relatively infrequent events.

The paper proceeds as follows. In section 2 we derive a simple measure of specific-tariff-induced variation in protection. In section 3 we describe the trade policy environment and present stylized facts about trade and duties from 1900 to 1940. We also construct and describe our primary measure of changes in realized tariff protection. In Section 4 we estimate the effect of changes in realized protection on industry import growth. We also conduct placebo exercises based on contemporaneous UK imports and on US imports surrounding the 1861 Morrill tariff. Section 5 details the effects of inflation-driven changes in average tariffs on local labor markets using linked Census data. Section 6 outlines additional applications and concludes.

2 Empirical Approach: Tariffs, Inflation, and Changes in Realized Protection

Trade barriers generally reflect both economic conditions and the demand for protection (Grossman and Helpman, 1994; Goldberg and Maggi, 1999), and the early 20th century US is no exception (Irwin and Kroszner, 1996; Irwin, 2017; Irwin and Soderbery, 2021).

[8]For papers outside of the last 30 years, see de Bromhead et al. (2019), Alessandria et al. (2021), Eriksson et al. (2021), and Heblich et al. (2022).

As a consequence, tariff changes, imports, and domestic outcomes are endogenously linked in a way that limits the usefulness of tariff averages as a source of identifying variation. In this section, we describe an approach that identifies plausibly exogenous variation in the protection afforded by a given tariff schedule by exploiting the structure of tariffs, rather than merely the level. To fix ideas, suppose at time t_0 policymakers select a combination of ad valorem tariffs, τ_v, and specific tariffs, f_v, for each good v. The ad valorem equivalent level of protection at time t_0 is thus

$$AVE_{vt_0} \equiv \tau_v + \frac{f_v}{p_{vt_0}} \tag{1}$$

Clearly, given knowledge of contemporaneous price levels p_{vt_0}, policymakers can achieve identical levels of protection with various combinations of τ_v and f_v. The particular combination chosen for good v generates what we refer to as its "specific tariff share":

$$STS_{vt_0} \equiv \frac{f_v}{p_{vt_0}\tau_v + f_v} \tag{2}$$

STS_{vt_0} represents the proportion of duties on good v generated by specific tariffs. Within a policy regime, this will change as a function of price levels. To see the importance of the specific tariff share, consider the price of an imported foreign variety of good v relative to a domestic variety, equal to one plus the ad valorem equivalent: $1+\tau_v+\frac{f_v}{p_{vt_0}}$. Differencing the natural logarithm of this measure and noting that within a policy regime τ_v and f_v are fixed, the change in the relative price of a foreign variety between periods can be written:

$$\begin{aligned}\Delta \ln(1+\tau_v+\frac{f_v}{p_{vt}}) &= \ln\left(1-\frac{\Delta p_{vt}}{p_{vt_1}}\frac{f_{vt_0}}{p_{vt_0}\tau_{vt_0}+f_{vt_0}}\frac{\tau_v+\frac{f_v}{p_{vt_0}}}{1+\tau_v+\frac{f_v}{p_{vt_0}}}\right) \\ &= \ln\left(1-\frac{\Delta p_{vt}}{p_{vt_1}}STS_{vt_0}\frac{AVE_{vt_0}}{1+AVE_{vt_0}}\right)\end{aligned} \tag{3}$$

In words, the log change in the relative price of a foreign variety is a function of the percent change in the price exclusive of tariffs, the good's specific tariff share, and its initial level of protection. Intuitively, for a given initial AVE level, price reductions will increase the ad valorem equivalent more when a larger share of the tariffs are nominally defined. This implies that once policymakers have chosen AVE_{vt_0} and STS_{vt_0}, the protection afforded good v in subsequent periods will depend on future price levels. More specifically, as price levels rise, the relative foreign price falls. We would thus expect to observe greater relative import growth among goods more reliant on specific tariffs in the presence of inflation, and lower growth in the presence of deflation.

Of course, if policymakers choose initial tariff levels as a function of expected future outcomes, the measure defined in equation 3 will still be endogenous. As a first step towards addressing this issue, we omit the final term from the measure in our baseline specifications and exploit only the quasi-random variation driven by specific tariff shares and price changes. Thus, it is only the initial structure of tariffs, rather than the level, that drives cross-sectional variation in our approach. We define our primary covariate of interest, which we refer to as capturing changes in "realized protection", as

$$\Delta RP_{vt} = \ln\left(1 - \frac{\Delta p_t}{p_{t_1}} STS_{vt_0}\right) \tag{4}$$

Where STS_{vt_0} represents the start of period specific tariff share and $\frac{\Delta p_t}{p_{t_1}}$ is the percentage change in the aggregate price level between t and $t+1$, relative to $t+1$.[9]

Note that our measure still potentially includes both random and non-random sources of variation – price changes and pre-existing specific tariff shares, respectively. To the extent that industries with higher values of STS_{vt_0} experience differential import growth for reasons other than changes in realized protection, estimates of the effect of that protection on trade will still be biased. We take a number of steps to mitigate this concern. First, in all specifications we control separately for STS_{vt_0}. This implies that estimates of the effect ΔRP_{vt} will capture the differential response of high STS_{vt_0} industries relative to low STS_{vt_0} industries, in periods with price movements relative to periods of price stability. Second, we conduct two placebo analyses to demonstrate that high STS_{vt_0} industries do not systematically respond differently to price movements for reasons other than changes in realized protection. Finally, we show that our results hold when exploiting variation in specific tariff shares determined decades prior to the start of our primary sample. We return to each of these points in section 4 below. First, however, we detail the policy environment and the data sources used in constructing our measure of exposure.

[9] Crucini (1994) explores variation in product-level tariff rates driven by three channels: legislative changes, changes in import prices in the presence of specific tariffs, and changes in product-level prices relative to the aggregate level. As our focus is on identifying the exogenous component of tariff changes, we focus on the second of these three channels.

3 Imports, Tariffs, and Prices in the U.S. from 1900-1940

From 1900 to 1940, US trade policy was characterized by five distinct regimes. The Dingley Tariff of 1897 was replaced by the Payne-Aldrich Tariff of 1909, followed by the Underwood-Simmons Tariff of 1913, the Fordney-McCumber Tariff of 1922, and ultimately the Smoot-Hawley Tariff of 1930.[10] We are, of course, not the first to study disaggregate measures of specific tariffs in these settings (Crucini, 1994; Bond et al., 2013; Harrison, 2018; Crucini and Ziebarth, 2022), but in what follows we describe the most comprehensive database of tariff rates over this period.[11]

Our identification comes from changes in realized tariff protection driven by cross-industry variation in the prevalence of specific tariffs, as well as time series variation in price levels. To operationalize this idea, we construct a novel database of tariffs and trade flows in the US by digitizing annual editions of *Foreign Commerce and Navigation of the United States* (FCNUS) every five years between 1900 and 1930 and the *Statistical Abstract of the United States* (SAUS) every year between 1900 and 1940. From these we obtain information on the value of imports, duties collected, and the type of duty at the tariff-line level.[12] To allow for mapping to more aggregate employment data, we manually concord each product to its two-digit Standard International Trade Classification (SITC) Revision 2 counterpart.[13]

In the interest of space, we relegate a detailed discussion of industry-level imports in this era to Appendix C, and briefly outline the nature of import growth here. Especially

[10] Due to its short duration, we omit the Emergency Tariff Act of 1921, which was replaced by September of the following year.

[11] Both Crucini (1994) and Bond et al. (2013) construct tariff line-level databases which for a subset of items that can be linked over time. Bond et al. (2013) construct such data from 1926-1934 to evaluate the role of Smoot-Hawley in propagating the Great Depression. Both Harrison (2018) and Crucini and Ziebarth (2022) rely on these data. Crucini (1994) studies the 1900-1940 period but restricts his analysis to 29 commodities for which he is able to construct a balanced panel. Because we are focused on an industry-level measure of exposure, we need not restrict our attention to a balanced panel of goods. As a result, we are able to focus on the entire set of imported goods and duties in each of these policy regimes.

[12] Products with compound duties – that is, featuring both ad valorem and specific duties – are classified as having specific duties when constructing STS_{vt}. An example of the pre-digitized *Foreign Commerce and Navigation of the US* data used to construct our primary measure can be found in Appendix B.1.

[13] Due to the absence of an official trade classification system until our 1925 sample, data can only be linked over time via product name. This is a time-intensive process that requires a consistent mapping for nearly 25,000 tariff line observations. Given our need to match tariffs and imports from the FCNUS to imports in the SAUS as well as UK import unit values in the Statistical Abstract for the United Kingdom, we aggregate the data to a consistent set of industries. These industry groups are slightly more aggregate than the two-digit SITC Revision 2 classification and are detailed in full in Appendix A.

early in this era, the US exhibited a comparative advantage in agricultural production, with high employment in domestic crops such as corn, cotton, oats, and wheat, and generally low imports in these goods. On the whole, imports were relatively diverse, with the most important industries including sugar-based products, intermediate materials such as textile fibers, rubber, and metal ores, as well as advanced manufactures of these products. As we will see, both overall tariff protection and reliance on specific tariffs in particular differed across all of these industries.

To provide a sense of the cross-policy variation present in our sample, we present aggregate policy-level AVE tariff rates and specific tariff shares in Table 1. The table also includes the number of unique tariff lines used to construct these measures, as well as the number of SITC industries to which they are concorded.

Table 1: Reliance on Specific Tariffs by Policy Regime

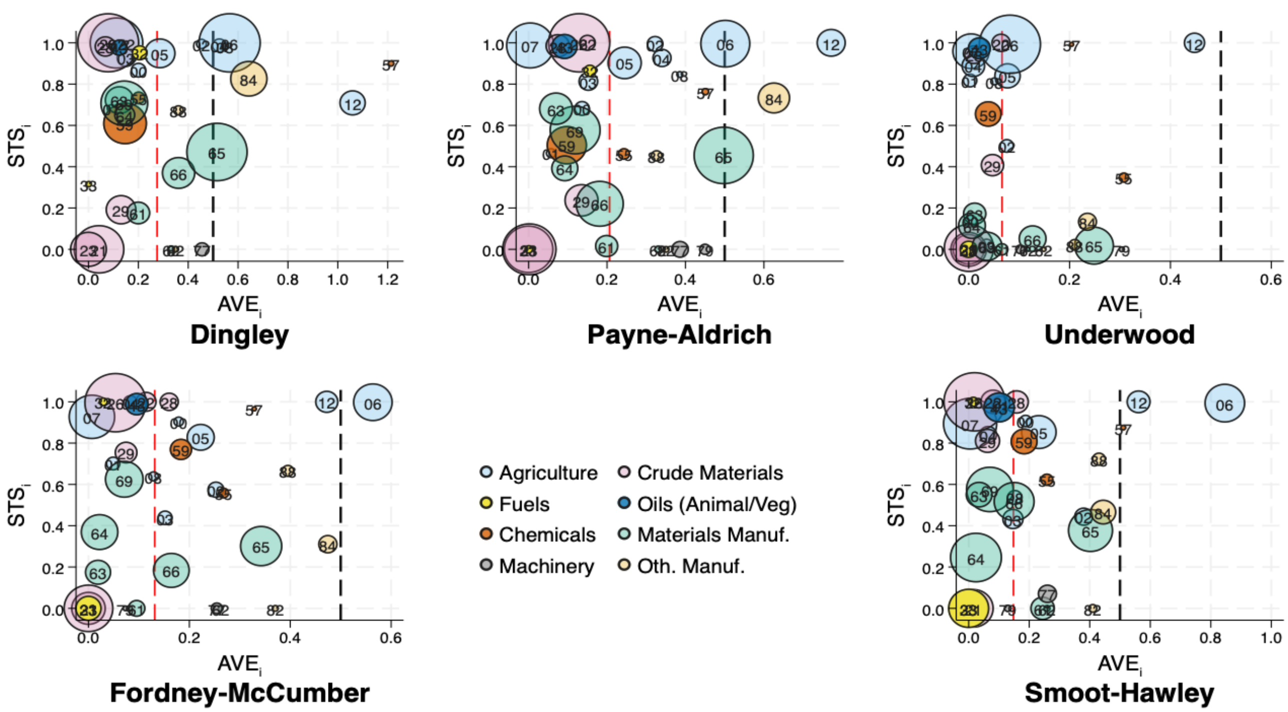
Year	Policy	AVE_t	STS_t	Industries	Products
		Panel A: 1900-1930			
1900	Dingley	0.27	0.67	33	2113
1905	Dingley	0.23	0.64	33	2352
1910	Payne-Aldrich	0.21	0.57	34	3780
1915	Underwood	0.12	0.38	34	2403
1920	Underwood	0.07	0.45	34	2584
1925	Fordney-McCumber	0.13	0.58	34	5071
1930	Smoot-Hawley	0.15	0.59	34	4601
		Panel B: 1848-1861			
1848	Walker	0.21	0.00	29	302
1861	Morrill	0.16	0.76	29	407

Notes: AVE_t and STS_t are value-weighted policy aggregates of equations 1 and 2. Industries are aggregations of two-digit Rev. 2 SITC industries, as detailed in Appendix A. Data digitized from the Foreign Commerce and Navigation of the United States – detailed sources can be found in Appendix tables B.1 for 1900-1940 and in table B.3 for 1848-1861.

Focusing on Panel A, we see that the aggregate AVE tariff varies considerably during our sample. Beginning with the Dingley Tariff of 1897, the overall AVE rate sits at 27%, then declines somewhat to 21% with the implementation of the Payne-Aldrich Tariff of 1909 before plummeting to 7% by 1920 under the Underwood-Simmons Tariff. The Fordney-McCumber Tariff of 1922, followed by the Smoot-Hawley Tariff of 1930, increase the level back to 15%. Crucially for our identification strategy, specific tariffs feature prominently across all policy regimes. Save for the Underwood-Simmons Tariff era in 1915 and 1920, the share of tariff revenue generated by specific tariffs never falls below 50%. At their minimum in 1915, specific tariffs still generate 38% of all tariff revenue.

Specific tariffs were not always so widely used as a trade policy tool. For a 15-year period following the Walker Tariff of 1846, specific tariffs were wholly absent from the tariff code. They were re-introduced with the Morrill Tariff of 1861 and have been used in some capacity ever since. While we defer the details of this discussion until later, we use data from this era in placebo and robustness exercises.[14] As such, we also digitize tariff-line data on trade flows, tariffs, and tariff type from 1848 to 1861.[15] In Panel B of the table we report *AVE* tariffs and specific tariff shares for both policies. In addition to re-introducing specific tariffs, the Morrill Tariff reduced the *AVE* tariff considerably.[16]

Figure 2: Industry level STS_i versus AVE_i by Policy Regime



Notes: Figure displays specific tariff share (STS_i) versus the ad valorem equivalent (AVE_i) for each trade policy regime. Industries are two-digit Rev. 2 SITC industries. Marker size is proportional to share of start of period imports. Black dashed vertical lines indicate a 50% ad valorem equivalent tariff while dashed red vertical lines indicate policy-level ad valorem equivalent tariff.

Identifying variation under our approach comes from both the cross-policy variation highlighted above and cross-industry differences in the prevalence of specific tariffs. To

[14] The Tariff of 1857 was enacted during this period as well, but it, too, featured no specific duties.

[15] These data are detailed in Appendix B.2.

[16] As noted by Flaherty (2001), the Morrill Tariff is often portrayed as representing a considerable increase in protection. Flaherty argues that this is in large part due to subsequent increases in tariffs used to raise revenue during the Civil War. Additionally, note that our calculation of the *AVE* tariff rate reflects the tariffs only on products with non-zero trade flows.

summarize both sources of variation more completely, in Figure 2 we display the relationship between the AVE, STS, and import share of each industry i for each policy regime between 1900 and 1930.[17] Each circle represents an SITC industry, with a size proportional to its share of imports. On the horizontal axis we plot AVE, while the vertical axis depicts the industry specific tariff share. We plot the overall level of tariff protection as a vertical red dashed line. The vertical black line indicates a 50% AVE to emphasize differences in the level of tariff protection across years.

Though it needn't be the case, industry AVE and STS are weakly positively correlated under each policy regime.[18] However, for any given level of protection there is substantial variation in the extent to which it is provided by specific tariffs. For instance, consider "Sugar, sugar preparations and honey" (SITC 06) relative to "Textile yarn, fabrics and made-up articles" (SITC 65) under the Payne-Aldrich Tariff. Both industries face an AVE rate of approximately 50%. However, the share of specific tariffs in sugar is twice that of textile products. In the face of rising prices during the subsequent decade, realized protection for sugar falls by more than that of textiles, despite the fact that they share the same initial average tariff level. This variation allows us to exploit changes in realized protection while controlling for initial tariffs.

Finally, we note that even as AVE tariff levels change across policies, industry specific tariff shares are highly persistent. One can see, for example, that products for human consumption (agricultural, food, and tobacco products, SITCs 00-12) tend to rely heavily on specific tariffs, while material manufactures tend to hover in the middle of the STS range.[19] Indeed, cross-policy correlation in industry specific tariff shares never falls below 0.5. This persistence extends beyond our primary sample – the industry specific tariff shares for the five regimes between 1900 and 1940 are highly correlated with those specified by the Morrill Tariff of 1861. This persistence suggests limited use of changes in tariff type as a means of addressing time-varying political economy concerns. We return to this persistence in section 4.1 below.

[17]In regimes during which we observe multiple years, our figures display the first year available. For example, 1900 and 1905 both fall under the Dingley Tariff, so we construct the figure based on the 1900 observations.

[18]The correlation ranges from 0.15 under the Underwood-Simmons Tariff to 0.24 under Payne-Aldrich.

[19]Because our sample spans the Prohibition era, we omit SITC 11, which is comprised primarily of alcohol.

3.1 Prices, 1900-1940

Temporal variation in our measure of realized protection is driven by changes in the dollar price of US imports over time. Our identification strategy requires that the relationship between prices and imports operates through the effect on realized protection, and not, for example, through unobserved domestic demand shocks. Because US prices are more likely to reflect such shocks, we emphasize variation in foreign price levels. Similarly, as product-level prices are jointly determined by product-level demand and supply shocks, as a baseline we exploit more aggregate price variation that is plausibly exogenous to product-level import values. As a proxy for aggregate foreign price levels, we use the United Kingdom aggregate consumer price index, which we obtain from the Jordà-Schularick-Taylor Macrohistory Database (Jordà et al., 2017).[20]

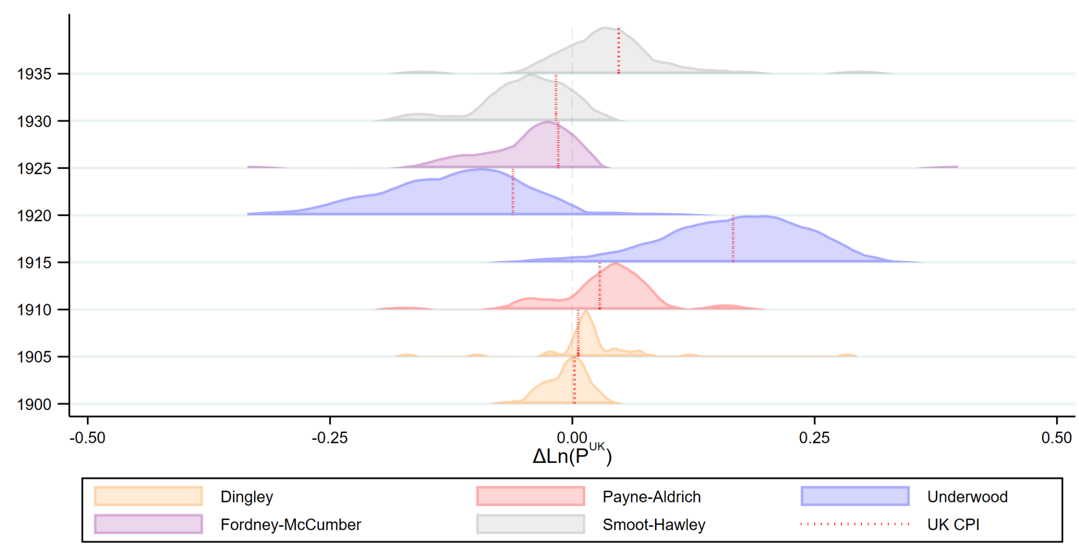
The drawback of aggregate price indices is of course that they do not allow us to explore differential industry-level price movements. Within-period variation in our measure of realized protection is thus solely driven by cross industry-differences in specific tariff shares. If industry price growth is non-uniform, our industry-level measure of realized protection will be measured with error. To address this shortcoming, as a robustness check we construct industry measures of price growth by digitizing annual UK product-level import values and quantities from 1900 to 1938.[21] As with our US sample, we manually concord these data to the two-digit SITC revision 2 classification, and construct industry log price growth from import unit values. The industries for which we are able to construct prices cover 98.5% of the value of US imports in our sample.[22] For industries in which we are unable to construct a price measure due to inadequate data, we utilize the aggregate UK CPI as our measure of industry price growth.

[20] http://www.macrohistory.net/data/. As a further robustness exercise, in unreported results we also construct prices for a "rest of world" index based on prices in Australia, Canada, Denmark, France, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom, also from Jordà et al. (2017). We also conduct additional robustness exercises using the US CPI from the same database and import unit values from the Census volume *Historical Statistics of the United States*. Specifically, the data come from Series 225-258 in Chapter U at https://www.census.gov/library/publications/1975/compendia/hist_stats_colonial-1970.html. Our results are qualitatively unchanged by these measures.

[21] Data are taken from annual editions of the "Statistical Abstract for the United Kingdom", which is not available for 1940.

[22] As detailed in appendix section B.3, we construct these as import-weighted averages of product-level log price growth. As such, we must address changes in the set of products and units of reporting across years. This prevents us from constructing measures for SITC 57 and 82 for our entire sample, for SITCs 00, 32, 55, 77, and 88 for two cross sections, and for SITC 62 for three cross sections. These observations account for less than 1.5% of US imports during our sample.

Figure 3: UK Industry and Aggregate Price Changes, 1900-1940



Notes: Density of annualized five-year changes in log industry prices plotted by cross section. For each five-year period the red dashed line indicates the change in log UK CPI, calculated using data from Jordà et al. (2017). Industry price growth is calculated from digitized versions of the Statistical Abstract for the United Kingdom, as detailed in Appendix B.3. Disaggregate information on industry import levels and import growth during our sample may be found in Section C.

Figure 3 displays the evolution of prices throughout our sample. The figure depicts kernel density plots of annualized five-year changes in UK industry import unit values, with red vertical lines indicating log changes in the aggregate UK CPI. As is clear from the figure, prices rise for the first half of our sample – most sharply during WWI – then fall through 1935 before rising modestly in the final five years of our sample. As expected, industry-level unit values move with the UK price index, but exhibit substantial variation around the average.

4 US Import Growth and Changes in Realized Protection

We now turn to the industry-level relationship between realized protection and imports. Table 2 reports industry-level summary statistics for each five-year period in our sample.[23] As shown in Figure 3 above, prices rise between 1900 and 1920. This, in turn, implies

[23]Detailed information on industry imports and import growth can be found in figures C.1 and C.2 of Appendix C.

that realized protection falls during these years. For instance, price growth between 1915 and 1920 corresponds to a reduction in realized protection of roughly 5.7 log points annually. Simultaneously, industry imports increase by 8.1 log points annually. This pattern of rising prices, falling realized protection, and rising imports holds more broadly prior to 1920. Similarly, as prices decline and realized protection rises after 1920, industry import growth falls.[24] We display the relationship between annualized changes in industry

Table 2: Summary of Import Growth, Tariffs, and Changing Protection

	1900	1905	1910	1915	1920	1925	1930	Total
$\Delta \ln(Imports^{US}_{it})$	0.045	0.100	0.010	0.081	-0.009	-0.022	-0.044	0.023
	(0.074)	(0.126)	(0.134)	(0.105)	(0.097)	(0.066)	(0.089)	(0.112)
$\Delta RP_{it} : UK^{CPI}_{t}$	-0.001	-0.004	-0.016	-0.057	0.024	0.008	0.010	-0.005
	(0.001)	(0.002)	(0.011)	(0.067)	(0.026)	(0.006)	(0.006)	(0.037)
$\Delta RP_{it} : UK^{UV}_{it}$	0.007	-0.010	-0.023	-0.054	0.057	0.025	0.031	0.005
	(0.017)	(0.039)	(0.035)	(0.073)	(0.079)	(0.057)	(0.039)	(0.063)
AVE_{it_0}	0.303	0.256	0.238	0.139	0.091	0.175	0.204	0.200
	(0.279)	(0.221)	(0.191)	(0.162)	(0.111)	(0.153)	(0.196)	(0.202)
STS_{it_0}	0.647	0.593	0.557	0.369	0.377	0.549	0.574	0.523
	(0.364)	(0.371)	(0.384)	(0.412)	(0.418)	(0.394)	(0.380)	(0.397)

Notes: Table presents summary statistics for five-year annualized log industry import growth and annualized changes in realized protection at the industry level. ΔRP_{it}, AVE_{it_0} and STS_{it_0} are changes in realized protection, start of period ad valorem equivalent protection and specific tariff shares respectively as defined in equations 4, 1, & 2. Variable means are reported above standard deviations which are reported in parentheses.

realized protection and import growth visually in Figure 4.[25] The pattern in the figure is clear: within and across policy regimes, rising prices lead to falling protection, which is associated with increases in imports.

More formally, we estimate our baseline regression, in which we relate annualized changes in import growth in industry i to annualized changes in industry realized protection:

$$\Delta \ln(Imports^{US}_{it}) = \beta_0 + \beta_1 \Delta RP_{it} + \Gamma X_{it} + \eta_t + \epsilon_{it} \tag{5}$$

with

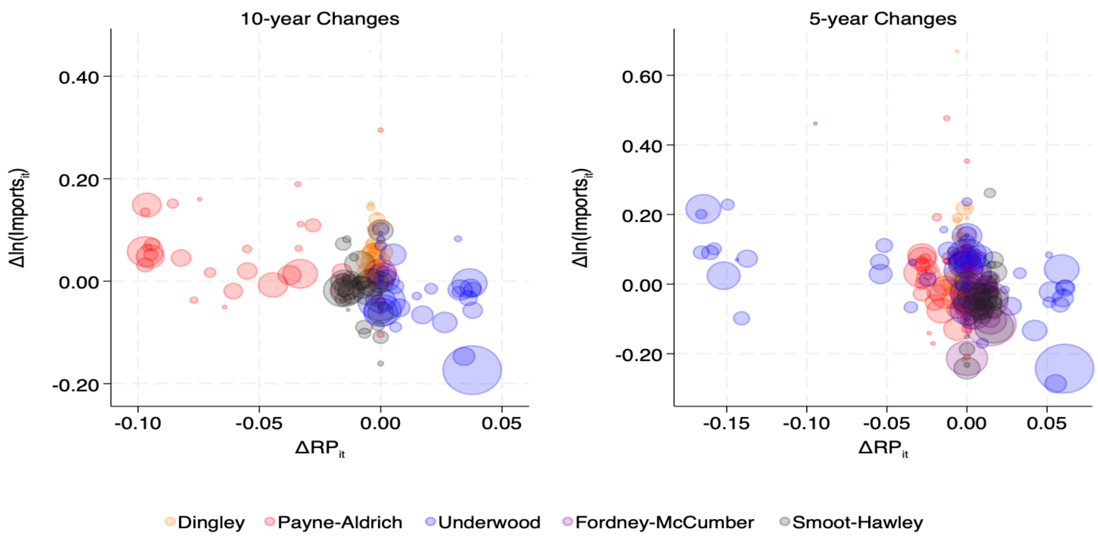
$$\Delta RP_{it} \equiv \ln\left(1 - \frac{\Delta p_t}{p_{t_1}} STS_{it_0}\right).$$

As we are ultimately interested in an analysis of decadal labor market changes, our baseline regressions employ 10-year changes in log import growth. We present our findings in Table

[24] An analogously constructed table of 10-year changes may be found in C.3.

[25] Imports have been deflated by the US CPI.

Figure 4: Annualized Industry Log Import Growth vs ΔRP_{it}.



Notes: Figure displays annualized log industry import growth against annualized changes in realized tariff protection as defined in equation 4. The left panel shows the 10-year variation in our sample which underlies our labor market analysis. The right panel shows the higher-frequency 5-year variation in our full sample.

3, sequentially introducing controls across columns.

Table 3: US Import Growth and ΔRP^{US}_{it}

	$\Delta \ln \left(Imports^{US}_{it}\right)$		
	(1)	(2)	(3)
ΔRP_{it}	-0.776	-0.823	-0.812
	(0.357)	(0.344)	(0.340)
$\ln(1 + AVE_{it_0})$		-0.088	-0.088
		(0.038)	(0.039)
STS_{it_0}			0.002
			(0.015)
Std. Coef.	-0.303	-0.321	-0.317
$Adj.R^2$	0.260	0.281	0.276
Obs.	135	135	135

Notes: Dependent variable is annualized 10-year log change in real US industry imports from 1900-1940 in stacked panels. ΔRP_{it}, is the percent change in tariff protection due to the inflationary erosion of specific tariffs and is defined in equation 4. Price growth used in constructing ΔRP_{it} is the UK CPI. All specifications include time fixed effects, and all regressions are unweighted. Standard errors are clustered at two-digit SITC level and reported in parentheses.

In column 1 we include only ΔRP_{it} and decade fixed effects to absorb the impact of aggregate shocks to prices and imports. As expected, rising protection is associated with relative declines in import growth. The effect is statistically significant at conventional levels and economically meaningful: a one standard deviation increase in ΔRP_{it} is associated with a relative reduction in import growth of 0.3 standard deviations.[26] In column 2, we condition on the initial level of $\ln(1+AVE_{it_0})$ to account for any differential growth among goods with different initial levels of protection. Higher levels of protection are associated with lower subsequent import growth, but inclusion of this control has little impact on our primary explanatory variable, increasing the magnitude of the estimate only slightly. In column 3 we include the initial industry STS_{it_0} to account for the possibility that pre-existing differences in reliance on specific tariffs may be related to subsequent import growth. This, too, leaves our primary result largely unaltered.

To facilitate comparison with existing work, we note that our results can be related to the more familiar import elasticity parameter.[27] The estimates in column 3 of Table 3 imply that a 10% increase in realized protection would result in an 8.1% reduction in imports. At the in-sample mean AVE of 20%, this corresponds to an increase in tariffs of approximately 1.7%, implying an approximate import elasticity of 4.8, well within the range of conventional estimates.[28]

In Table 4, we explore the robustness of these results to a number of alternative specifications. In column 1, we repeat column 3 of Table 3 and introduce two-digit SITC industry fixed effects to allow for persistent industry-level trends. The point estimate of interest increases in magnitude slightly, to -0.89, and remains significant at the 5% level. In column 2 we weight observations by start-of-period import values. The magnitude of the effect increases to -1.21, suggesting a larger elasticity among industries accounting for a larger share of US imports. In column 3 we explore annualized five-year changes in imports and analogous measures of realized protection. Here, too, we observe a significant, negative, and economically meaningful effect. The estimate implies that a one standard deviation increase in realized protection leads to a 0.26 standard deviation decrease in import growth at the industry level. Notably, this effect is smaller in magnitude than the

[26] The standard deviation of 10-year changes in realized protection is 0.032 using the UK CPI and .053 using industry prices, while a standard deviation increase in annualized 10-year log import growth is 0.08. Full summary statistics for 10-year changes in imports can be found in C.3.

[27] Appendix C.1 details additional identifying assumptions required for a more formal treatment of elasticity estimation in our context and provides estimates under these various assumptions.

[28] This follows from the fact that, for small changes in prices, equation 3 is approximately $\Delta RP_{it} \times \frac{AVE_{it}}{1+AVE_{it}}$. At the mean AVE_{it} of 20%, a 10% increase in realized protection yields a $0.1 \times 0.1667 \approx 1.7\%$ increase in tariffs.

Table 4: US Import Growth and ΔRP_{it}^{US} – Robustness

	$\Delta\ln\left(Imports_{it}^{US}\right)$			
	(1)	(2)	(3)	(4)
ΔRP_{it}	-0.891	-1.211	-0.560	-0.525
	(0.333)	(0.503)	(0.245)	(0.187)
$\ln(1+AVE_{it_0})$	0.015	-0.034	-0.085	-0.095
	(0.090)	(0.029)	(0.040)	(0.037)
STS_{it_0}	-0.003	-0.035	0.012	0.019
	(0.031)	(0.022)	(0.017)	(0.017)
Std. Coef.	-0.348	-0.597	-0.257	-0.334
$Adj.R^2$	0.254	0.527	0.200	0.300
Obs.	135	135	236	135
Period.	1900-40	1900-40	1900-35	1900-40
Price Growth	UK^{CPI}	UK^{CPI}	UK^{CPI}	UK_i^{UV}
Ind FE	Yes	No	No	No
Weighted	Equal	Value	Equal	Equal
Δt	10-year	10-year	5-year	10-year

Notes: Dependent variable is annualized 10-year and 5-year log changes in real US industry imports from 1900-1940 in stacked panels. ΔRP_{it} is the change in realized protection, which is the percent change in US tariff protection due to the inflationary erosion of specific tariffs and is defined in equation 4. Each column makes one adjustment to column 3 of table 3 indicated in the footer. These modifications are industry fixed effects, value weighting, 5-year changes, and UK import unit values to construct changes in realized protection in columns 1-4 respectively. All specifications include time fixed effects. Standard errors are clustered at two-digit SITC level and reported in parentheses.

analogous 10-year change, consistent with the idea that import growth responds to price-driven changes in trade costs more over time (Boehm et al., 2023). Finally, in column 4 we construct realized protection exploiting industry-level price variation. Specifically, we use industry-level import unit values constructed from digitized UK import data.[29] As is clear from the column, our primary result still obtains: inflation erodes the protective capacity of specific tariffs and leads to relative increases in import growth.[30]

4.1 Placebo Exercises: UK Imports and The Morrill Tariff of 1861

The preceding results document a differential response to price movements among industries reliant on specific tariffs. While we argue that this is driven by changes in realized

[29] These data are discussed in more detail in Appendix B.3.

[30] We exploit aggregate prices in our baseline specifications due to the fact that industry-prices are more likely to be influenced by US import demand, and as such raise concerns about endogeneity. We discuss price variation more fully in Appendix C.1

protection, there are several potential alternative explanations. First, industries that rely on specific tariffs might be more responsive to price changes than those that rely on ad valorem tariffs for reasons unrelated to trade policy. If this is the case, as prices rise during economic expansions, imports would rise by more among goods reliant on specific tariffs. Similarly, as prices fell during contractions, imports would fall by more in such sectors. Such a pattern mimics the one we find here, though it is driven by cross-industry differences in cyclicality, rather than the response to trade costs. Second, if politicians are able to correctly forecast inflation, they might use this forecast when choosing tariff types in order to protect certain industries. If this is true, then our approach is subject to the same political economy concerns as studies using average tariff levels as a source of identification. We consider each of these possibilities in turn.

We begin by exploring analogous results to those described above in a separate market, namely the UK. As discussed in detail in de Bromhead et al. (2019), for much of this period British trade policy was generally liberal, with exceptions for revenue generation. Beginning in the late 1920s, tariffs rose sharply, with newly added tariffs disproportionately taking an ad valorem form. Given the differences in tariff codes between the two markets, UK imports are not subject to the same changes in realized import protection as US imports. However, to the extent that underlying product characteristics rather than specific tariffs themselves drive our results, we would expect to observe a similar relationship between prices and imports in the two markets as a function of *US* specific tariff shares. To address this possibility, we digitize UK imports from 1900 to 1938 and repeat the preceding analysis in that setting.[31] Specifically, we regress changes in UK industry log imports between 1900 and 1938 on changes in *US* realized tariff protection. As before, standard errors are clustered at the two-digit SITC industry level. The results of this exercise are presented in Table 5.

Columns 1 through 3 replicate our baseline results from the first three columns of Table 3, while columns 4-7 replicate columns 1-4 of Table 4.[32] The contrast in results across the two markets is stark. UK import growth is not related to changes in realized protection, measured using US specific tariff shares, in any specification. Indeed, the direction of the relationship is reversed in six of the seven specifications. That is, changes

[31] Details of these data may be found in Appendix B.3

[32] Here, we employ the US CPI and US import unit values to construct changes in realized protection to avoid the same endogenous relationship between UK imports and prices that motivates the use UK prices in our US import growth setting. We have also estimated these specifications utilizing UK CPI and industry unit values and still find no predictive power of changes in US realized protection on UK import growth. These results are available upon request.

Table 5: Placebo Analysis of UK Import Growth and ΔRP_{it}^{US}

	$\Delta \ln\left(Imports_{it}^{UK}\right)$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ΔRP_{it}^{US}	0.277	0.284	0.155	0.175	-0.077	0.070	0.057
	(0.338)	(0.334)	(0.333)	(0.362)	(0.368)	(0.244)	(0.212)
$\ln(1+AVE_{it_0}^{US})$		0.009	0.014	-0.048	-0.012	0.024	0.014
		(0.018)	(0.020)	(0.076)	(0.013)	(0.031)	(0.020)
$STS_{it_0}^{US}$			-0.017*	-0.030	0.011	-0.021	-0.019*
			(0.010)	(0.032)	(0.020)	(0.013)	(0.010)
Std. Coef.	.089	.091	.05	.056	-.029	.026	.027
$Adj.R^2$	0.075	0.068	0.077	0.015	0.258	0.083	0.075
Obs.	120	120	120	120	120	211	120
Period.	1900-40	1900-40	1900-40	1900-40	1900-40	1900-35	1900-40
Price Growth	US^{CPI}	US^{CPI}	US^{CPI}	US^{CPI}	US^{CPI}	US^{CPI}	US^{UV}
Ind FE	No	No	No	Yes	No	No	No
Weighted	Equal	Equal	Equal	Equal	Value	Equal	Equal
Δt	10-year	10-year	10-year	10-year	10-year	5-year	10-year

Notes: Dependent variable is annualized 10-year and 5-year log changes in real UK industry imports from 1900-1940 in stacked panels. ΔRP_{it}^{US} is the US change in realized protection, which is the percent change in US tariff protection due to the inflationary erosion of specific tariffs and is defined in equation 4. Columns 1-3 replicate the analogous columns from Table 3 but replace the UK CPI with the US CPI, while columns 4-7 replicate the robustness specifications found in columns 1-5 of table 4. All specifications include time fixed effects. Standard errors are clustered at two-digit SITC level and reported in parentheses.

in US realized protection predict import growth in the US, but not the UK. This suggests that unobserved product-specific characteristics do not drive our results.[33]

As a second placebo, we turn our attention to an environment in which we do not need to rely on import data from a separate economy. Beginning with the Walker Tariff of 1846, the United States relied solely on ad valorem tariffs for a period of 15 years. In March of 1861, specific tariffs were re-introduced as a policy tool under the Morrill Tariff, after which they remained a prominent feature of US trade policy. If industries that rely on specific tariffs respond differently to price changes for reasons other than changes in realized protection, this should be apparent in the years preceding the Morrill Tariff even though no specific tariffs were in place in these years.

To explore this possibility, we digitize product-level imports between 1848 and 1860 from annual editions of *Commerce and Navigation of the United States*. In 1861, we

[33] In appendix table C.2 we conduct an additional test to ensure that unobserved trends do not explain our results. Specifically, we show that our results are qualitatively similar when estimating our the effects of changes in realized protection separately among periods of inflation and deflation. Thus, for unobserved trends to be the driver of our results it would need to be the case that those these trends change direction coincidentally during periods of inflation versus deflation.

digitize imports and duties under the Morrill Tariff from the same source. As above, we concord these data to the two-digit SITC level and deflate them using the US CPI.[34] For each industry, we calculate the ad valorem equivalent and specific tariff share under the Morrill Tariff – that is, as of 1861. Using the UK wholesale producer price index to measure inflation, we calculate *pseudo* changes in realized protection between 1848 and 1860 from the yet-to-be-enacted Morrill Tariff.[35] We estimate the relationship between industry import growth and these pseudo changes in realized protection as follows:

$$\Delta \ln(Imports_{it}) = \beta_0 + \beta_1 \Delta RP_{it}^{Morrill} + \beta_2 \ln(1 + AVE_i^{Morrill}) + \beta_3 STS_i^{Morrill} + \eta_t + \epsilon_{it}$$
$$\text{with } \Delta RP_{it}^{Morrill} \equiv \ln\left(1 - \frac{\Delta p_t}{p_{t_1}} STS_i^{Morrill}\right). \quad (6)$$

β_1, our point estimate of interest, captures the differential import response to price movements among industries that will ultimately rely more heavily on specific tariffs, but do not during the period under study. If such industries respond differently to price shocks independent of the channel we propose above, we would expect the coefficient to be negative and significant.

Table 6: Placebo Analysis of US Import Growth and $\Delta RP_{it}^{Morrill}$

	$\Delta \ln\left(Imports_{it}^{US}\right)$				
	(1)	(2)	(3)	(4)	(5)
$\Delta RP_{it}^{Morrill}$	0.872	2.319	0.913	6.170	-7.582
	(1.061)	(1.197)	(1.264)	(3.327)	(5.690)
$\ln(1 + AVE_i^{Morrill})$	-0.311	-0.327	-0.311	-0.317	-0.268
	(0.189)	(0.186)	(0.187)	(0.191)	(0.187)
$STS_i^{Morrill}$	0.005	0.032	0.005	0.105	-0.159
	(0.056)	(0.061)	(0.055)	(0.072)	(0.136)
Adj.R^2	0.025	-0.000	-0.007	0.073	0.018
Obs.	352	175	116	87	57
Δt	1-year	2-year	3-year	4-year	6-year
Period	1848-60	1848-60	1848-60	1848-60	1848-60

Notes: Dependent variable is annualized log change in industry imports from 1848-1860 in stacked panels. $\Delta RP_{it}^{Morrill}$ is the *pseudo* change in realized protection induced by the yet to be enacted Morrill Tariff of 1861 – given by equation 6. Price growth used in constructing *Pseudo* ΔRP_{it} is the UK PPI. Columns differ in duration of changes and number of panels. All specifications include time fixed effects, and all regressions are unweighted. Standard errors clustered at two-digit SITC level and reported in parentheses.

[34] Details on the import and tariff data from this period are documented in Appendix section B.2.

[35] UK CPI data from the Jordà-Schularick-Taylor database are not available during this period. We use the UK PPI as trade data are only available for fiscal years during this period, and inflation using the PPI can be constructed to match this. The PPI is available from Federal Reserve of St. Louis: https://fred.stlouisfed.org/series/WPPIUKQ.

Making full use of the 12-year sample, we estimate the model with one-, two-, three-, four-, and six-year changes in log industry imports and the analogous changes in realized protection. We report the results in Table 6. Standard errors are clustered at the two-digit SITC level and all variables are annualized to facilitate comparison with previous tables. Across all specifications, the point estimate of interest is never significantly negatively related to import growth. If anything, the relationship seems to exhibit the opposite pattern, though not robustly so.[36] That is, specific tariffs govern the response of trade flows after they are implemented, but not before.[37]

4.2 Persistence of Specific Tariffs

A further threat to identification is the possibility that changes in realized protection are themselves non-random. This would be possible if specific tariffs were determined jointly with an inflation forecast. That is, if politicians anticipate subsequent price movements and set specific tariffs in expectation of the implied effects on realized protection, our measure would be subject to the same concerns that complicate the use of ad valorem equivalent tariffs directly. For example, in the face of expected deflation, politically influential industries might lobby for higher levels of specific tariffs. Such a possibility requires that politicians frequently alter specific tariffs in the face of changing prices. Conditional on average tariff levels, politicians seeking to protect domestic industries should increase specific tariff shares when expecting deflation and decrease them when expecting inflation. We find no evidence of such behavior. In particular, in Table 7 we show that the correlation between specific tarif shares under the Morrill Tariff and those in our primary sample ranges from approximately 50 to 66%. That is, whether facing inflation or deflation, industry reliance on specific tariffs between 1900 and 1930 is strongly predicted by tariff policy in 1861.[38]

As a final attempt to address to potential endogeneity in realized protection, we construct an instrument for our primary sample exploiting the structure of protection under

[36]While insignificant, the point estimates in this table are substantially larger than those in our baseline specification, as are the standard errors. This is potentially due to the fact that mean annualized log industry import changes is nearly 10% during the Walker era and a much more modest 2% in our primary sample.

[37]We have also estimated this specification dropping changes spanning the Canadian-American Reciprocity Treaty of 1854, as well as omitting years following the financial crisis of 1857. Neither modification impacts this null result.

[38]Additionally, in Appendix C.4 we evaluate the feasibility of price forecasting during our sample and show that an accurate forecast of future price growth was almost certainly beyond the means of early 20^{th} policymakers.

Table 7: Cross-Policy Correlation in Industry Specific Tariff Shares

	Dingley	Payne-Aldrich	Underwood	Fordney-McCumber	Smoot-Hawley	Morrill
Dingley	1.000					
Payne-Aldrich	0.950	1.000				
Underwood	0.504	0.592	1.000			
Fordney-McCumber	0.795	0.824	0.664	1.000		
Smoot-Hawley	0.771	0.786	0.694	0.945	1.000	
Morrill	0.572	0.632	0.495	0.665	0.636	1.000

Notes: Table reports pairwise correlations of industry-level specific tariff shares across policies. Specific tariff shares are calculated as the share of duties among products with a specific tariff relative to total duties within an industry and reflect the first period in our data after a policy is implemented. Data are digitized from the Foreign Commerce and Navigation of the United States from 1900-1930 quinquennially to cover the primary five policy regimes, and in 1861 to obtain tariffs under the Morrill Tariff.

the Morrill Tariff. Specifically, we construct realized protection for each decade between 1900 and 1940 as in equation 4, but use specific tariff shares from 1861. We then examine the effect of changes in realized protection on imports in industry i as

$$\Delta \ln(Imports_{it}) = \beta_0 + \beta_1 \widehat{\Delta RP_{it}} + X_{it}\beta + \epsilon_{it}$$
$$\text{where,}$$
$$\Delta RP_{it} = \gamma_0 + \gamma_1 \Delta RP_{it}^{Morrill} + X_{it}\gamma + \nu_{it}. \quad (7)$$

Results are reported in Table 8. Consistent with Table 7, the first stage results in Panel B show that specific tariff shares under the Morrill Tariff of 1861 are strongly predictive of those implemented up to 70 years later.[39] Morevoer, the second stage of our IV regression highlights that this variation is sufficient to identify the effect of price-driven changes in AVE levels on US import growth: as in our primary specifications, changes in realized protection are strongly predictive of changes in imports. This further suggests that the effect of realized protection on import growth is unlikely to be driven by time-varying correlates of reliance on specific tariffs.

[39] The Montiel Olea and Pflueger (2013) robust weak instrument test with the appropriate small-sample correction is indicated below Panel B.

Table 8: US Import Growth and Instrumented ΔRP_{it}

	$PanelA: \Delta \ln \left(Imports^{US}_{it}\right)$		
	(1)	(2)	(3)
$\Delta \widehat{RP_{it}}$	-1.253	-1.266	-1.451
	(0.574)	(0.586)	(0.605)
$\ln(1 + AVE_{it_0})$		-0.049	-0.050
		(0.036)	(0.037)
$STS^{Morrill}_i$			-0.015
			(0.011)
Standardized Coef.	-.606	-.612	-.701
$Adj.R^2$	0.365	0.371	0.363
	Panel B: 1^{st} *Stage* ΔRP_{it}		
	(1)	(2)	(3)
$\Delta RP^{Morrill}_{it}$	0.575	0.574	0.571
	(0.104)	(0.103)	(0.102)
MP Effective - F	30.77	30.8	31.43
$Adj.R^2$	0.752	0.751	0.749
Obs.	115	115	115

Notes: Dependent variable is annualized 10-year log change in real US industry imports from 1900-1940 in stacked panels. ΔRP_{it}, is the percent change in tariff protection due to the inflationary erosion of specific tariffs and is defined in equation 4. First stage instrument is the change in realized protection using the specific tariff share under the Morrill Tariff of 1861 defined in equation 8. All specifications include time fixed effects, and all regressions are unweighted. Standard errors clustered at two-digit SITC level and reported in parenthesis. MP Effective - F is the first stage effective F-statistic with small-sample correction detailed in Montiel Olea and Pflueger (2013).

5 Import Growth and Structural Change

We now turn to the effects of trade at the individual level. The early 20^{th} century was a period of rapid industrialization in the US (Irwin, 2003). As our approach yields a consistent measure of import exposure across the entirety of this era, it allows us to shed light on the role of trade in structural change in this important period in the history of the American economy. In particular, we explore the effect of import growth on labor market outcomes and the transition away from agriculture into manufacturing and services, using our measure of realized protection as an instrument.

We begin by aggregating industry-level exposure to the county level using data from the full count decennial Census (Ruggles et al., 2020). To facilitate a mapping between trade flows and employment data, we first concord the SITC industry classification described above to Census industries.[40] For each county c, we then calculate a weighted

[40]Specifically, we map all counties to consistent geographic 1900 boundaries using crosswalks provided by Eckert et al. (2020). We then construct population weights based on the IND1950 variable in the IPUMS data. Due to the importance of agriculture in this era, we separate agricultural employment

average of industry-level changes in log imports, using start-of-decade county-industry labor shares among men ages 18-65 as weights. Our county-level measure of import exposure is thus:

$$\Delta \ln(Imports_{ct}) = \sum_i \frac{L_{ict_0}}{L_{ct_0}} \Delta \ln(Imports_{it}) \tag{8}$$

Here, $\Delta \ln(Imports_{it})$ represents changes in log industry imports at the national level. This is weighted by $\frac{L_{ict_0}}{L_{ct_0}}$, the start-of-decade industry employment share in county c among tradable sectors, as in Kovak (2013).[41]

Similarly, we construct a county-level measure of changes in realized tariff protection, weighting industry realized protection by each industry's start-of-decade labor share within the county. We employ our aggregate UK CPI-based measure of changes in prices, yielding

$$\Delta RP_{ct} = \sum_i \frac{L_{ict_0}}{L_{ct_0}} \ln(1 - \frac{\Delta p_t}{p_{t_1}} \times STS_{it_0}) \tag{9}$$

We also construct measures for the start-of-period AVE_{ct_0} and STS_{ct_0}, using county-specific employment-weighted averages of industry-level AVE_{it_0} and STS_{it_0}.

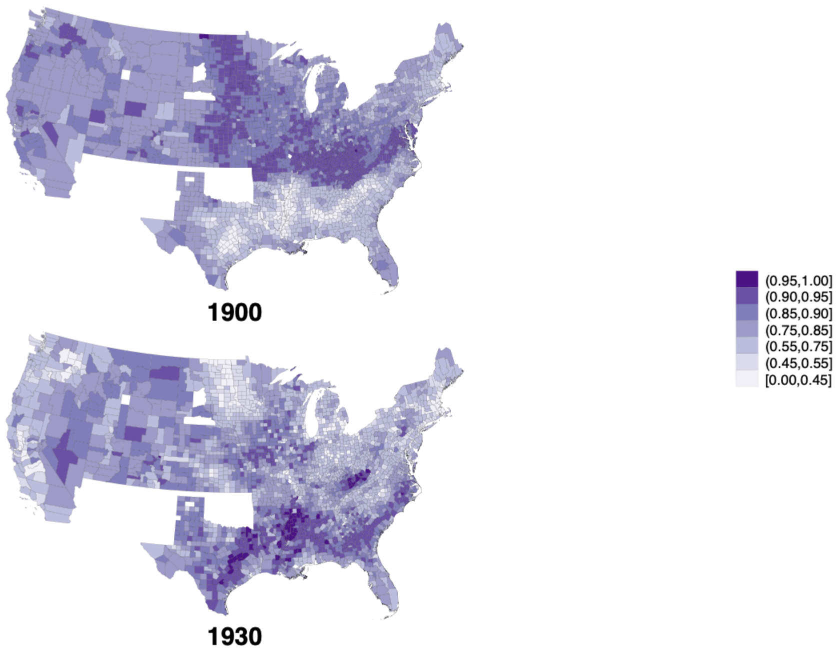
Figure 5 displays the geographic distribution of specific tariff shares, which drive the cross-sectional variation in exposure, at the county level in the first and last decades of our sample. As is clear from the figure, the variation across industries described above begets variation across regions. The prevalence of specific tariffs in certain agriculture and food products as well as mining, for instance, leads to reductions in protection for the Upper South, Great Plains, and Upper Midwest in the first half of our sample as prices rise. Cotton, however, is duty free at the beginning of our sample, implying very little exposure to price changes for much of the Deep South. Similarly, sharp declines in prices between 1920 and 1930 imply increased protection in much of the West and Appalachia, but not in the South.[42] By 1930, reliance on specific tariffs has expanded more broadly throughout the South and Gulf Coast, and we thus see a more mixed geographical distribution.

(IND1950 105) into crops and livestock using the county-level value of farm products and sales of domestic animals, taken from NHGIS (Manson et al., 2022). We further divide crops into corn, oats, wheat, cotton, and "other", using county acreage shares, also from NHGIS.

[41] This is consistent with the approach suggested in Borusyak et al. (2022), who note that focusing exclusively on the traded sector does not impose the assumption that the import shock is mean-zero, while including the non-tradable sector does.

[42] Due to the geographic similarity in the distribution of specific tariff shares in 1910 and 1920 to that of 1900, we have omitted those decades from our figure to improve legibility.

Figure 5: Start-of-Decade County STS_{ct_0}



Notes: Maps depict start-of-decade county-level specific tariff shares for 1900 and 1930. Other decades available upon request. Omitted counties lack data on agricultural output required to construct this measure for agricultural sectors. County boundaries are mapped to consistent county boundaries over time following Eckert et al. (2020).

5.1 Import Growth and Labor Market Outcomes

We now turn to the effect of trade on labor market outcomes. In particular, using linked Census data from Abramitzky et al. (2020), we follow men between the ages of 18 and 55 across Censuses for each decade between 1900 and 1940.[43] Under this approach, for individual j located in county c in Census year t, we regress individual outcomes in Census year $t + 10$ against county-level averages of changes in log imports between t and $t + 10$, $\Delta \ln(Imports_{ct})$. We instrument for $\Delta \ln(Imports_{ct})$ with ΔRP_{ct}. Our primary regression is thus:

$$Outcome_{jct+10} = \beta_0 + \beta_1 \Delta \ln(\widehat{Imports}_{ct}) + \beta_2 X_{jt_0} + \beta_3 X_{ct_0} + \gamma_t + \epsilon_{ct} \tag{10}$$

Here, X_{jt_0} and X_{ct_0} represent a set of start-of-decade controls for individual and county characteristics, respectively, that may otherwise contaminate our estimates. Specifically, we control for an individual's age, literacy, nativity, race, whether they are Hispanic, and

[43] Age is defined as of the start of the relevant decade, such that we observe men as old as 65 by the end of the decade.

their urban status. At the level of the county, we control for start-of-period $\ln(1+AVE_{ct_0})$, STS_{ct_0}, the share of employment accounted for by the tradable sector and by agriculture, and the share of the population that is, respectively, foreign born, literate, non-white, and under the age of 35. We also control for the individual's start-of-period labor force status by including indicator variables for the following initial sector of employment: agriculture, mining, construction, manufacturing, services, and other. All observations are weighted using linking probabilities following Abramitzky et al. (2020) and include decade fixed effects, γ_t.[44] Standard errors are clustered at the county level.

We begin by exploring labor force attachment as an outcome in column 1 of Table 9. In particular, we specify a linear probability model in which the outcome is an indicator variable equal to one if the individual is in the labor force at the end of the decade.[45] The point estimate in the column is negative and significant, with a magnitude that implies that an increase in import growth of one standard deviation reduces the probability of labor force participation by approximately 0.3 percentage points. The mean end-of-decade share of our sample not in the labor force is approximately 3.4%, so this is a sizeable effect.[46]

Leaving work entirely is, of course, only one potential response to import competition. Indeed, given the lack of a broad social safety net prior to the onset of the Great Depression, this may not be the primary margin of adjustment during our sample. In column 2 of the table, we explore whether import growth additionally affects income levels among those who remain in the labor force. As the Census does not include income until 1940, we have no direct measure of income for the majority of our sample. However, IPUMS does report occupational income scores, which measure the median income within an occupation. We are thus able to examine whether individuals in counties with higher relative growth in imports disproportionately shift into lower-paying occupations.[47] Column 2 regresses changes in individual log occupational income scores against the same set of covariates as in column 1. Consistent with a general decline in labor market opportuni-

[44]Specifically, we employ the standard algorithm from Abramitzky et al. (2020) requiring exact name matches across Censusus.

[45]The definition of labor force participation in the IPUMS dta changes throughout our sample and labor force status not available at all as an outcome in 1900. As such, we define labor force participation similarly to the way it is defined in the 1910-1930 data. Namely, we define being in the labor force as "reporting any gainful occupation" – this corresponds to values below 980 of the variable OCC1950 in the IPUMS data. See https://usa.ipums.org/usa-action/variables/LABFORCE#comparability_section.

[46]Summary statistics for outcomes and key covariates may be found in Appendix Table D.1.

[47]Note that the occupational income score is defined based on the 1950 Census, and income scores vary across occupations, but not locations or demographic groups.

Table 9: Import Growth and Individual Labor Market Outcomes

	(1) Not in Labor Force$_{j,t+10}$	(2) $\Delta\ln(Income_{j,t+10})$	(3) Migrate State$_{j,t+10}$	(4) Switch Industry$_{j,t+10}$
$\Delta\ln(\widehat{Imports_{ct}})$	0.005	-0.025	0.013	-0.029
	(0.001)	(0.003)	(0.007)	(0.003)
$\ln(1+AVE_{ct_0})$	0.022	0.110	-0.576	-0.192
	(0.013)	(0.101)	(0.156)	(0.045)
STS_{ct_0}	0.013	-0.016	0.118	0.129
	(0.003)	(0.011)	(0.028)	(0.013)
1^{st} Stage $\hat{\beta}$	-2.797	-2.797	-2.797	-2.797
1^{st} stage-F	725.512	725.512	725.512	725.512
Dep. μ	0.034	0.071	0.282	0.653
Obs.	29,792,145	25,390,582	29,792,145	27,001,711
County Controls	Y	Y	Y	Y
Individual Controls	Y	Y	Y	Y
Decade F.E.	Y	Y	Y	Y

Notes: Regressions of instrumented county-level import growth on longitudinal individual level outcomes based on linked data following Abramitzky et al. (2020) from 1900-1910, 1910-1920, 1920-1930, and 1930-1940. Dependent variable in column 1 is whether the individual is in the labor force at the end of the decade. Column 2 outcome is the decadal change in log occupational income score. Column 3 outcome is whether an individual moved to another state during the decade. Column 4 indicates whether an individual switched industries. Import data come from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and authors' calculations. Population data from IPUMS (Ruggles et al., 2020). Controls are measured at the start of decade. Import growth is instrumented by ΔRP_{ct} as in equation 9. Standard errors are clustered at the county level.

ties, import growth corresponds to an average shift towards lower-paying occupations: a one standard deviation increase in import growth maps to a 0.017 log point reduction in occupational income growth – approximately 20% of the mean decadal log income change during our sample.

In column 3, we explore the nature of this adjustment further by examining the effect of import growth on the probability of migrating to another state and find no differential response. This suggests limited geographic mobility as a response to trade, perhaps due to the idiosyncratic nature of the underlying shocks. In column 4, we explore the effect of import competition on the likelihood of changing industries conditional on being in the labor force at both the beginning and the end of the decade. The column suggests a role for reduced cross-industry mobility in explaining the declining labor market outcomes in columns 1 and 2. Specifically, a one standard deviation increase in import growth corresponds to a 1.9 percentage point reduction in the probability that an individual changes industries throughout the decade. That is, import growth seems to alter the decision to change industries within our sample, but not locations.

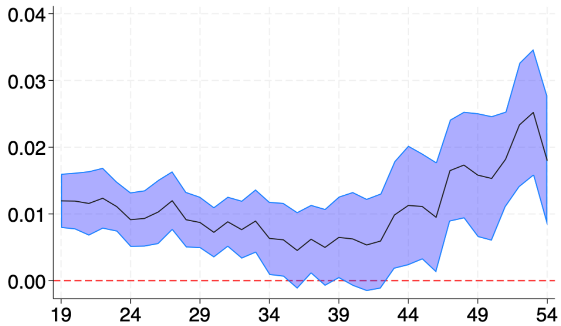
In the appendix, we explore the robustness of these findings along a number of dimensions. First, we show that results are similar across groups divided by race or nativity: in Appendix Table D.2 we repeat the specifications from Table 9 separately for White, Black, and foreign-born individuals and find that all groups are impacted by import competition. Second, we show that our findings are not driven by a particular time period, sequentially omitting each decade in our sample in Table D.3. Third, we demonstrate robustness to running unweighted specifications, to controlling for decade dummy variables interacted with agriculture, manufacturing, and tradable employment shares, and to using alternative measures both for our instrument and for import growth. These results are reported in Appendix Table D.4. Finally, we estimate the effects of trade on labor markets using aggregate county-level employment averages rather than individual outcomes. Under this approach we also employ the standard error correction detailed by Borusyak et al. (2022) to analyze county-level labor force participation in Tables D.7 and D.9 and county-level income in Tables D.8 and D.10. None of these exercsises yield any meaningful change in the interpretation of our findings: trade is a powerful force in shaping labor markets in this era.

5.2 Effects Throughout the Age Distribution

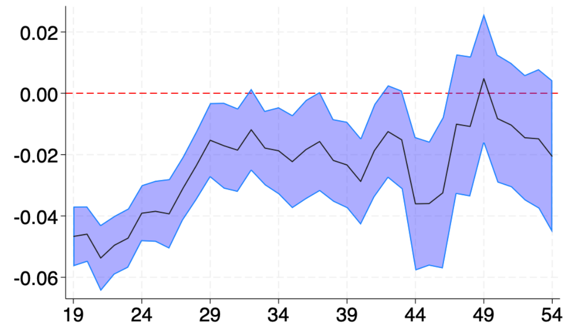
Our focus is on structural change in response to import growth over a period of decades. Such processes, however, depend not only on what is affected but who is affected. Specifically, the long-run implications of the labor market responses documented above depend on where in the age distribution they are most pronounced. The size of our sample affords us the statistical power to explore heterogeneous effects across age groups in great detail. As such, we repeat the specification from Table 9 separately for rolling three-year age intervals between 18 and 55. That is, we run seperate regressions for cohorts of individuals age 18-20, 19-21, and so on. Note that, since we exploit variation in tariff rates across multiple decades, we are able to control for time-specific shocks that might affect individuals of a given age cohort at a point in time, such as WWI or the Great Depression. Figure 6 plots the point estimates and 95% confidence intervals for each of the outcomes in Table 9, where the age reported on the horizontal axis is the midpoint of the relevant age interval.

Several patterns stand out in the figure. First, while the effect of import growth on

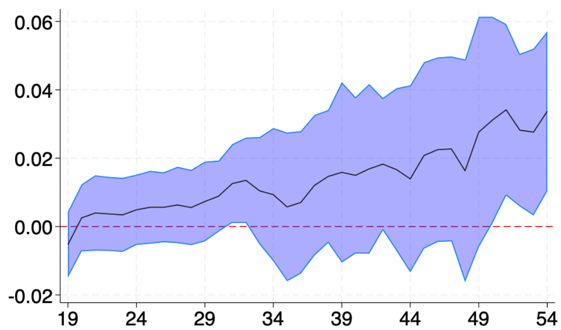
Figure 6: The Effect of Import Growth on Individual Outcomes by Age



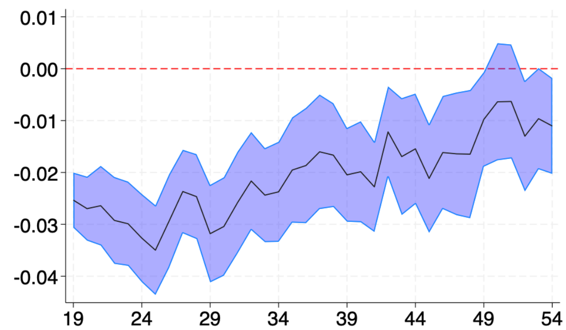
(a) Probability of NILF$_{j,t+10}$



(b) $\Delta \ln(\text{Income}_{j,t+10})$



(c) Probability of Cross-State Migration$_{j,t+10}$



(d) Probability of Industry Switching$_{j,t+10}$

Notes: Figure displays the effect of import growth on decadal changes in individual outcomes by age cohort. Regressions are run separately for ages 18-20, 19-21, 20-22, etc. The coefficient for instrumented county-level import growth is displayed with a 95% confidence interval. Data are constructed based on linking procedures following Abramitzky et al. (2020). All specifications include individual- and county-controls as well as decade dummy variables. Import data come from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and authors' calculations. Population data from IPUMS (Ruggles et al., 2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as in equation 9. Standard errors are clustered at the county level.

labor force attachement is felt throughout the age distribution, it is most pronounced among those under 30 and, especially, those older than 45. The effect of imports on income growth, conversely, is dramatically larger for those under 30 and is reduced by more than half for those above that age, disappearing entirely by age 50. The reduced probability of switching industries similarly falls most heavily on the young, though the gradient throughout the age distribution is less steep than that for income.

Taken as a whole, the figure suggests that the effects of import growth are most pronounced at the ends of the age distribution throughout our sample period. The youngest individuals see both labor force participation and income fall, with the latter effect driven in part by a reduction in the ability to change industries. Those at the upper end of the working-age distribution respond to declining labor market conditions by disproportionately leaving the labor market entirely. Those between the age of 30 and 45 see more modest effects on their labor market prospects.

5.3 Sectoral Transitions

The finding that imports produce relative reductions in both income and the probability of changing industries suggests a reduction in upward mobility as a result of import competition throughout our sample. We explore this possibility more fully by analyzing the effect of import growth on the probability of transitioning between sectors. The first decades of the 20^{th} century US involved the expansion of the manufacturing and service sectors and the transition away from agriculture for broad swathes of the population (Michaels et al., 2012; Eckert and Peters, 2022; Fiszbein, 2022). Our measure combined with linked Census data allows us to explore the role of trade in this process in an entirely novel way.

Specifically, we group all individuals in our sample into one the following mutually exclusive categories based on their start-of-decade labor force status: employed in agriculture, employed in mining, employed in construction, employed in manufacturing, employed in services, employed in non-classified occupations, or not working. For each group, we run seven separate specifications in which the outcome is a dummy variable equal to one if an individual ends the decade in a given category. Covariates, weighting, and clustering are all as in Table 9. We report the results from these specifications in Figure 7.[48] Each row in the figure corresponds to the labor force status at the start of the decade, while each column corresponds to the accompanying labor force status at the end of the decade. Sectors are ordered from lowest average occupational income score on the leftmost column to highest on the rightmost column. The point estimate and standard error for instrumented import growth is reported for each possible transition.[49]

Three striking patterns emerge from the figure. First, the diagonal, which corresponds to the effect of imports on the probability of maintaining one's initial labor force status, is positive and significant among the lower income sectors only. That is, the reduction in industry mobility documented in Table 9 seems to be driven by a lower probability of leaving agriculture and mining. If anything, the probability of transitioning out of the service sector increases with import growth. Second, there is a reduction in the

[48] We omit the "other" employment category for space and due to a lack of interpretability. This omission implies that rows in the figure do not necessarily sum to 0.

[49] The full set of coefficients is reported in Appendix Table D.5.

Figure 7: The Effect of Import Growth on the Probability of Sectoral Transitions

Notes: Figure displays the coefficient on instrumented import growth from separate regressions in which the outcome is an indicator varialbe equal to one if an individual ended the decade in a given sector – indicated by columns – conditional on having started the decade in a particular sector – indicated by rows. The category "other" is omitted from both rows and columns. Cells have been color-coded such that dark red indicates the least likely outcome for a given row, while dark blue indicates the most likely. Outcomes are obtained based on linked data following Abramitzky et al. (2020). All specifications include individual and county controls as well as decade dummy variables. Import data come from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and authors' calculations. Population data come from IPUMS (Ruggles et al., 2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as in equation 9. Standard errors are clustered at the county level. Full results reported in Table D.5.

probability of entering the higher-income manufacturing and service sectors regardless of initial sector. Taken together, these results suggest that import growth limits upward mobility among those individuals most exposed to it – workers are more likely to stay in low-income sectors and are less likely to enter high-income ones. Finally, the first column in the figure shows that the increased probability of not working as a result of import competition is driven by those beginning in the agriculture and mining sectors. There is no statistically significant effect on the probability of not working for those beginning in the manufacturing or service sectors. Overall, this suggests a movement down the developmental ladder in response to import competititon in this era, in which those in high income sectors are increasingly likely to move into agriculture or mining at lower incomes, while those already in these sectors are more likely to leave the labor force entirely.

Overall, these findings suggest an important role for trade policy in shaping the evolution of the US economy in the first half of the 20^{th} century. Import growth led to relative reductions in manufacturing and service employment growth in favor of agriculture and mining. Further, while trade did little to affect the probability of leaving the manufacturing sector among those already employed in it, it dramatically reduced the chances of transitioning into higher income sectors among those beginning in lower income industries. Moreover, as the bulk of these costs were borne by younger workers, these effects may have persisted into the future. We leave exploration of this possibility to future work.

6 Conclusion

This paper develops a novel approach to quantifying the effects of changes in tariff protection on imports and labor market outcomes to study the effects of trade on structural change in the US between 1900 and 1940. By interacting price changes with cross-industry variation in the prevalence of specific tariffs, we construct a measure of exposure at the industry and county level that varies over time even in the absence of changes to policy. The measure predicts import growth at both the industry and county levels, as well as county-level labor market outcomes. Relying on linked individual-level Census data, we highlight novel channels through which trade shaped the US economy in this era. Most notably, import growth impeded the transition from agriculture into the expanding manufacturing sector. The effects were borne most heavily by workers outside of prime earnings years, particularly the young.

We are currently pursuing several extensions of this work, including assessing the effect of trade exposure on Congressional voting on trade bills in the early 20^{th} century (Greenland et al., 2021), a structural framework for incorporating both statutory and inflationary changes in tariffs during the 1970s and 1980s (Greenland et al., 2023), and an assessment of the intergenerational effects of trade shocks (Greenland et al., 2024). This is a small set of the potential applications for this approach. Just as the inflationary relationship between price shocks and nominal tariffs is exploitable well beyond the 1940s in the US, economies around the world continue to rely on specific tariffs to varying extents, suggesting the possibility of a similar approach in a wider range of countries. Further, the period explored in this paper provides a particularly rich policy environment in which to investigate the relationship between trade and a variety of government activities. The ability of governments to ameliorate the negative consequences of trade is of first-order importance for trade economists. Policy shifts in this period on matters of unionization, voting rights, educational standards, and the social safety net provide the sort of empirical variation that economists require to explore this important topic. The method proposed here thus provides an opportunity to explore not merely trade shocks, but also the accompanying effects of a rich set of coincident policy interventions.

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Online Appendix (Not for Publication)

This Online Appendix contains additional empirical results as well as more detailed explanations of data and methods used in the main text.

For Online Publication: Appendices

This appendix provides additional information about our primary analysis and is broken into four sections. In section A we detail industry definitions and aggregation. Section B describes data sources and outlines the mapping between the raw data and industry-level variables. This section is divided by country and period as follows: US tariff and import data sources from 1900-1940 are detailed in section B.1; US tariff and import data sources from 1848-1861 are detailed in section B.2; UK import data and industry price growth construction are detailed in section B.3.

In section C we provide additional information regarding industry import growth during our sample and explore robustness of our primary industry results to sample changes and alternative measures of realized protection. Finally, in section D we provide additional information regarding our labor market analysis.

A Industry Classification

The majority of our sample pre-dates a formal statistical classification, with products identified solely by their names. To ensure a consistent mapping across all four of our databases (US tariffs 1900-1930, US imports 1900-1940, UK imports 1900-1938, and US imports 1848-1861) we concord all tariff and import lines to a consistent set of industries based on the two-digit SITC revision 2 classification, which allows us to cover over 95% of all US import value during this period. Due to differences in the level of aggregation provided in the various data sources, we aggregate SITC industries slightly. This process results in 34 two-digit industries. Table A.1 presents the native two-digit SITC code as well as the mapping to our more aggregate industry definitions. Immediately following this table we provide a detailed explanation for any modifications to the original SITC industries. Column 1 reports the original two-digit code. Column 2 provides the two-digit description. Column 3 indicates our industry assignment of these codes, and column 4 provides a description of the resulting industry group.

Table A.1: Aggregation of SITC-2 Industries

SITC-2	SITC Revision 2 2-digit Description	Industry	Short Description
00	Live animals chiefly for food	00	Animals
94	Animals, live, nes, (including zoo animals, pets, insects, etc)	00	Animals
01	Meat and preparations	01	No Change
02	Dairy products and birds' eggs	02	No Change
03	Fish, crustacean and mollusks, and preparations thereof	03	No Change
04	Cereals and cereal preparations	04	No Change
05	Vegetables and fruit	05	No Change
06	Sugar, sugar preparations and honey	06	No Change
07	Coffee, tea, cocoa, spices, and manufactures thereof	07	No Change
08	Feeding stuff for animals (not including unmilled cereals)	08	No Change
09	Miscellaneous edible products and preparations	43*	Split
11	Beverages	†	** Dropped (Prohibition)
12	Tobacco and tobacco manufactures	12	No Change
21	Hides, skins and furskins, raw	21	No Change
22	Oil seeds and oleaginous fruit	22	No Change
23	Crude rubber (including synthetic and reclaimed)	23	No Change
26	Textile fibers (not wool tops) and their wastes (not in yarn)	26	No Change
28	Metalliferous ores and metal scrap	28	No Change
29	Crude animal and vegetable materials, nes	29	No Change
32	Coal, coke and briquettes	32	No Change
33	Petroleum, petroleum products and related materials	33	No Change
34	Gas, natural and manufactured	†	** Dropped (Not observed)
35	Electric current	35	Electric current
41	Animal oils and fats	43	Natural Oils
42	Fixed vegetable oils and fats	43	Natural Oils
43	Animal and vegetable oils and fats, processed, and waxes	43	Natural Oils
51	Organic chemicals	59	Chemicals a.m.o.
52	Inorganic chemicals	59	Chemicals a.m.o.
53	Dyeing, tanning and coloring materials	59	Chemicals a.m.o.
54	Medicinal and pharmaceutical products	59	Chemicals a.m.o.
58	Artificial resins and plastic materials, and cellulose esters etc	59	Chemicals a.m.o.
59	Chemical materials and products, nes	59	Chemicals a.m.o.
55	Oils and perfume materials; toilet and cleansing preparations	55	Chemicals a.m.o.
57	Explosives and pyrotechnic products	57	No Change
61	Leather, leather manufactures, nes, and dressed furskins	61	No Change
62	Rubber manufactures, nes	62	No Change
24	Cork and wood	63	Cork, Wood, a.m.o.
63	Cork and wood, cork manufactures	63	Cork, Wood, a.m.o.
25	Pulp and waste paper	64	Pulp, Paper, a.m.o.
64	Paper, paperboard, and articles of pulp, of paper or of paperboard	64	Pulp, Paper, a.m.o.
65	Textile yarn, fabrics, made-up articles, nes, and related products	65	No Change
27	Crude fertilizer and crude minerals	66	Non-metallic minerals, fertilizers, a.m.o.
56	Fertilizers, manufactured	66	Non-metallic minerals, fertilizers, a.m.o.
66	Non-metallic mineral manufactures, nes	66	Non-metallic minerals, fertilizers, a.m.o.
67	Iron and steel	69	Metals a.m.o.
68	Non-ferrous metals	69	Metals a.m.o.
69	Manufactures of metals, nes	69	Metals a.m.o.
71	Power generating machinery and equipment	77	Machinery
72	Machinery specialized for particular industries	77	Machinery
73	Metalworking machinery	77	Machinery
74	General industrial machinery and equipment, nes, and parts of, nes	77	Machinery
75	Office machines and automatic data processing equipment	77	Machinery
76	Telecommunications, sound recording and reproducing equipment	77	Machinery
77	Electric machinery, apparatus and appliances, nes, and parts, nes	77	Machinery
81	Sanitary, plumbing, heating, lighting fixtures and fittings, nes	77	Machinery
78	Road vehicles	79	Transportation Equipment
79	Other transport equipment	79	Transportation Equipment
82	Furniture and parts thereof	82	No Change
83	Travel goods, handbags and similar containers	61*, 89*, 63*	Split
84	Articles of apparel and clothing accessories	84	No Change
85	Footwear	62*, 61*	Split
87	Professional, scientific, controlling instruments, apparatus, nes	†	*Dropped (Uncategorizable)
88	Photographic equipment and supplies, optical goods; watches, etc	88	No Change
89	Miscellaneous manufactured articles, nes	†	*Dropped (Uncategorizable)
91	Postal packages not classified according to kind	†	*Dropped (Uncategorizable)
93	Special transactions, commodity not classified according to class	†	*Dropped (Uncategorizable)
95	Armored fighting vehicles, war firearms, ammunition, parts, nes	57*, 79*	Split
96	Coin (other than gold coin), not being legal tender	†	* Dropped (Gold Standard)
97	Gold, non-monetary (excluding gold ores and concentrates)	†	* Dropped (Gold Standard)

Animals (SITC 00 & SITC 94): The UK samples separate edible animals from animals for uses other than human consumption inconsistently within decades. In order to construct industry price growth measures, we require a consistent definition of products. Consequently, we map all to a combined animals category.

Miscellaneous Edible (SITC 09): This is comprised solely of "vinegar" and "lard", which appear intermittently throughout the sample. We remap lard to animal fats and oils and drop the remaining vinegar observations, as they appear in a small number of years.

Beverages (SITC 11): This category is almost wholly comprised of alcohol in most years. In 1920, Prohibition in the United States made imports illegal until its repeal 1933. Including this category would result in spurious changes in import growth during our sample that are unrelated to realized protection and confound all but the 1900-1910 cross-section. As a result, we drop SITC 11 from our import data.

Gas, Natural and Manufactured (SITC 34): This category is only observed in 1900 and 1905 in the FCNUS tariff data, making calculation of the effects of changes in import growth over our sample infeasible. We drop these observations.

Natural Oils (SITC 41-43): We combine Animal oils and fats (41), Fixed vegetable oils and fats (42) and Animal and vegetable oils and fats, processed, and waxes (43) due to changing aggregation over time that may otherwise cause elements of 41 and 42 to be categorized in 43.

Chemicals and manufactures of (SITCs 51-54, 58, & 59): We aggregate Organic chemicals (51), Inorganic chemicals (52), Dyeing, tanning and coloring materials (53), Medicinal and pharmaceutical products (54) and Artificial plastic materials, n.e.s. (58), Chemical materials and products, nes (59). 51 and 52 have substantial overlap with 53 and 54, especially as product use over time changes. Chemicals may be used both as a dyeing agent and for medicinal or cosmetic purposes, making consistent distinctions difficult or impossible to make. In some years these chemicals are specified by end use, and others not. Consequently, we construct a single chemicals industry group.

Cork, Wood, and manufactures of (SITCs 24 & 63): This combines cork and wood with cork and wood manufactures. US and UK differ in the extent to which they distinguish these two different groups, and aggregation changes over time.

Pulp, Paper and manufactures of (SITCs 25 & 64): This combines Pulp and waste paper (25) with Paper, paperboard, and articles of pulp, of paper or of paperboard (64). Ambiguity over time regarding waste paper and articles of pulp, for example, make it difficult to separate these categories fully.

Non-metallic minerals, fertilizers, and manufactures of (SITCs 27, 56, & 66): We combine Crude fertilizer and crude minerals (27), Fertilizers, manufactured (56), and Non-metallic mineral manufactures (66). There is substantial overlap between unprocessed and manufactured fertilizers as well as the minerals used in their production.

Metals and manufactures of (SITC 67- 69): We combine Iron and steel (67), Non-ferrous metals (68), and Manufactures of metals, nes (69). Difficulties in distinguishing iron and steel manufactures used as inputs (67) from finished manufactures of metals (69) requires that we aggregate these categories.

Machinery (SITC 71-77): This category contains all machinery with the exception of road vehicles and transportation equipment. The SITC categories disaggretate by industry use, while this level of disaggregation is not always clear in the tariff data, particularly early in the sample.

Transportation Equipment (SITC 78 & 79): This category contains road vehicles and transportation equipment. Due to the rapid onset of automobile production and air travel during our sample, we aggregate these to maintain a consistent set of these products over time.

Splitting: (SITC 83 & 86) Because these categories are infrequently populated in of our samples, we map each product to the product which comprises the majority of its inputs. This is almost exclusively recategorizing rubber footwear to rubber, or leather footwear and luggage to leather products, or wood and wicker baskets to wooden products. These are groups 61 (Leather products), 62 (Rubber manufactures), and 63 (Cork and Wood a.m.o.). Residual uncategorizable products are assigned to 89 (Miscellaneous manufactured article n.e.s.)

Dropped: (SITC 87): This is comprised of professional scientific instruments, and does not appear before 1930. Consequently we omit these from our analysis.

Dropped: (SITC 89) This is comprised of Miscellaneous manufactured articles, nes. While it is always populated, the products have little to no cohesive commonality or obvious means of mapping to labor markets. This is a small portion of our data and is omitted.

Dropped: (SITC 96-97) These categories include coin and non-monetary gold. Due to the reliance on the gold standard during this period we omit golds and gold related products and coins.

B Data Sources and Variable Construction

B.1 US Tariff and Import Data, 1900-1940

Foreign Commerce and Navigation of the United States (FCNUS)

For every five years between 1900 and 1930, we digitize the Foreign Commerce and Navigation of the United States (FCNUS) and obtain imports and tariffs by type at the tariff-line level. This digitization results in 25,042 tariff line observations from 1900 to 1930. For each tariff line we identify the appropriate industry based on the SITC revision 2 classification as amended in Section A based solely on product names. This yields a consistent mapping of products over time. We provide details of this data in its raw form in Table B.1.

Table B.1: FCNUS Data Sources

Year	Policy Regime	Data Source	Table	Pages	Tariff Lines	Coverage
1900	Dingley	FCNUS	No. 15	943-1116	2269	95.4%
1905	Dingley	FCNUS	No. 15	930-994	2562	98.9%
1910	Payne-Aldrich	FCNUS	No. 15	943-1147	4173	95.5%
1915	Underwood	FCNUS	No. 9	821-869	2725	96.0%
1920	Underwood	FCNUS	No. 9	525-574	2839	95.2%
1925	Fordney-McCumber	FCNUS	No. 9	15-88	5490	95.0%
1930	Smoot-Hawley	FCNUS	No. 9 Part 2	569-647	4984	95.4%

Notes: Table presents information about the raw tariff line data which form the basis of our analysis. Tariff lines indicates the number of unique tariff line items in each year's data. Coverage indicates the percent of import value which we were able to categorize to a two-digit SITC revision 2 industry as amended in section A

The first two columns indicate the year and prevailing trade policy regime. The next three columns indicate the data source, table, and pages digitized to obtain our tariff data. The column indicated by tariff lines indicates the number of tariff lines obtained from digitizing the raw data. Coverage indicates the value share of total imports covered by our final sample in each year. Coverage is always less than 100% due to sample restrictions described in appendix A – some imports are un-classifiable or are omitted intentionally (e.g., alcoholic beverages) to ensure consistent coverage of imports.

Our identification strategy requires us to identify the type of duty (specific, compound, or ad valorem) in order to construct industry *AVE* and *STS*. The duty type is readily apparent in the raw data, as can be seen in figure B.1, which reproduces a sample of the undigitized FCNUS data from 1900. We have indicated the duty-free products in gray and specific (both compound and specific only) in purple and salmon. Blue are ad valorem only.

We calculate specific tariff shares at the industry level by summing all duties among goods with any specific component and dividing the sum by total duties collected within an industry. Similarly, industry-level *AVE* is calculated by dividing total duties by total

Figure B.1: FCNUS Tariff Data

IMPORTED MERCHANDISE ENTERED FOR CONSUMPTION IN THE UNITED STATES, INCLUDING BOTH ENTRIES FOR OF DUTY COLLECTED DURING THE YEARS
1900.

ARTICLES.	Rates of duty.	Quantities.	Values.	Duties.	AVERAGE. Value per unit of quantity.	AVERAGE. Ad valorem rate of duty.
			Dollars.	*Dollars.*	*Dollars.*	*Per cent.*
Brass, and manufactures of:						
Old brass, clippings from brass or Dutch metal, fit only for remanufacture (pounds).	Free	4,573,487	553,307.65		0.12	
Wire cloth (pounds)	1¼ cents per pound and 45 per cent.	354.50	497.00	228.08	1.40	45.89
Manufactures of, not specially provided for	45 per cent.		25,104.93	11,297.22		45
	Duty remitted (Secs. 2513 and 2514, R. S.)		215.00			
Total brass, and manufactures of	Free		553,307.65			
	Dutiable		25,816.93	11,525.30		44.64
Brazilian pebble, unwrought or unmanufactured	Free					
Breadstuffs:						
Barley (bushels)	30 cents per bushel	161,613.83	78,257.52	48,484.15	.484	62
Barley, pearled, patent, or hulled (pounds)	2 cents per pound	178,999	23,212.50	3,579.98	.129	15.43
Bran and mill feed	20 per cent		47,786.45	9,557.29		20
Bread and biscuit	20 per cent		95,887.71	19,177.55		20
Buckwheat (bushels)	15 cents per bushel	285.17	131.50	42.78	.461	32.65
Buckwheat flour (pounds)	20 per cent	68,370	929.50	185.90	.013	20
Corn or maize (bushels)	15 cents per bushel	3,595.34	3,182.08	539.31	.885	16.94
Corn or maize, burnt or roasted	20 per cent		172.00	34.40		20
Corn meal (bushels)	20 cents per bushel	68.40	85.84	13.71	1.26	16.13
Macaroni, vermicelli, and all similar preparations (pounds).	1½ cents per pound	18,608,037	820,163.05	279,120.58	.044	34.03
Oat hulls (pounds)	10 cents per 100 lbs.	5,649,850	13,085.00	5,649.85	.002	43.46
Oats (bushels)	15 cents per bushel	40,554.93	18,361.67	6,083.26	.453	33.24
Oatmeal and rolled oats (pounds)	1 cent per pound	241,674.50	14,313.70	2,416.75	.059	16.9
Rye (bushels)	10 cents per bushel	330	366.00	33.00	1.11	9.02
Rye flour (pounds)	½ cent per pound					
Wheat (bushels)	25 cents per bushel		4,705.87	862.97	1.36	18.34
Wheat, crushed	20 per cent	773.09	1,422.00	284.40		20
Wheat flour (barrels)	25 per cent	3,451.88	3,757.12	939.29	4.86	25
Wheat screenings	10 per cent		1,313.00	131.30		10
Total breadstuffs			1,127,132.51	377,136.47		33.46

Notes: Figure displays pre-digitized data from the 1900 Foreign Commerce and Navigation of the US. Color coding reflects duty type. Grey are duty free. Purple are compound duties which we classify as specific tariffs. Salmon are specific (per-unit) tariffs. Blue are ad-valorem duties.

imports in the industry.

Statistical Abstract of the United States (SAUS)

We also digitize the Statistical Abstract of the Untied States (SAUS) every five years between 1900 and 1940. These flows are far more aggregate than the tariff line data and include between 200 and 400 line items annually. These data allow us to construct a measure of imports when the FCNUS would be insufficient. For example, in 1930 imports in the FCNUS span two volumes. Our sample described above only reflects the second volume because the Smoot-Hawley tariff was enacted in the middle of 1930. As a consequence, import values in this FCNUS volume are substantially less than the total import values for 1930. By using the SAUS, we are able to construct a consistent measure of imports for each year. Again, we manually concord these products to their industry counterparts based on name for each year in our series.

Table B.2: SAUS Data Sources

Year	Policy Regime	Data Source	Table	Pages	Product Lines	Coverage
1900	Dingley	1905 SAUS	No.72	273-302	207	93.3%
1905	Dingley	1905 SAUS	No.72	273-302	208	91.8%
1910	Payne-Aldrich	1919 SAUS	No. 282	425-472	261	93.7%
1915	Underwood	1919 SAUS	No. 282	425-472	261	95.1%
1920	Underwood	1921 SAUS	No. 308	483-521	490	97.9%
1925	Fordney-McCumber	1929 SAUS	No. 538	550-585	189	96.4%
1930	Smoot-Hawley	1934 SAUS	No. 491	486-520	193	94.5%
1935	Smoot-Hawley	1938 SAUS	No. 536	523-561	187	93.9%
1940	Smoot-Hawley	1941 SAUS	No. 603	613-651	191	95.5%

Notes: Table presents information about the raw import data used in our analysis. Product lines indicates unique lines from the respective table. Coverage indicates percent of import value which we were able to categorize to a two-digit SITC revision 2 industry as amended in section A.

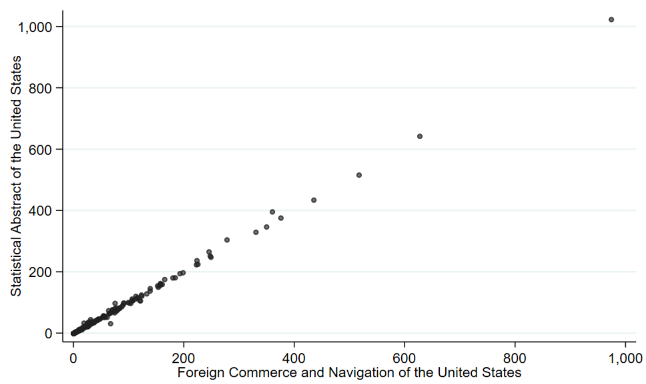
While both the FCNUS and SAUS report US import values at a disaggregate level, their coverage does differ. The primary difference between the series is that the FCNUS reports imports for consumption (upon which duties may be levied) while the SAUS reports total imports. These may differ if, for example, imports enter the US into bonded storage or for re-export. In such a case, the FCNUS would not report an item in the import data, while SAUS would.

In practice, however, this distinction makes little difference for our analysis. In figure B.2, we compare real import values across these two sources between 1900 and 1925.[50] The industry-level import values across the two sources are correlated at 99.74%. Given the fact that both sources were separately concorded to SITC industries, this also provides a check on the accuracy of the concordances.

Due to its availability throughout the entirety of the sample, we use SAUS data to construct import values in our analysis. However, our results are robust to using import values from the FCNUS whenever possible. Specifically, for log changes ending *prior* to 1930 we have data for the full year's imports from the FCNUS for both the starting and ending periods. This allows us to construct log import growth from the FCNUS. When we do not – i.e., during 1920-1930, 1925-1930, 1930-1935, and 1930-1940 – we use the SAUS to construct log industry import growth. Our results are qualitatively unchanged by this alternative approach.

[50] As noted above, although we do have the FCNUS import values under the Smoot-Hawley tariff of 1930, we exclude these data from our comparison because the Smoot-Hawley tariff is implemented partway through 1930, making the FCNUS part 2 an incomplete source for imports in that year.

Figure B.2: Real Imports at Census Industry: SAUS vs FCNUS



Notes: This figure presents a scatterplot of the real value of imports digitized from the Foreign Commerce and Navigation of the United States and the Statistical Abstract of the United States. Values are calculated at the two-digit SITC level and are reported in millions of 1900 USD.

B.2 US Import and Tariff Data, 1848-1861

This section details the data used in construction of the Morrill Tariff tariff measure, as well as imports in the 13 years immediately preceding the Morrill Tariff. This period was defined by two tariff regimes, the Walker Tariff of 1846 and the Tariff of 1857. Import data are reported in the *Commerce and Navigation of the United States* over fiscal years beginning July 1 and ending on June 30. For example, the first year of this series is published in 1849 and provides coverage of imports from July 1, 1847 to June 30, 1848. With the exception of the sample from the Morrill Tariff year itself, all of our data from 1848 to 1860 span the same 12-month period. The Morrill Tariff was enacted on March 2, 1861. Consequently, the initial sample of this data span March 2, 1861 through the end of the 1861 fiscal year on June 30, 1861. The full series description for each sample is reported below in Table B.3.

For all years, we digitize import values and quantities, units, duties paid, duty type, and unit duties. We manually link each product to its nearest two-digit SITC industry via the process described in Section A. Of the 34 industries found in our primary sample, 29 are present in the Morrill Tariff data, while 31 are available in the preceding 13 years. They are jointly defined for 28 of those industries. SITC codes 22, 57, and 82 are absent from the Morrill Sample, while SITC 79 is absent from the 1848-1860 sample.

B.2.1 Morrill Tariff Duties and Specific Tariff Share

As noted above, trade flows are recorded by fiscal year. Unlike our baseline FCNUS sample from 1900-1940, duties under the Morrill Tariff are not reported directly. Instead, they must be calculated using the duty rates, value, and quantity – all of which are reported in the Commerce and Navigation of the United States. A sample of these data may be found in B.3.

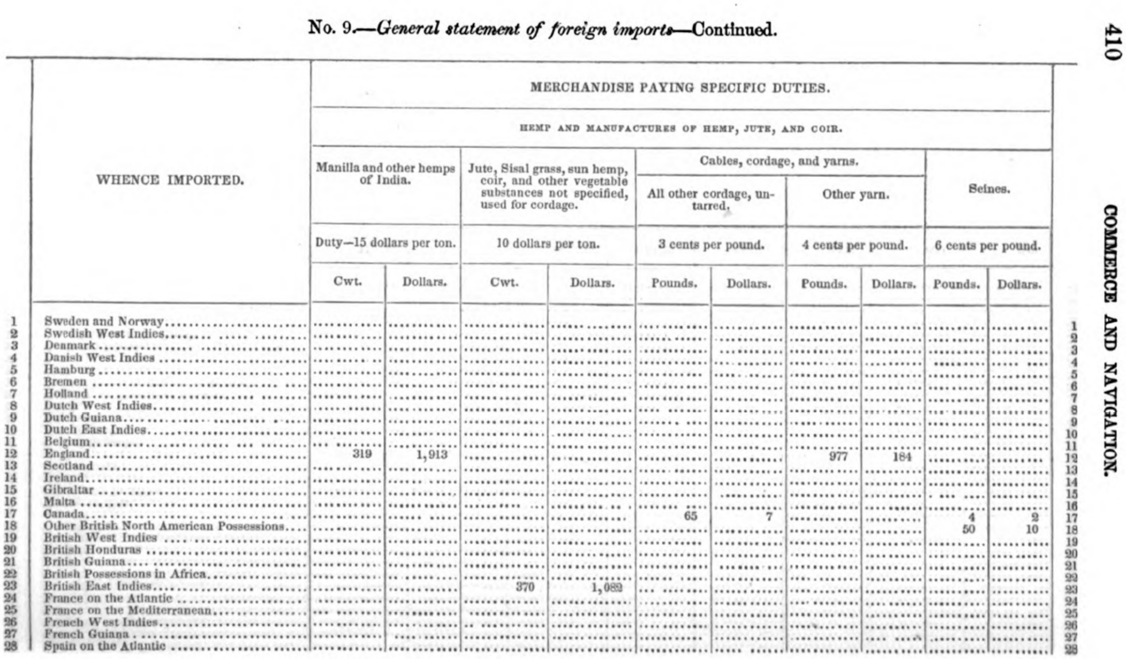
To see how these data may be used to calculate tariffs and specific tariff shares by

Table B.3: CNUS Data Sources

Year	Policy Regime	Data Source	Table	Pages
1847/1848	Walker	Commerce and Navigation of the US	No. 6 A.	258-270
1848/1849	Walker	Commerce and Navigation of the US	No. 6	266-278
1849/1850	Walker	Commerce and Navigation of the US	No. 6	268-280
1850/1851	Walker	Commerce and Navigation of the US	No. 6	274-287
1851/1852	Walker	Commerce and Navigation of the US	No. 6	266-275
1852/1853	Walker	Commerce and Navigation of the US	No. 6	266-275
1853/1854	Walker	Commerce and Navigation of the US	No. 6	276-285
1854/1855	Walker	Commerce and Navigation of the US	No. 6	292-301
1855/1856	Walker	Commerce and Navigation of the US	No. 6	284-293
1856/1857	Walker	Commerce and Navigation of the US	No. 6	272-281
1857/1858	1857	Commerce and Navigation of the US	No. 6	294-305
1858/1859	1857	Commerce and Navigation of the US	No. 6	290-301
1859/1860	1857	Commerce and Navigation of the US	No. 6	294-305
1861/1861†	Morrill	Commerce and Navigation of the US	No. 9	368-535

Notes: This table presents information regarding the sources of raw US import data used in our Morrill Tariff placebo and IV analysis found in section 4. A sample of this data may be found in B.3. Trade flows were mapped to industries as described in appendix A.

Figure B.3: Sample of CNUS Data from Morrill Tariff Era



No. 9.—*General statement of foreign imports*—Continued.

410 COMMERCE AND NAVIGATION.

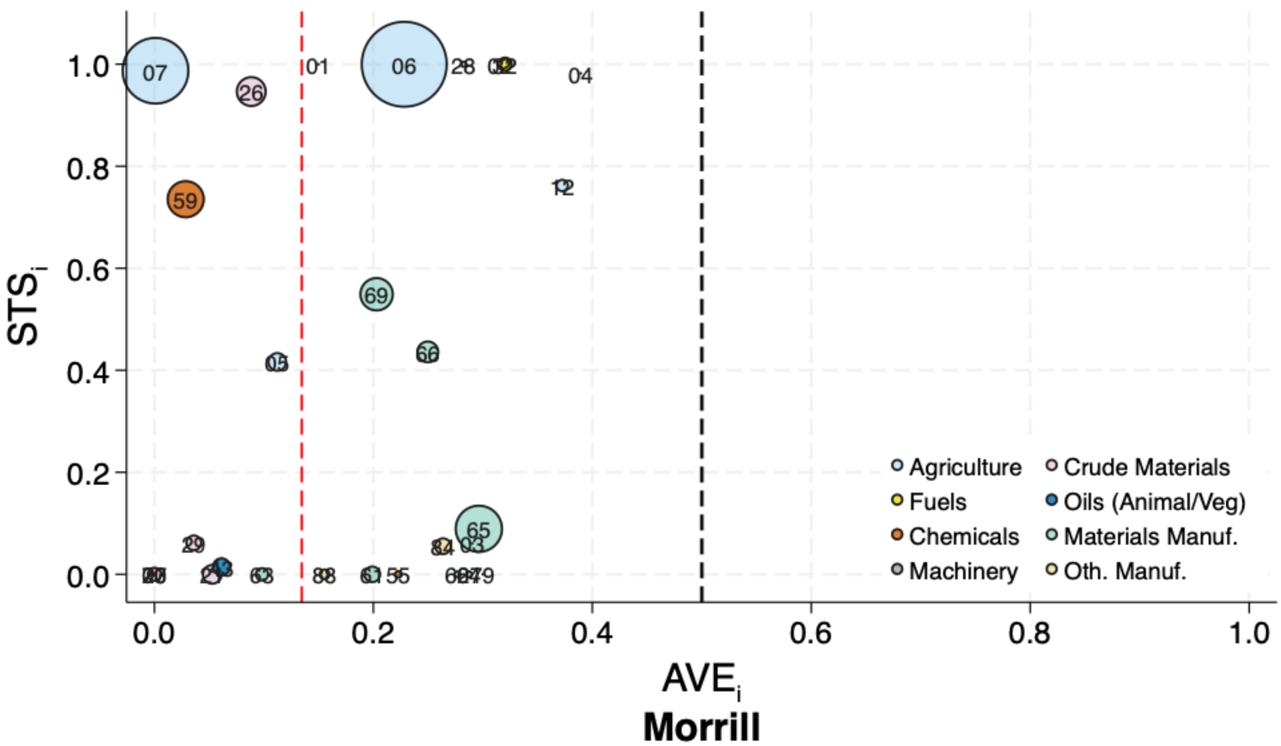
MERCHANDISE PAYING SPECIFIC DUTIES.

HEMP AND MANUFACTURES OF HEMP, JUTE, AND COIR.

	WHENCE IMPORTED.	Manilla and other hemps of India. Duty—15 dollars per ton. Cwt.	Dollars.	Jute, Sisal grass, sun hemp, coir, and other vegetable substances not specified, used for cordage. 10 dollars per ton. Cwt.	Dollars.	Cables, cordage, and yarns. All other cordage, untarred. 3 cents per pound. Pounds.	Dollars.	Other yarn. 4 cents per pound. Pounds.	Dollars.	Seines. 6 cents per pound. Pounds.	Dollars.	
1	Sweden and Norway											1
2	Swedish West Indies											2
3	Denmark											3
4	Danish West Indies											4
5	Hamburg											5
6	Bremen											6
7	Holland											7
8	Dutch West Indies											8
9	Dutch Guiana											9
10	Dutch East Indies											10
11	Belgium											11
12	England	319	1,913					977	184			12
13	Scotland											13
14	Ireland											14
15	Gibraltar											15
16	Malta											16
17	Canada					65	7			4	2	17
18	Other British North American Possessions									50	10	18
19	British West Indies											19
20	British Honduras											20
21	British Guiana											21
22	British Possessions in Africa											22
23	British East Indies			370	1,082							23
24	France on the Atlantic											24
25	France on the Mediterranean											25
26	French West Indies											26
27	French Guiana											27
28	Spain on the Atlantic											28

industry, consider the product listed "Jute sisal grass, sun hemp, coir, and other vegetable substances not specified used for cordage." Value is recorded in current US dollars, while the units are specified as Cwt. (United States hundredweight), and the specific tariff is listed on a per ton basis. Total duties on this product are calculated by converting quantity to tons (dividing observed units by 20) and then multiplying the resulting units by $10. We manually convert units into the units on which the duty is levied. We then construct STS and AVE at the industry level as in our primary sample. Figure B.4 presents the relationship between these two variables.

Figure B.4: Industry level STS_i versus AVE_i by Morrill Tariff



Notes: Figure displays the Specific Tariff Share (STS_i) versus the Ad Valorem Equivalent (AVE_i) for the Morrill Tariff of 1861. Industries are two digit SITC REV-2 industries. Marker size proportional to share of start of period imports. Solid vertical line indicates a 50% Ad Valorem Equivalent Tariff while dashed line indicates policy Ad Valorem Equivalent Tariff.

B.3 UK Import Data and Unit Value Construction, 1900-1938

Statistical Abstract for the United Kingdom (SAUK)

We digitize data from four editions of the Statistical Abstract for the United Kingdom. From these we take import values, quantities, and product names. We link these to the two-digit SITC revision 2 as above. The import data are recorded at a more aggregate level in the last two decades of our sample. Sources are reported in Table B.4.

We record bookend periods in duplicate – once from each edition – to ensure that when reported product categories change across editions, we do not construct a change in imports spanning two distinct levels of aggregation. For example, we obtain 1900, 1905, and 1910 from the same edition in order to construct changes in imports and prices

Table B.4: Sources of UK Import Data

Year	Text	Table	Pages
1900-1910	1915 SAUK	No. 39	126-160
1910-1920	1924 SAUK	No. 34	88-120
1920-1930	1932 SAUK	No. 240	350-360
1930-1938	1940 SAUK	No. 285	392-402

Notes: Sources of import values and quantities digitized and used in construction of UK import flows and industry price growth.

between 1900 and 1910. We then re-digitize 1910 from a second edition of SAUK spanning 1910, 1915, and 1920 to ensure a consistent product group and aggregation for our intra-period changes in imports and prices. Because the 1940 data are not available, we digitize the 1938 file and scale up all changes as needed to construct five-year or 10-year equivalent growth in imports and prices.

We assess the quality of our approach by also digitizing "category" level imports and ensuring that the total value of constituent products match these product group aggregate values. For example, in the figure below we check to see that the total value of imported goods categorized under Article I.A. in 1900 is equal to the category total – 62,992,082.

Each of the aforementioned series were of sufficient quality to match import aggregate import values from these tables almost exactly with the exception of the 1905 data from the 1915 edition of the Statistical Abstract for the United Kingdom. When data were illegible (e.g. import values for steel manufactures on page 152), we turned to the 1919 edition to verify the values and quantities.

Industry Price Indices

When constructing five- or 10-year price changes at the industry level, we restrict our attention to products for which we can identify an appropriate SITC code, for which we are able to construct a unit price during both periods, and for which the units in both periods allow for comparison via a consistent unit value. If unit conversions are feasible – e.g., UK CWT (hundredweight), or UK Tons to 112 lbs. and 2240 lbs., respectively – we make the appropriate quantity conversion to calculate unit values. If this is not the case – e.g., wine counted in bottles in 1900 and kegs in 1905 – then the product is not included in constructing changes in unit values across periods. Table B.5 reports the percent of aggregate import value for which we are able to map to an SITC code in column 2. Columns 3 and 4 report the percent of this value utilized in construction of SITC-level changes in log unit values.

We calculate within-product changes in log prices by aggregating to the SITC level,

Figure B.5: Sample of 1900-1905 Import Values

IMPORTS—VALUE. 142

No. 39.—DECLARED VALUE of the PRINCIPAL and OTHER
(Exclusive of Bullion and Specie.

NOTE.—*The figures given in italics for the totals of the Groups of the several*
owing to a change in the classification

ARTICLES.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
I.—FOOD, DRINK, AND TOBACCO.								
A.—GRAIN AND FLOUR:	£	£	£	£	£	£	£	£
Wheat	23,345,929	23,081,372	27,079,823	29,940,191	34,266,416	35,279,931	32,676,185	37,346,548
Barley	5,152,977	6,163,012	7,136,321	7,230,741	7,171,115	6,031,644	5,677,587	6,564,670
Oats	5,236,409	6,347,719	5,041,323	4,263,950	3,726,120	4,713,265	4,532,160	3,383,553
Maize	12,327,859	12,387,225	11,713,132	12,465,583	10,247,134	11,034,748	11,972,694	14,604,504
Peas (other than fresh), including Split Peas.	780,138	747,168	740,123	690,768	767,097	725,104	614,649	602,648
Beans (other than fresh), including Split Beans.§	536,898	629,831	§ 787,290	738,044	676,284	535,519	383,668	450,539
Lentils, including Split Lentils	Incl. with "Seeds, Tares and Vetches" (Class II., Sec. K.).		* 41,837	52,969	62,078	61,079	53,048	94,991
Rye	359,800	344,383	312,206	302,701	280,303	305,293	323,545	317,456
Wheatmeal and Flour	10,102,548	10,341,519	8,925,617	9,723,652	7,258,600	6,044,845	6,817,213	6,694,082
Oatmeal, Groats, and Rolled Oats (including Quaker Oats).	523,765	546,132	486,241	537,415	456,593	463,293	495,980	479,352
Maize Meal	456,449	457,345	83,270	176,622	100,940	144,829	195,302	213,581
Rice	} 2,408,069	2,477,465	2,524,156	{ 2,015,188	2,228,097	2,295,756	2,259,732	2,800,464
Rice Meal and Flour				347,103	403,126	562,197	743,847	536,390
Meal, Other	84,886	83,239	‡267,965	250,759	254,537	138,531	239,463	186,437
Other Farinaceous Substances and Manufactures.†	1,676,355	809,695	844,696	906,719	897,257	864,251	895,516	1,133,941
Total of Grain and Flour	*62,992,082*	*64,416,105*	*65,984,000*	69,642,405	68,796,597	69,200,285	67,880,589	75,409,156

Notes: Figure displays sample of data taken from page 142 of Statistical Abstract for the United Kingdom, 1915.

Table B.5: Value Share Coverage

Year	SITC	5-year $\Delta Ln(P_{it})$	10-year $\Delta Ln(P_{it})$
1900	0.982	0.884	0.884
1905	0.980	0.910	-
1910	0.964	0.899	0.899
1915	0.974	0.933	-
1920	0.998	0.901	0.901
1925	0.997	0.882	-
1930	0.997	0.875	0.875
1935	0.998	0.880	-

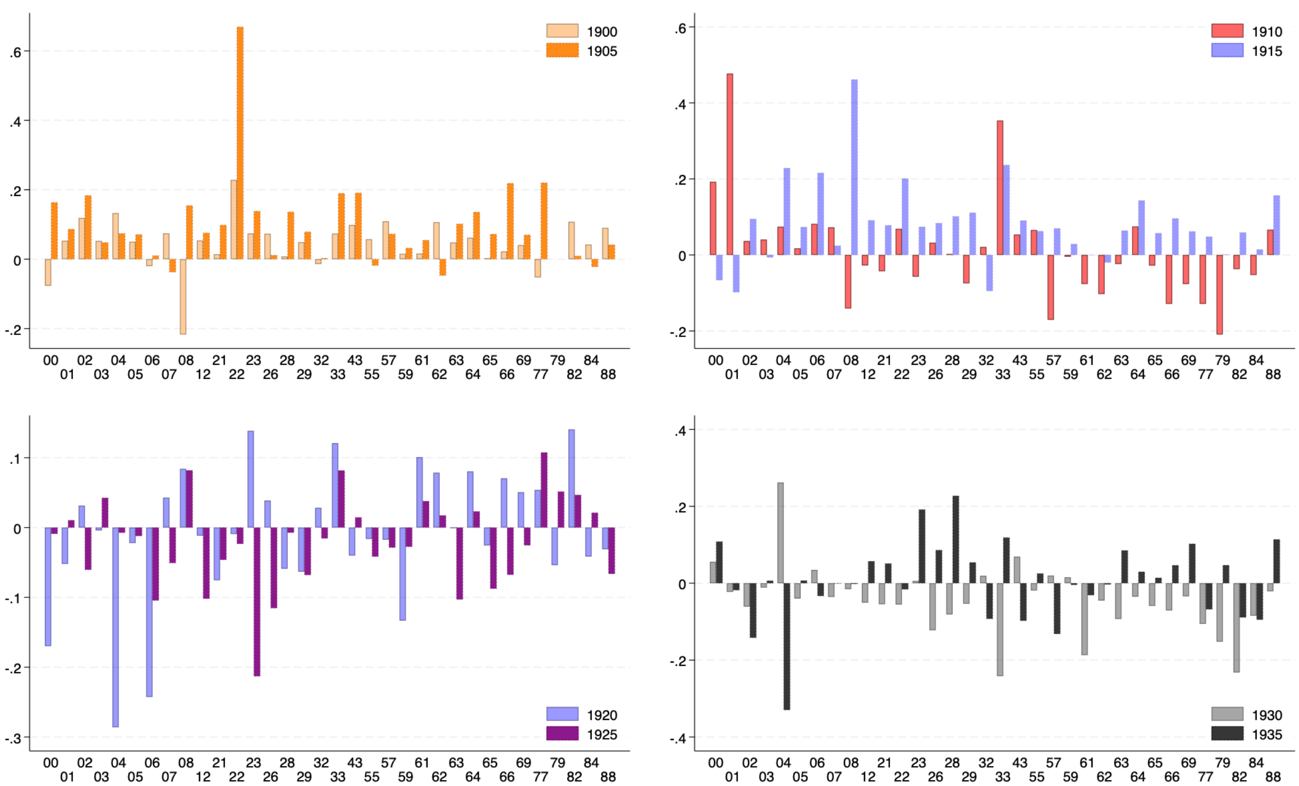
Notes: Share of total imports used in construction of UK import values as well as share of these values used in constructing 5-year and 10-year industry price growth.

weighting by start-of-period import values. For example, to calculate a price change for textile manufactures (SITC 65) we aggregate information on various silk and cotton imports by first constructing the log change in prices among the unit values separately, and then taking an expenditure-weighted average of the cotton and silk products among all cotton and silk expenditures. Finally, in some years we are unable to construct a product-level unit value for any product within an SITC category. In such situations, we substitute the aggregate UK CPI as our measure of industry price growth.

C Industry Import Growth Descriptives and Robustness

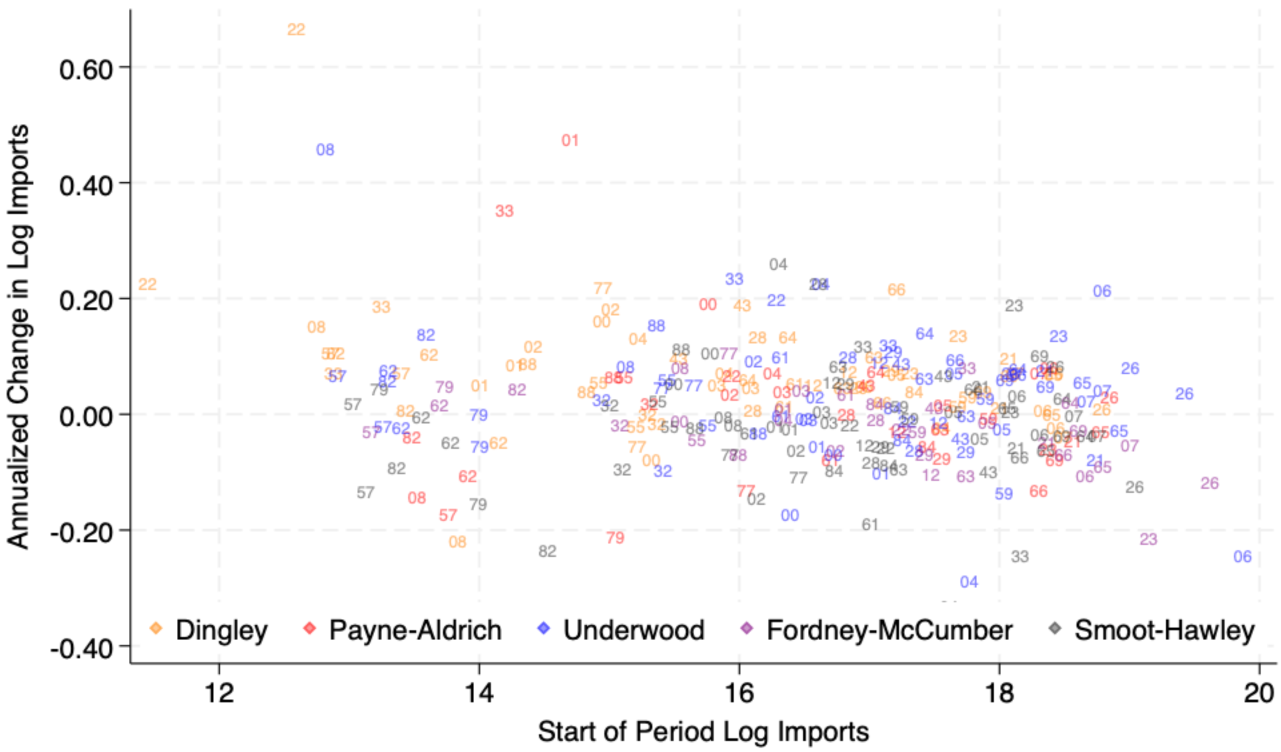
In this section we provide additional information on industry-level trade flows, discuss the relationship between our estimates and the standard trade elasticity, and demonstrate robustness of the baseline industry specifications found in Section 4. We begin by detailing the relative importance of various US sectors in driving import growth during our sample. To do so, we provide two characterizations of our data. In figure C.1 we display annualized US log import growth for each five-year period in our sample. This variation underlies the dependent variable the our industry-level analysis found in Section 4. These are color coded to match their use elsewhere in the paper and reflect the trade policy in place at the start of period – the Dingley Tariff (orange), Payne-Aldrich (red), Underwood-Simmons (blue), Fordney-McCumber (purple), and Smoot-Hawley (Gray).

Figure C.1: Annualized Log Import Growth by Industry



Given the heterogeneous importance of sectors in the overall composition of US imports, we also present a scatterplot of the relationship between real log import growth and start-of-period real log imports in Figure C.2.

Figure C.2: Growth in Log Imports vs Log Imports by Industry and Policy



Notes: This figure presents annualized 5-year import growth for from 1900-1940 by two-digit SITC industry as amended in Appendix A. Imports are digitized from the Foreign Commerce and Navigation of the United States and Statistical Abstract of the United States.

C.1 Import Growth and Elasticity

To help relate our estimates to those in the trade elasticity literature, we outline a simple framework to construct an import growth equation and provide estimates of key parameters under varying assumptions.

Industry, i's import demand is subject to time varying taste shocks b_{it} with a constant import demand elasticity σ across all industries $i \in I$, and can be written

$$q_{it} = b_{it} p_{it}^{-\sigma} P_t^{\sigma-1} E_t$$

with

$$P_t \equiv \left(\sum_{i \in I} b_{it} p_{it}^{1-\sigma} \right)^{\frac{1}{1-\sigma}} \tag{C.1}$$

where p_{it} are tariff-inclusive import prices and p^*_{it} are tariff-exclusive prices in the domestic currency and E_t are exogenously given expenditures on imports. Tariffs can be specified as ad valorem τ_{it} or specific f_{it} so that import prices become:

$$p_{it} = p^*_{it} \left(1 + \underbrace{\tau_{it} + \frac{f_{it}}{p^*_{it}}}_{AVE_{it}} \right), \tag{C.2}$$

Export supply for industry i is given by

$$p^*_{it} = e^{\eta_{it}} q_{it}^{\omega}$$

where $\omega \geq 0$ captures the inverse export supply elasticity and η_{it} is a time-varying industry-specific productivity shock. Then log import demand and inverse log export supply can be written:

$$\ln y^*_{it} = -\sigma \ln (1 + AVE_{it}) + (1 - \sigma) \ln p^*_{it} + (\sigma - 1) \ln P_t + \ln E_t + \ln b_{it}$$

and

$$\ln p^*_{it} = \frac{-\sigma\omega}{1 + \omega\sigma} \ln (1 + AVE_{it}) + \frac{\omega(\sigma - 1)}{1 + \omega\sigma} \ln P_t + \frac{\omega}{1 + \omega\sigma} \ln E_t + \frac{1}{1 + \omega\sigma} \eta_{it} + \frac{\omega}{1 + \omega\sigma} \ln b_{it} \tag{C.3}$$

respectively, which yield the following expression for industry imports:

$$\ln y^*_{it} = -\frac{\sigma(1 + \omega)}{1 + \omega\sigma} \ln (1 + AVE_{it}) + \gamma_t + \frac{(1 + \omega)}{1 + \omega\sigma} \ln b_{it} + \frac{(1 - \sigma)}{1 + \omega\sigma} \eta_{it}. \tag{C.4}$$

Here, γ_t absorbs aggregate expenditures and price indices.

As the cost and demand shocks are in the residual of our estimation equation, to the extent that affect tariff policy through political economy channels estimates on the effect of $\ln(1 + AVE_{it})$ on imports will be biased. To see how our approach addresses this issue, we express import growth in changes:

$$\Delta \ln y^*_{it} = -\frac{\sigma(1+\omega)}{1+\omega\sigma}\Delta \ln(1 + AVE_{it}) + \xi_t + \epsilon_{it} \tag{C.5}$$

where ξ_t captures the change in γ_t and ϵ_{it} embeds the changing demand and cost shocks.

We then write $\Delta \ln(1 + AVE_{it})$ in terms of t_0 policy variables, changes in policy variables, and price changes. First, write

$$\begin{aligned} \Delta \ln(1 + AVE_{it}) &= \ln(1 + AVE_{it_1}) - \ln(1 + AVE_{it_0}) \\ &= \ln\left(1 + \frac{\Delta AVE_{it}}{AVE_{it_0}} \times \frac{AVE_{it_0}}{1 + AVE_{it_0}}\right) \end{aligned} \tag{C.6}$$

Then, we rewrite ΔAVE_{it} as a function of legislated tariffs and price movements:

$$\begin{aligned} \Delta AVE_{it} &\equiv \tau_{it_1} - \tau_{it_0} + \frac{f_{it_1}}{p_{it_1}} - \frac{f_{it_0}}{p_{it_0}} \\ &= \Delta\tau_{it} + \frac{\Delta f_{it}}{p_{it_1}} - \frac{f_{it_0}\Delta p_{it}}{p_{it_1}p_{it_0}} \end{aligned} \tag{C.7}$$

As legislated tariff levels are endogenously related to imports, our approach exploits variation in the final term, which captures changes in AVE_it driven by price movements in the presence of specific tariffs. Substituting this into our import growth equation we obtain

$$\Delta \ln y^*_{it} = -\frac{\sigma(1+\omega)}{1+\omega\sigma} \ln\left(1 - \frac{\Delta p_{it}}{p_{it_1}} \underbrace{\frac{f_{it_0}}{p_{it_0}\tau_{it_0} + f_{it_0}}}_{STS_{it_0}} \frac{AVE_{it_0}}{1 + AVE_{it_0}}\right) + \xi_t + \epsilon_{it}$$

If we assume that initial policy variables τ_{it_0} and f_{it_0} are uncorrelated with unobserved determinants of import growth – *changes* in demand or cost shocks b_{it} and η_{it}, respectively – then this equation is identified if we also assume that price changes are exogenous. However, as prices are determined by equation C.3, this will hold only in special conditions. As demand shocks and cost shocks are embedded in Δp_{it}, our measure of intra-policy tariff changes $\Delta \ln 1 + AVE_{it} = \ln\left(1 - \frac{\Delta p_{it}}{p_{it_1}} STS_{it_0} \frac{AVE_{it_0}}{1+AVE_{it_0}}\right)$ will will still be correlated with the residual.

If, however, US demand has no impact on prices, the equation is identified. To see this, suppose $\omega = 0$, which corresponds to the small country case. The tariff-exclusive price $p^*_{it} = e^{\eta_{it}}$ then varies solely due to industry specific productivity shocks:

$$\Delta \ln y^*_{it} = -\sigma \ln \left(1 - \frac{\Delta p_{it}}{p_{it_1}} STS_{it_0} \frac{AVE_{it_0}}{1 + AVE_{it_0}}\right) + \xi_t + \epsilon_{it} \quad \text{(C.8)}$$

$\Delta \ln (1 + AVE_{it})$ will be independent of the residual so long as demand and supply shocks are independent. Industry-specific price shocks that are embedded in $\Delta \ln (1 + AVE_{it})$ are still be correlated with the residual, but using only aggregate price growth and including time fixed effect ξ_t removes this correlation.[51] Because we believe the identifying assumptions required to obtain a structural elasticity estimate here are particularly strong, we caution a strict interpretation of these parameters and present them only for comparison with the existing literature.

Table C.1 estimates the OLS version of equation C.8 as well as three IV versions using our measure of changes in realized protection as an instrument. As in our baseline regressions in Table 3, we include controls for initial AVE and STS. In column 1 we obtain an estimated σ of 3.6. This is only identified so long the initial tariff levels are uncorrelated with import growth. To address this issue, we use our preferred measure $\Delta RP_{it} = \ln \left(1 - \frac{\Delta p_{it}}{p_{it_1}} STS_{it_0}\right)$ as an instrument for $\ln \left(1 - \frac{\Delta p_{it}}{p_{it_1}} STS_{it_0} \frac{AVE_{it_0}}{1+AVE_{it_0}}\right)$ and again rely only on UK CPI for price variation. The estimated elasticity increases to 6.8. In columns 3 and 4 we allow for additional price variation which incrementally increases our concerns about the endogenous relationship with prices. In column 3, we utilize an IV which embeds industry price variation and in column 4 we add exchange rate variation to these industry prices. Regardless of the source of price variation, our estimates are in line with the prior literature on trade elasticities (see (Boehm et al., 2023) for a survey).

[51] While this informs our use of aggregate price series for our baseline results we also have to maintain the assumption that tariffs are not chosen to impact import growth. If they do, then $E[\epsilon_{it}|AVE_{it_0}] \neq 0$. and our estimated effects will still be confounded. Additionally, controlling for initial tariff levels either as AVE_{it_0} or $\ln (1 + AVE_{it_0})$ would only correct this issue if we assumed that these were linear functions of our demand and supply disturbances. As such, we omit the interior $\frac{AVE_{it_0}}{1+AVE_{it_0}}$ from our baseline approach and as an added measure we also attempt to control for it directly.

Table C.1: Estimates of the Import Elasticity

	Panel A: $\Delta \ln(Imports^{US}_{it})$			
	(1)	(2)	(3)	(4)
$\Delta \ln(1 + AVE_{it})$	-3.597	-6.681	-4.153	-5.342
	(1.819)	(2.896)	(1.764)	(2.229)
Estimator	OLS	IV	IV	IV
R^2	0.265	0.244	0.246	0.171
1^{st}-Stage f.	-	17.157	13.42	12.819
Price Index	UK^{CPI}	UK^{CPI}	UK^{UV}_{it}	$XR - UK^{UV}_{it}$
	Panel B: First Stage Coefficient			
	(1)	(2)	(3)	(4)
ΔRP_{it}		0.122	0.196	0.152
		(0.029)	(0.053)	(0.042)
R^2	0.268	0.672	0.392	0.338
N.	135	135	135	135

Notes: Dependent variable is annualized 10-year log changes in real US industry imports from 1900-1940 in stacked panels. The primary covariate is the change in US tariff protection due to the inflationary erosion of specific tariffs and is defined in equation C.8. Columns differ by estimator and price variation employed in constructing this variable and are indicated in the footer. All regressions are unweighted and include time fixed effects and controls from column 3 of table 3. Standard errors are clustered at two-digit SITC level and reported in parentheses.

C.2 Estimating Effects During Inflation and Deflation Separately

Here we estimate the effects of changes in realized protection separately during inflationary and deflationary periods. Across the entirety of our 40-year sample, prices increase modestly. As such, one might worry that our estimates capture unobserved industry-level correlates of changes in realized protection that are also associated with import growth. To explore this possibility, we split our sample into inflationary (1900-1920) and deflationary (1920-1935) periods and estimate our baseline equation for five-year changes separately for each period:

$$\begin{aligned}\Delta \ln(Imports_{it}^{US}) =& \beta_0 + \beta_1 \Delta RP_{it} + \Gamma X_{it} + \eta_t + \epsilon_{it} \\ &\text{with} \\ \Delta RP_{it} \equiv& \ln\left(1 - \frac{\Delta p_t}{p_{t_1}} STS_{it_0}\right).\end{aligned}$$

In order for unobserved industry trends to be driving our results, the trends would have to change signs in 1920 as the inflationary erosion of protection associated with rising imports became deflationary increases in protection leading. Without a clear mechanism for such a switch, finding that our baseline results obtain after splitting our sample should assuage such fears. Table C.2 replicates Table 3 with the inflationary period (1900-1920) in Panel A and the deflationary period (1930-1935) in panel B.

As before, column 1 includes only time fixed effects as a control. Changes in realized protection predict import growth in both the inflationary and deflationary periods, though the effect is larger in deflationary periods. The addition of initial AVE_{it_0} levels as a covariate in column 2 makes no qualitative difference on this conclusion. It is only in column 3, in which we control for STS_{it_0} directly that this effects diverge meaningfully – the estimate in deflationary periods increases and is cut in half in deflationary periods. This may be driven by the high degree of multicolinearity between STS_{it_0} and our measure of realized protection when split separately into high and low inflation periods. Given the persistence in STS over time, a within-period correlation of STS_{it_0} and ΔRP_it of -63% and 83% in periods of inflation and deflation, respectively, makes it difficult to separately identify the two coefficients. Put another way, if prices grew linearly, the two estimates would not be separable. Identifying them both thus requires meaningful deviation from price trends, such as bouts of inflation and deflation. Further, note that STS_{it_0} is always insignificantly related to import growth in the pooled sample.

That our main effect holds in the first two columns and maintains a consistent sign in all specifications suggests little evidence for unobserved trends that coincidentally switch signs at the same time as realized protection.

Table C.2: Asymmetry of Import Growth and ΔRP_{it}^{US}

	Panel A: Inflationary Periods		
	(1)	(2)	(3)
ΔRP_{it}	-0.464	-0.522	-0.278
	(0.263)	(0.270)	(0.300)
$\ln(1+AVE_{it_0})$		-0.113	-0.123
		(0.054)	(0.056)
STS_{it_0}			0.035
			(0.036)
Std. Coef.	-0.232	-0.261	-.0139
R^2	0.078	0.095	0.096
Obs.	134	134	134
Panels	4	4	4

	Panel B: Deflationary Periods		
	(1)	(2)	(3)
ΔRP_{it}	-1.208	-1.207	-3.006
	(0.539)	(0.543)	(1.082)
$\ln(1+AVE_{it_0})$		-0.007	-0.020
		(0.044)	(0.041)
STS_{it_0}			0.086
			(0.034)
Std. Coef.	-0.36	-0.359	-0.895
R^2	0.050	0.040	0.082
Obs.	102	102	102
Panels	3	3	3

Price Growth	UK^{CPI}	UK^{CPI}	UK^{CPI}
Time FE	Yes	Yes	Yes
Weighted	Equal	Equal	Equal
Δt	5-year	5-year	5-year
Period	1900-35	1900-35	1900-35

Notes: Dependent variable is annualized 5-year log changes in real US industry imports from 1900-1935 in stacked panels. ΔRP_{it}^{US} is the US change in realized protection, which is the percent change in US tariff protection due to the inflationary erosion of specific tariffs and is defined in equation 4. Columns 1-3 replicate baseline the analogous columns from Table 3. Panel A estimates this effect during inflationary periods, while Panel B does so during deflationary periods. Standard errors are clustered at two-digit SITC level and reported in parentheses.

C.3 Additional Summary Statistics and Industry Robustness

We now turn to additional specifications of our industry analysis. We begin by providing summary statistics for the 10-year changes in log imports, realized protection, AVE, and STS. These can be found in Table C.3 and are the counterpart to the five-year sample found in Table 2 in the primary text. The series found in both tables have been annualized to facilitate comparison.

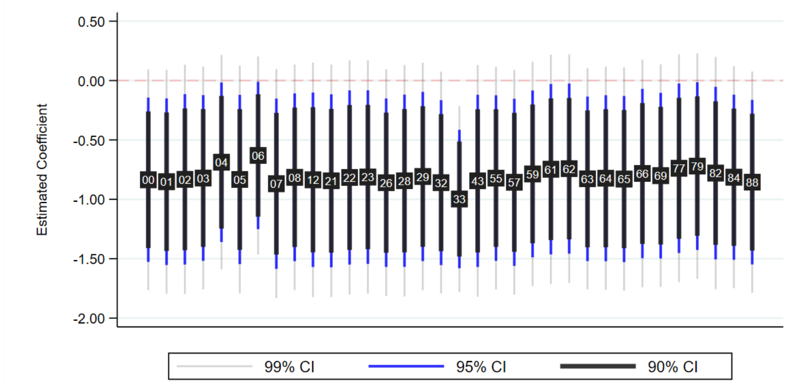
Table C.3: Summary Statistics for 10-Year Sample

	1900	1910	1920	1930	Total
$\Delta \ln(Imports_{it}^{US})$	0.072	0.045	-0.015	-0.019	0.021
	(0.080)	(0.082)	(0.062)	(0.053)	(0.080)
$\Delta RP_{it} : UK_t^{CPI}$	-0.003	-0.049	0.015	-0.009	-0.012
	(0.002)	(0.037)	(0.016)	(0.006)	(0.031)
$\Delta RP_{it} : UK_t^{UV}$	-0.001	-0.056	0.036	0.009	-0.003
	(0.025)	(0.047)	(0.051)	(0.021)	(0.051)
AVE_{it_0}	0.303	0.238	0.091	0.204	0.208
	(0.279)	(0.191)	(0.111)	(0.196)	(0.214)
STS_{it_0}	0.647	0.557	0.377	0.574	0.538
	(0.364)	(0.384)	(0.418)	(0.380)	(0.396)

Notes: Table presents summary statistics for 10-year industry import growth and changes in realized protection. For ease of comparison with table 2, all variables have been annualized. Variable means are reported above variable standard deviations (in parenthesis).

In Figure C.3 we demonstrate that our primary findings are not driven by any single industry. To do so, we estimate our industry-level import growth regressions as in columns 3 of table 3, sequentially omitting each two-digit SITC code in our sample. We report the primary coefficient of interest (ΔRP_{it}) from these specifications with the omitted industry indicated in the circle. Standard error bars indicate significance at 10, 5, and 1% respectively.

Figure C.3: Annualized Log Import Growth Omitting Industries



Notes: Each vertical bar is the primary coefficient from table 3 column 3 estimated by omitting the indicates two-digit SITC code. Black, blue, and grey bars indicate 90%, 95%, and 99% confidence intervals respectively.

As noted in the text, to the extent that specific tariffs are employed endogenously as a policy tool, we would expect specific tariff shares to vary substantially over time as both prices and political economy concerns fluctuate. Furthermore, we would anticipate a negative correlation between industry specific tariff shares during periods of price increases and periods of price declines, as politicians hoping to protect domestic industry would rely on specific tariffs when facing deflation, and ad valorem tariffs when anticipating inflation. No such pattern appears in the data. In Table 7 we present pairwise correlations between industry-level STS across all trade policy regimes in our sample. Specific tariff shares are highly and positively correlated throughout.

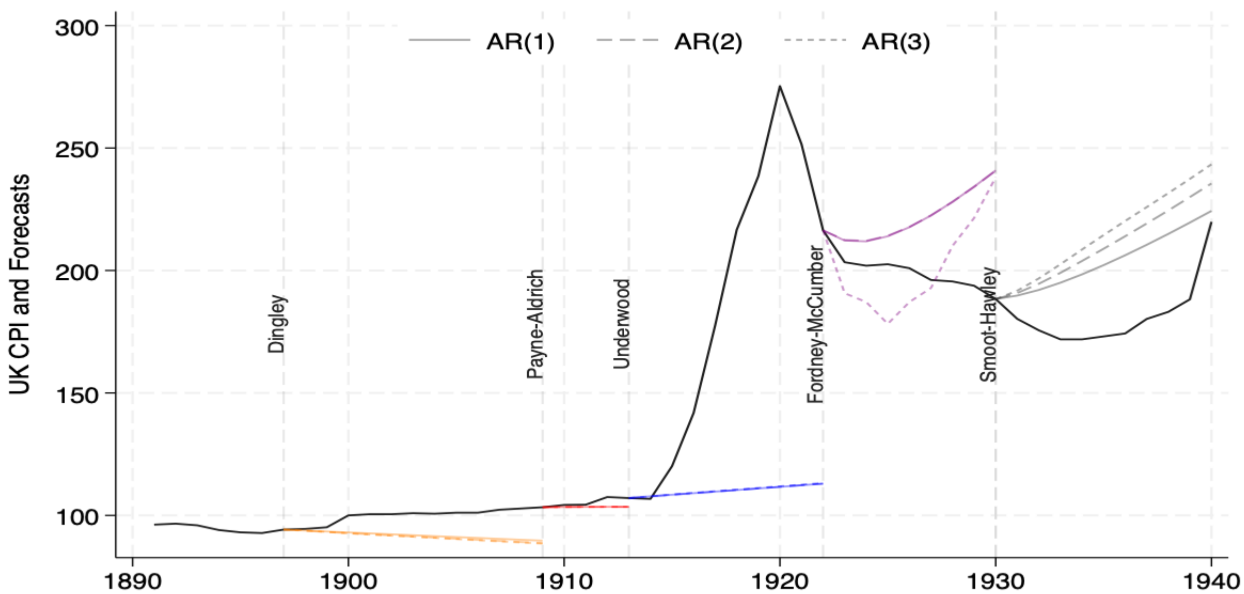
As a whole, these results suggest that time-varying political economy concerns do not play a dominant role in determining specific tariff shares or their relationship with subsequent import growth.

C.4 Price Forecasting

As discussed in the text, a further threat to identification is the possibility that changes in realized protection are themselves non-random. This would be possible if specific tariffs were determined jointly with an inflation forecast. That is, if politicians anticipate subsequent price movements and set specific tariffs in expectation of the implied effects on realized protection, our measure would be subject to the same concerns that complicate the use of ad valorem equivalent tariffs directly. For example, in the face of expected deflation, politically influential industries might lobby for higher levels of specific tariffs. With this in mind, we evaluate the feasibility of price forecasting during our sample.

Prices in this era experienced periods of rapid inflation, as well as bouts of substantial deflation, as highlighted in Figure 1 in the text. To accurately use specific tariffs as a means of future protection, politicians would need to correctly anticipate both. To further emphasize this point, we explore how well a simple price forecast matches subsequent price growth in this period.

Figure C.4: UK CPI Forecasts at Policy Onset



Notes: Forecast series constructed from AR(1), AR(2), and AR(3) models of log UK CPI growth, respectively, and are based on years (t_{-25}, t_{-1}) preceding the policy's onset at year t. UK CPI data taken from Jordà et al. (2017).

Specifically, in Figure C.4 we present forecasts of the UK CPI, as used in our baseline measure of changes in realized protection. We estimate an auto-regressive model of log price growth based on 25 years of data prior to each change in tariff policy and use estimates from these models to construct a dynamic forecast beginning at the onset of the policy regime and continuing through the subsequent policy regime's inception. We report forecasts from models estimated using one to three lags. As is clear from the figure, differences between the expected and realized price growth are considerable and represent likely unanticipated changes in realized protection. Take, for example, price forecasts at the onset of the Dingley Tariff in 1897. Forecasts would have predicted subsequent deflation, thus favoring specific tariffs as a tool to engender increased protection. In fact, prices increased. Even in cases when a simple forecast correctly predicts the direction of price changes, such as under the Underwood Tariff, the discrepancy between the magnitude of anticipated and realized price movements is substantial. Such volatility limits the scope for endogenous tariff setting through specific tariffs, as unanticipated changes in price levels lead directly to unanticipated changes in protection.[52]

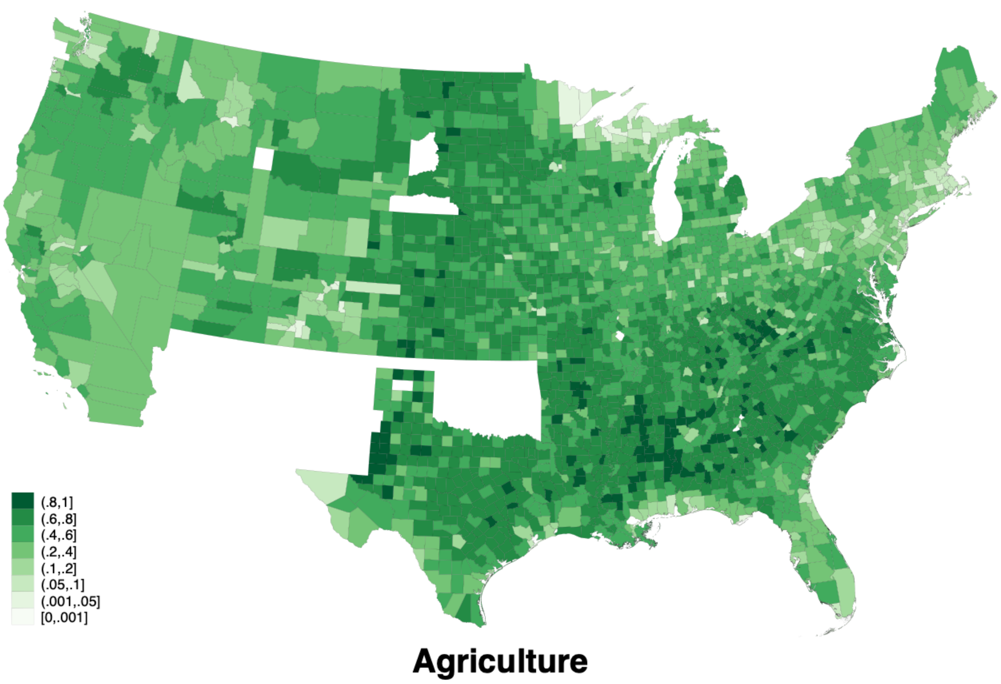
[52] These results are consistent with the broader literature on price forecasting during this period, e.g. Irwin (2014), Evans and Wachtel (1993), Hamilton (1992), and Dominguez and Fair (1988).

D Labor Market Descriptives and Robustness

This section provides additional information regarding our spatial mapping of trade flows to labor markets in section 5, as well as additional descriptive features of the labor market shock. Section D.1 presents additional labor market robustness tables based on our primary analysis while Section D.2 provides a county-level analysis of labor market outcomes.

In order to construct our shift share shock we map national import growth to counties by creating an employment-weighted average of national industry imports. Given its importance to labor markets in this era, we display the share of county employment accounted for by agriculture in figure D.1.

Figure D.1: Employment Shares in Agriculture, 1900



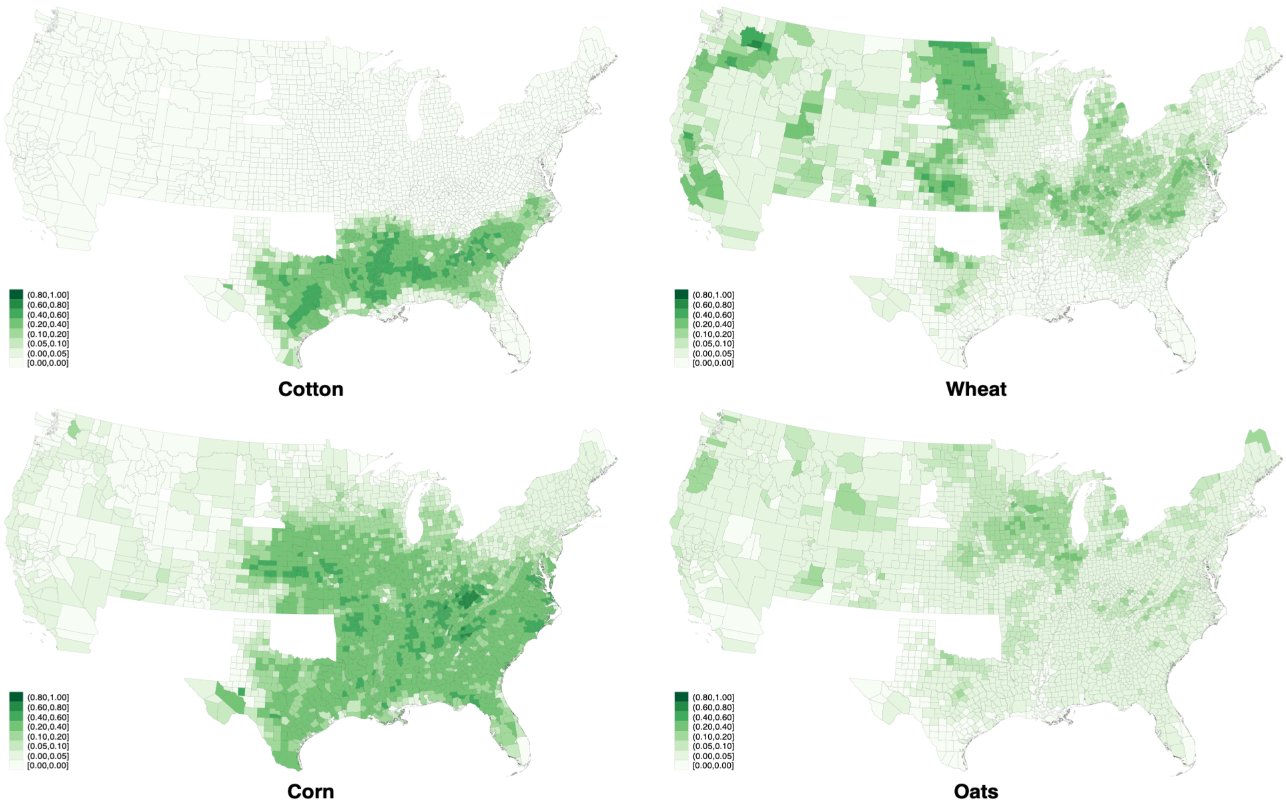
Notes: Agricultural employment defined as 1950 IPUMS Census industry 105.

On average, one-third of county-level employment is engaged in agriculture. Due to the importance of agriculture as a whole, as well as the geographic dispersion of crops, we separate four major crops from our industry import data and map them to labor markets with the aid of the NHGIS county-level acreage data from 1899. These data provide county-level acreage by crop type for each of 37 crops. Over 93% of all acreage is used in the production of five crops: Corn, Grasses, Wheat, Oats, and Cotton. Of these, we can readily identify Corn, Wheat, Oats, and Cotton in the FCNUS, SAUS, and SAUK data.[53]

[53] Corn imports are missing from the Statistical Abstract data in 1910. Due to corn's importance in

We thus construct acreage share-based employment weights for agricultural workers within a county based on corn, oats, wheat, cotton, livestock production, and a composite residual category. We display the variation for the four major crops in D.2.

Figure D.2: Employment Share Attributed to Major Crop Groups



For all other products, we map imports to labor markets by concording trade flows to the Census Industry (IND1950) through three steps. First, using a conversion table provided by UN Trade Statistics we map SITC codes to the 6-digit 1993 Harmonized System (HS) classification scheme.[54] This is an n-to-one mapping, so we apportion trade SITC flows to each HS product weighting by the inverse number of HS codes to which a given SITC code concords.

We then map from HS to 4-digit SIC codes using the concordance constructed by Pierce and Schott (2012). We apportion these codes in equal share to the SIC products to which they concord. Again, we weight trade flows by the inverse number of SIC products to which an HS code maps. Finally, we concord SIC codes to 1990 Census industry codes using the concordance provided by James Lake (http://p2.smu.edu/jlake/data_code.html). These then map in an n-to-one fashion to 1950 census industry codes, which is

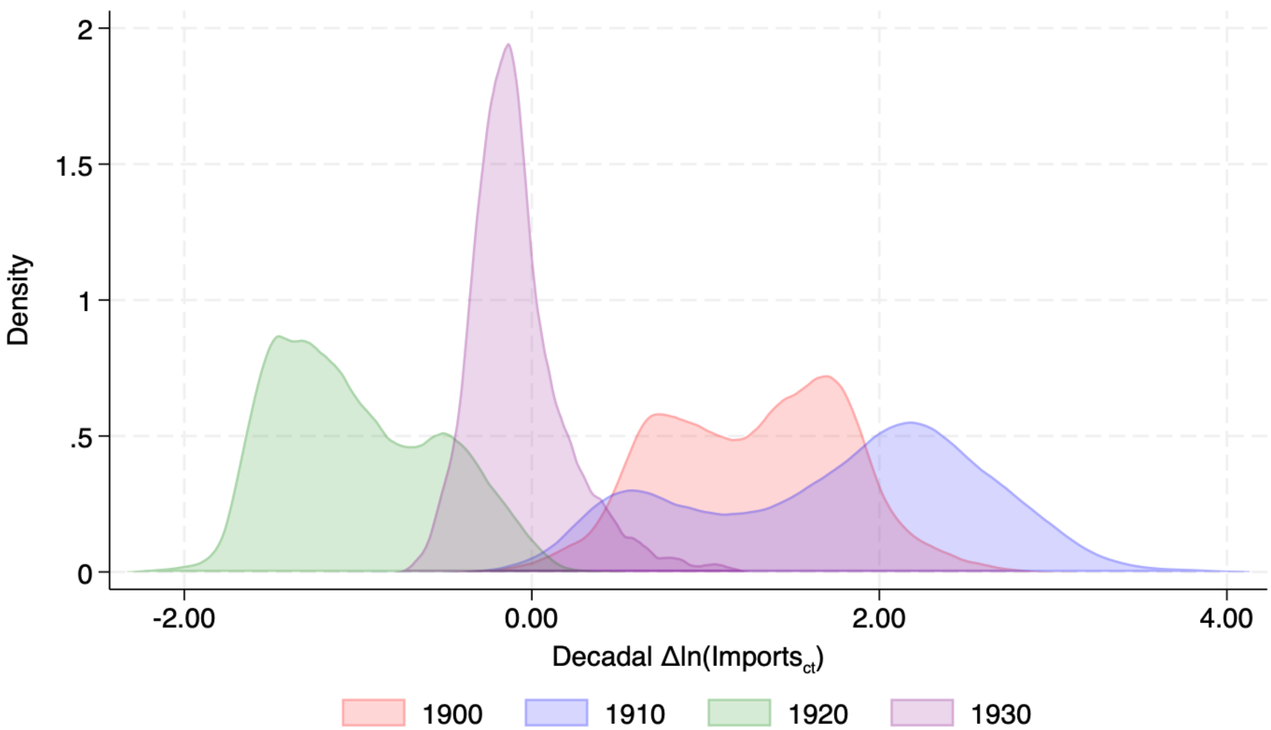
employment, we infer corn imports in this year by multiplying corn imports from the 1910 FCNUS data by the ratio of Statistical Abstract to FCNUS imports for corn in 1909. We then subtract this value from "other breadstuffs" in the Statistical Abstract data.

[54] https://unstats.un.org/unsd/trade/classifications/correspondence-tables.asp

the native classification for industrial employment in our 1900-1940 census data.

In Figure D.3 we display the distribution of our shift share shocks by decade. As is clear from the figure, these county level shocks match our aggregate import growth patterns: 1900-1920 was characterized by import growth, while 1920-1940 experienced a contraction, though county-level experiences differed substantially.

Figure D.3: Kernel Density of Import Exposure by Decade



Notes: Figure displays kernel density of county log changes in imports per worker by decade.

D.1 Robustness of Linked Labor Market Outcomes

In this section, we provide summary statistics for our key covariates and explore the robustness of our baseline labor market results to a host of alternative specifications. Table D.1 provides summary statistics for the covariates in our individual labor market analysis in section 5.

Table D.1: Descriptive Statistics for Individual Labor Market Analysis

	1900	1910	1920	1930	Total
$\Delta \ln(Imports_{ct})$	1.011	1.197	-0.597	-0.138	0.989
	(0.456)	(0.925)	(0.555)	(0.235)	(0.660)
ΔRP_{ct}	-0.030	-0.609	0.143	-0.088	-0.140
	(0.006)	(0.187)	(0.082)	(0.030)	(0.250)
$NILF_{i,t+10}$	0.030	0.047	0.038	0.066	0.034
	(0.170)	(0.211)	(0.191)	(0.248)	(0.180)
$\Delta \ln(Income_{i,t+10})$	0.064	0.093	0.080	0.074	0.071
	(0.502)	(0.453)	(0.437)	(0.477)	(0.490)
$MigrateState_{i,t+10}$	0.298	0.236	0.215	0.185	0.282
	(0.458)	(0.424)	(0.411)	(0.388)	(0.450)
Switch Industry$_{i,t+10}$	0.663	0.607	0.616	0.664	0.650
	(0.473)	(0.488)	(0.486)	(0.472)	(0.477)

Notes: Table reports summary statistics for key dependent and explanatory variables by decade and overall. Variable mean stacked above variable standard deviation (in parenthesis). As with individual-level regressions, summary statistics are weighted following Abramitzky et al. (2020).

First, in Table D.2, we repeat the specification from Table 9 separately for White, Black, and foreign-born individuals. As is clear from the table, while point estimates vary slightly between groups, the overall implication that relative labor market conditions declined as a result of import growth era is not specific to one particular group.

In Table D.3, we similarly show that our results are not driven by a particular decade. This is especially important given the existence of large idiosyncratic shocks such as World War I, the Great Depression, and the beginning of World War II in our sample. While the probabilty of switching industries is sensitive to omitting 1910-1920, perhaps due to sectorally concentrated shocks related to World War I, the result that income and labor force participation declined in response to import growth is not.

In Table D.4, we subject our baseline estimates to a battery of alternative specification choices. In column 1, we run unweighted specifications. In column 2 we introduce county fixed effects to control for time-invariant county characteristics that might drive our results. In columns 3-5 we include, respectively, county tradable employment shares, manufacturing shares, and agricultural employment shares, each interacted with year dummies. This addresses the concern that our trade shocks are in fact capturing more general sector-specific time-varying changes. In column 6 we exploit tariff data as of the middle of the decade, rather than the beginning, to capture the fact that trade policy changes throughout the decade and ititial tariffs levels might be a poor proxy for tariff

Table D.2: Baseline Individual Results by Demographic Status

	(1) $NILF_{j,t+10}$	(2) $\Delta \ln(Income_{j,t+10})$	(3) $Migrate_{j,t+10}$	(4) Switch Industry$_{j,t+10}$
	Outcomes Among White Males			
$\Delta Ln(\widehat{Imports_{ct}})$	0.005	-0.028	0.003	-0.018
	(0.001)	(0.002)	(0.003)	(0.002)
$\ln(1 + AVE_{ct_0})$	0.034	0.121	-0.665	-0.122
	(0.012)	(0.021)	(0.089)	(0.069)
STS_{ct_0}	0.013	0.004	0.130	0.079
	(0.002)	(0.006)	(0.020)	(0.011)
1^{st} Stage $\hat{\beta}$	-2.846	-2.846	-2.846	-2.846
1^{st} Stage F	971.503	971.503	971.503	971.503
Obs.	28,012,850	23,831,262	28,012,850	25,377,089
	Outcomes Among Black Males			
$\Delta Ln(\widehat{Imports_{ct}})$	0.002	-0.050	0.004	-0.026
	(0.002)	(0.009)	(0.010)	(0.007)
$\ln(1 + AVE_{ct_0})$	-0.018	0.181	-0.550	-0.071
	(0.009)	(0.051)	(0.124)	(0.042)
STS_{ct_0}	-0.003	0.045	0.100	0.159
	(0.002)	(0.014)	(0.028)	(0.011)
1^{st} Stage $\hat{\beta}$	-1.557	-1.557	-1.557	-1.557
1^{st} Stage F	80.903	80.903	80.903	80.903
Obs.	1,745,047	1,531,978	1,745,047	1,595,769
	Outcomes Among Foreign-born Males			
$\Delta Ln(\widehat{Imports_{ct}})$	0.008	-0.009	0.025	-0.058
	(0.003)	(0.010)	(0.019)	(0.008)
$\ln(1 + AVE_{ct_0})$	0.047	-0.098	-0.603	-0.237
	(0.025)	(0.213)	(0.309)	(0.108)
STS_{ct_0}	0.025	-0.138	0.086	0.119
	(0.013)	(0.063)	(0.089)	(0.043)
1^{st} Stage $\hat{\beta}$	-3.323	-3.323	-3.323	-3.323
1^{st} Stage F	342.855	342.855	342.855	342.855
Obs.	4,113,675	3,532,575	4,113,675	3,781,485
County Controls	Y	Y	Y	Y
Individual Controls	Y	Y	Y	Y
Decade F.E.	Y	Y	Y	Y

Notes: Regressions of instrumented county-level import growth on longitudinal individual level outcomes based on linked data following Abramitzky et al. (2020) from 1900-1910, 1910-1920, 1920-1930, and 1930-1940. Dependent variables is whether the individual was in the labor force at the end of the decade in column 1. Column 2 is the decadal change in occupational income score. Column 3 is whether an individual moved to another state. Column 4 indicates whether an individual switched industries. Panels differ in terms of which subpopulation the effects are estimated for. Panel A is White males. Panel B is Black males. Panel C is Foreign-born males. Import data from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and authors' calculations. Population data from IPUMS (Ruggles et al., 2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as equation 9. Standard errors are clustered at the county level.

protection in place for much of the decade. In column 7 we employ the full measure of changes in ΔAVE_{it} in constructing our instrument, derived in equation 3, rather than

Table D.3: Robustness of Baseline Individual Results to Sample Restrictions

	(1)	(2)	(3)	(4)
	Panel A: N.I.L.F$_{j,t+10}$			
$\Delta\ln(\widehat{Imports}_{ct})$	0.008	0.011	0.004	0.005
	(0.001)	(0.002)	(0.002)	(0.001)
1^{st} Stage $\hat{\beta}$	-3.355	-4.368	-2.593	-2.779
1^{st} Stage F	968.835	166.082	480.375	702.088
Obs.	25,428,590	23,349,323	21,299,586	19,298,936
	Panel B: $\Delta\ln(\text{Income}_{j,t+10})$			
$\Delta\ln(\widehat{Imports}_{ct})$	-0.019	-0.015	-0.027	-0.024
	(0.001)	(0.007)	(0.004)	(0.003)
1^{st} Stage $\hat{\beta}$	-3.355	-4.368	-2.593	-2.779
1^{st} Stage F	968.835	166.082	480.375	702.088
Obs.	21,797,335	19,841,418	18,154,714	16,378,279
	Panel C: Migrate State$_{j,t+10}$			
$\Delta\ln(\widehat{Imports}_{ct})$	0.020	0.036	0.009	0.013
	(0.003)	(0.017)	(0.011)	(0.007)
1^{st} Stage $\hat{\beta}$	-3.355	-4.368	-2.593	-2.779
1^{st} Stage F	968.835	166.082	480.375	702.088
Obs.	25,428,590	23,349,323	21,299,586	19,298,936
	Panel D: Switch Industry$_{j,t+10}$			
$\Delta\ln(\widehat{Imports}_{ct})$	-0.006	0.048	-0.042	-0.029
	(0.001)	(0.007)	(0.004)	(0.003)
1^{st} Stage $\hat{\beta}$	-3.355	-4.368	-2.593	-2.779
1^{st} Stage F	968.835	166.082	480.375	702.088
Obs.	23,069,588	21,055,556	19,239,933	17,640,056
Sample Restriction	Drop 1900	Drop 1910	Drop 1920	Drop 1930
County Controls	Y	Y	Y	Y
Individual Controls	Y	Y	Y	Y
Decade F.E.	Y	Y	Y	Y

Notes: Regressions of instrumented county-level import growth on longitudinal individual level outcomes based on linked data following Abramitzky et al. (2020) from 1900-1910, 1910-1920, 1920-1930, and 1930-1940. Each column drops a single decade from the sample. Each panel reports an outcome from table 9. Dependent variable is whether the individual was in the labor force at the end of the decade in Panel A. Panel B is the decadal change in occupational income score. Panel C is whether an individual moved to another state. Panel D indicates whether an individual switched industries. Import data from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and authors' calculations. Population data from IPUMS (Ruggles et al., 2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as equation 9. Standard errors are clustered at the county level. All controls from table 9 are included and have been suppressed for space.

omitting initial AVE levels as in our baseline. Finally, in column 8, rather than measuring county import growth as a weighted average of log changes in industry imports, we construct county weighted average imports in levels at the beginning and end of each decade, and take the log difference of this average. This addresses concerns that large log changes in imports in industries with initially low levels of imports might drive our results. As is clear from the table, our results are broadly robust to these alternative specifications.

Table D.4: Robustness of Baseline Individual Results to Alternate Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: N.I.L.F.$_{j,t+10}$							
$\Delta Ln(\widehat{Imports_{ct}})$	0.007	0.008	0.010	0.019	0.018	0.009	0.007	0.031
	(0.001)	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)	(0.001)	(0.009)
1^{st} Stage $\hat{\beta}$	-3.332	-2.474	-2.150	-1.357	-1.084	-2.257	-22.171	-0.431
1^{st} Stage F	567.263	695.741	648.015	117.744	256.646	291.042	91.787	73.949
Obs.	29,811,174	29,792,145	29,792,145	29,792,145	29,792,145	29,792,145	29,792,145	29,792,145
	Panel B: Δ ln (Income$_{j,t+10}$)							
$\Delta Ln(\widehat{Imports_{ct}})$	-0.017	-0.024	-0.021	-0.037	-0.032	-0.015	-0.019	-0.164
	(0.001)	(0.002)	(0.004)	(0.007)	(0.007)	(0.005)	(0.007)	(0.025)
1^{st} Stage $\hat{\beta}$	-3.332	-2.474	-2.150	-1.357	-1.084	-2.257	-22.171	-0.431
1^{st} Stage F	567.263	695.741	648.015	117.744	256.646	291.042	91.787	73.949
Obs.	25,405,982	25,390,582	25,390,582	25,390,582	25,390,582	25,390,582	25,390,582	25,390,582
	Panel C: Migrate State$_{j,t+10}$							
$\Delta Ln(\widehat{Imports_{ct}})$	0.015	0.010	0.028	-0.001	0.025	0.002	-0.000	0.085
	(0.003)	(0.003)	(0.008)	(0.011)	(0.009)	(0.011)	(0.010)	(0.045)
1^{st} Stage $\hat{\beta}$	-3.332	-2.474	-2.150	-1.357	-1.084	-2.257	-22.171	-0.431
1^{st} Stage F	567.263	695.741	648.015	117.744	256.646	291.042	91.787	73.949
Obs.	29,811,174	29,792,145	29,792,145	29,792,145	29,792,145	29,792,145	29,792,145	29,792,145
	Panel D: Switch Industry$_{j,t+10}$							
$\Delta Ln(\widehat{Imports_{ct}})$	-0.008	-0.021	-0.024	-0.003	-0.016	-0.038	-0.030	-0.187
	(0.001)	(0.002)	(0.004)	(0.007)	(0.006)	(0.004)	(0.003)	(0.023)
1^{st} Stage $\hat{\beta}$	-3.332	-2.474	-2.150	-1.357	-1.084	-2.257	-22.171	-0.431
1^{st} Stage F	567.263	695.741	648.015	117.744	256.646	291.042	91.787	73.949
Obs.	27,017,834	27,001,711	27,001,711	27,001,711	27,001,711	27,001,711	27,001,711	27,001,711
Spec. Change	Unw.	Cty F.E.	Trd X Yr	Mfg. x Yr	Ag. x Yr	Mid-Samp.	Alt. IV	Alt. Imp.
County Controls	Y	Y	Y	Y	Y	Y	Y	Y
Individual Controls	Y	Y	Y	Y	Y	Y	Y	Y
Decade F.E.	Y	Y	Y	Y	Y	Y	Y	Y

Notes: Regressions of instrumented county-level import growth on longitudinal individual level outcomes based on linked data following Abramitzky et al. (2020) from 1900-1910, 1910-1920, 1920-1930, and 1930-1940. Each column changes the specification relative to that found in our baseline regressions in Table 9. Column 1 reports unweighted regressions. Column 2 includes county fixed effects. Columns 3-5 include interactions between tradable share, manufacturing share, and agricultural share with year dummies, respectively. Column 6 uses mid-decade policy variables for STS and AVE. Column 7 uses the full measure of changes in tariffs as derived in equation 3 as an instrument. Column 8 uses an alternate measure of import growth. Each panel reports an outcome from table 9. Dependent variable is whether the individual was in the labor force at the end of the decade in Panel A. Panel B is the decadal change in log occupational income score. Panel C is whether an individual moved to another state. Panel D indicates whether an individual switched industries. Import data from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and authors' calculations. Population data from IPUMS (Ruggles et al., 2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as equation 9 except in column 7. Standard errors are clustered at the county level. All controls from table 9 are included and have been suppressed for space.

Table D.5: Sectoral Transitions by Initital Sector

	(1) N.I.L.F.	(2) Agriculture	(3) Mining	(4) Construction	(5) Manufacturing	(6) Services	(7) Other
	When Starting from N.I.L.F.$_{j,t_0}$						
$\Delta \ln(\widehat{Imports}_{ct})$	0.002	-0.008	0.009	-0.000	-0.001	0.000	-0.010
	(0.005)	(0.006)	(0.002)	(0.001)	(0.004)	(0.006)	(0.002)
Obs.	1,587,590	1,587,590	1,587,590	1,587,590	1,587,590	1,587,590	1,587,590
1^{st} Stage $\hat{\beta}$	-2.858	-2.858	-2.858	-2.858	-2.858	-2.858	-2.858
1^{st} stage-F	777.064	777.064	777.064	777.064	777.064	777.064	777.064
	When Starting from Agriculture$_{j,t_0}$						
$\Delta \ln(\widehat{Imports}_{ct})$	0.013	0.028	0.007	-0.008	-0.031	-0.006	-0.007
	(0.002)	(0.004)	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)
Obs.	8,044,799	8,044,799	8,044,799	8,044,799	8,044,799	8,044,799	8,044,799
1^{st} Stage $\hat{\beta}$	-1.683	-1.683	-1.683	-1.683	-1.683	-1.683	-1.683
1^{st} stage-F	363.814	363.814	363.814	363.814	363.814	363.814	363.814
	When Starting from Mining$_{j,t_0}$						
$\Delta \ln(\widehat{Imports}_{ct})$	0.011	0.011	0.076	-0.002	-0.056	-0.044	-0.004
	(0.004)	(0.010)	(0.015)	(0.004)	(0.013)	(0.015)	(0.007)
Obs.	728,957	728,957	728,957	728,957	728,957	728,957	728,957
1^{st} Stage $\hat{\beta}$	-2.030	-2.030	-2.030	-2.030	-2.030	-2.030	-2.030
1^{st} stage-F	165.241	165.241	165.241	165.241	165.241	165.241	165.241
	When Starting from Construction$_{j,t_0}$						
$\Delta \ln(\widehat{Imports}_{ct})$	0.000	0.031	0.008	-0.003	-0.018	-0.007	-0.011
	(0.002)	(0.004)	(0.001)	(0.005)	(0.004)	(0.005)	(0.002)
Obs.	1,902,453	1,902,453	1,902,453	1,902,453	1,902,453	1,902,453	1,902,453
1^{st} Stage $\hat{\beta}$	-2.794	-2.794	-2.794	-2.794	-2.794	-2.794	-2.794
1^{st} stage-F	870.783	870.783	870.783	870.783	870.783	870.783	870.783
	When Starting from Manufacturing$_{j,t_0}$						
$\Delta \ln(\widehat{Imports}_{ct})$	0.003	0.022	0.006	-0.003	-0.005	-0.008	-0.013
	(0.002)	(0.003)	(0.001)	(0.001)	(0.006)	(0.004)	(0.002)
Obs.	5,988,134	5,988,134	5,988,134	5,988,134	5,988,134	5,988,134	5,988,134
1^{st} Stage $\hat{\beta}$	-2.783	-2.783	-2.783	-2.783	-2.783	-2.783	-2.783
1^{st} stage-F	779.708	779.708	779.708	779.708	779.708	779.708	779.708
	When Starting from Services$_{j,t_0}$						
$\Delta \ln(\widehat{Imports}_{ct})$	0.002	0.019	0.006	-0.000	-0.011	-0.010	-0.009
	(0.002)	(0.003)	(0.001)	(0.001)	(0.003)	(0.004)	(0.002)
Obs.	9,803,471	9,803,471	9,803,471	9,803,471	9,803,471	9,803,471	9,803,471
1^{st} Stage $\hat{\beta}$	-3.005	-3.005	-3.005	-3.005	-3.005	-3.005	-3.005
1^{st} stage-F	747.919	747.919	747.919	747.919	747.919	747.919	747.919
	When Starting from Other$_{j,t_0}$						
$\Delta \ln(\widehat{Imports}_{ct})$	0.005	0.008	0.005	-0.015	0.016	-0.001	-0.020
	(0.003)	(0.005)	(0.003)	(0.003)	(0.007)	(0.006)	(0.003)
Obs.	1,146,497	1,146,497	1,146,497	1,146,497	1,146,497	1,146,497	1,146,497
1^{st} Stage $\hat{\beta}$	-3.066	-3.066	-3.066	-3.066	-3.066	-3.066	-3.066
1^{st} stage-F	778.397	778.397	778.397	778.397	778.397	778.397	778.397

Notes: Table displays the primary coefficient from a single regression of import growth on the likelihood of entering a given sector conditional on having started the decade in the sector. Outcomes are obtained based on linked data following Abramitzky et al. (2020). All specifications include individual and county controls as well as time decade dummy variables. Import data from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and authors' calculations. Population data from IPUMS (Ruggles et al., 2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as equation 9. Standard errors are clustered at the county level.

D.2 County Level Labor Market Analysis

In this section we turn to the effect of trade on aggregate local outcomes, focusing on labor force participation and log average income. Under this approach, we regress changes in local outcomes against county-level averages of changes in log imports, $\Delta \ln(Imports_{ct})$, for each decade t between 1900 and 1940, instrumenting with ΔRP_{ct}:

$$\Delta Outcome_{ct} = \beta_0 + \beta_1 \Delta \ln(\widehat{Imports_{ct}}) + \beta_2 X_{ct} + \gamma_t + \epsilon_{ct} \tag{D.1}$$

Here, X_{ct} represents a set of start-of-decade controls for county characteristics that may otherwise contaminate our estimates. All specifications are weighted by county population and include time fixed effects, γ_t. Following the approach developed by Borusyak et al. (2022), we estimate these regressions at the industry-year level, which allows us to correct for correlation in residuals across counties driven by similarity in local industrial composition.[55] While we observe over 11,000 county-year observations, this masks the more aggregate industry-level variation at the heart of studies employing a shift-share approach. Consequently, in each table we report both the number of industry-by-year observations as well as the inverse Herfindahl-Hirschman index of industry-level employment. This "effective sample size" (Borusyak et al., 2022) captures the extent to which industrial employment is concentrated, which may lead to inappropriate statistical inference.[56]

Table D.6: Descriptive Statistics for County Labor Market Analysis

	1900	1910	1920	1930	Total
$\Delta \ln(Imports_{ct})$	1.122	1.152	-0.588	-0.139	0.275
	(0.475)	(0.930)	(0.564)	(0.235)	(0.954)
ΔRP_{ct}	-0.030	-0.602	0.136	-0.090	-0.137
	(0.006)	(0.185)	(0.081)	(0.030)	(0.288)
$\Delta \frac{Labor_{ct}}{Population_{ct_0}}$	0.028	-0.017	0.003	-0.039	-0.010
	(0.033)	(0.034)	(0.033)	(0.027)	(0.040)

Notes: Table reports summary statistics for key dependent and explanatory variables by decade and overall. Variable mean stacked above variable standard deviation (in parenthesis). As with county-level regressions, summary statistics are weighted by start of decade county population.

We construct county-level exposure using only information on the tradable sector and do not impose a shock of "zero" on the non-tradable units. This follows the approach of

[55] Estimating this relationship in the "complete-shares" case – that is, calculating labor shares using tradable employment only – ensures that our experimental design does not exploit variation in exposure to the non-tradable sector and so does not require including the tradable share as a control. Further, it ensures that our fixed effects isolate intra-period variation without having to include the share of the labor force in tradable sectors interacted with time fixed effects.

[56] In Monte Carlo simulations Borusyak et al. (2022) find that an effective sample size of at least 20 provides appropriate rejection rates for hypothesis testing. Our effective sample size is more than three times this large.

Borusyak et al. (2022) and Kovak (2013). While the data reported in table D.6 are the raw county-level summary statistics, we follow Borusyak et al. (2022) and demean these samples in our empirical work so that the employment share weighted average shock (ΔRP_{ct}) is zero across our entire sample when estimated at the "shock" level. This will have no impact on the standard deviations reported in this table, nor the standardized effects reported in county-level robustness tables below. .

We begin by exploring labor force attachment as an outcome. In Table D.7 we regress decadal changes in labor force-to-population ratios for men ages 18-65 against county-level import growth. Column 1 includes only import growth and decade fixed effects. The point estimate is negative and significant. The magnitude of the effect implies that a one standard deviation increase in import exposure reduces growth in labor force participation rates by approximately 0.27 standard deviations.[57] In columns 2 and 3 we sequentially introduce start-of-decade controls for county-level AVE_{ct_0} and STS_{ct_0}. These leave our estimates largely unchanged.

Table D.7: Changes in County Labor Force Participation

	$\Delta \frac{LaborForce_{ct}}{Population_{ct}}$				
	(1)	(2)	(3)	(4)	(5)
$\Delta \ln(\widehat{Imports_{ct}})$	-0.011***	-0.011***	-0.014***	-0.015***	-0.015***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
New Controls	Year FE	AVE_{ct_0}	STS_{ct_0}	$Demographics_{ct_0}$	Region FE
1^{st} Stage Coeff.	-3.328	-3.309	-3.317	-3.422	-3.391
1^{st} Stage F	29.35	32.174	27.765	23.481	22.044
Obs.	262	262	262	262	262
Effective N	65	65	65	65	65
Std. Coeff.	-0.267	-0.269	-0.347	-0.353	-0.36

Notes: Dependent variable is change in log labor force to population ratios among men ages 18-65 at the county level from 1900-1910, 1910-1920, 1920-1930, 1930-1940. Import data from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and author's calculations. Population data from IPUMS Ruggles et al. (2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as defined in equation 9. Regressions are weighted by start-of-period population. Standard errors in industry-year "shock-level" regressions (Borusyak et al., 2022) are clustered at the two-digit SIC level.

In column 4 we control separately for the start-of-decade county share of labor in the tradable sector, in agricultural production, and in manufacturing. In this column we also introduce a number of county-specific, start-of-decade measures intended to control for differential trends in labor market outcomes as a function of local characteristics. These controls include the share of the population that is literate, the share of the population that is foreign-born, the share of the population that is non-white, and the share of the population that is under age 35. Inclusion of these controls increases the magnitude

[57] The standard deviation in log import growth is 0.95. Multiplying this by the reported point estimate yields a reduction in the labor force-to-population ratio of .0096, which is 0.27 standard deviations of the growth standard deviation.

of the point estimate slightly, but leaves our primary finding unchanged. Finally, in column 5 we directly control for persistent differential labor market trajectories across geographic areas via Census region fixed effects. Similar in spirit to the agriculture and manufacturing controls in column 4, this addresses the concern that our results might be driven by variation in broader, regionally clustered sectoral trends to economic shocks. Our results are unaffected by this addition.

Table D.8: Changes in Log Average County Income

	$\Delta Income_{ct}$				
	(1)	(2)	(3)	(4)	(5)
$\Delta \ln(\widehat{Imports_{ct}})$	-0.005*	-0.005**	-0.012***	-0.017***	-0.017***
	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)
New Controls	Year FE	AVE_{ct_0}	STS_{ct_0}	$Demographics_{ct_0}$	Region FE
1^{st} Stage Coeff.	-3.329	-3.309	-3.318	-3.423	-3.391
1^{st} Stage F	29.348	32.173	27.765	23.475	22.042
Obs.	262	262	262	262	262
Effective N	65	65	65	65	65
Std. Coeff.	-0.119	-0.125	-0.309	-0.421	-0.422

Notes: Dependent variable is change in log average county income among men ages 18-65 at the county level from 1900-1910, 1910-1920, 1920-1930, 1930-1940. Import data from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and author's calculations. Population data from IPUMS Ruggles et al. (2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as defined in equation 9. Regressions are weighted by start-of-period population. Standard errors in industry-year "shock-level" regressions (Borusyak et al., 2022) are clustered at the two-digit SIC level.

In Table D.8, we repeat the same specifications with decadal log changes in the average county-level income as our outcome. As with labor participation, our results obtain at the aggregate level. Specifically, the point estimate in column 5 implies that a one standard devation increase in import competition yields a 0.42 standard deviation decline in average log county income growth.

In Tables D.9 and D.10 we consider a number of robustness tests to these results. In each column, we replicate column 5 of Table D.7 and D.8 with a single modification. In column 1, rather than weighting by county population, we run unweighted regressions. For labor force participation the standardized effect is negative and approximately twice the size of the baseline. We note, however, that the first-stage F-statistic is reduced, as is the effective number of observations. This is likely due to the fact that evenly weighting counties places relatively more weight on small, predominantly agricultural counties, with less variation in tariff exposure, creating a weaker instrument.

Our baseline estimating equation implicitly assumes that expected changes in realized protection are the same across industries – that is, conditional on controls, the industry-level shocks are as good as random. The controls in columns 2 through 4 relax this assumption. Specifically, we separately introduce controls for the share of the population in the tradable sector, in the agricultural sector, and in the manufacturing sector, respec-

Table D.9: Changes in County Labor Force Participation Robustness

	$\Delta \frac{LaborForce_{ct}}{Population_{ct}}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta \ln(\widehat{Imports_{ct}})$	-0.020***	-0.017***	-0.022**	-0.016*	-0.014***	-0.015***
	(0.007)	(0.002)	(0.008)	(0.009)	(0.002)	(0.002)
Spec. Change	Unw.	Share x Yr.	Ag x Yr.	Mfg x Yr.	Mid.	County FE
1^{st} Stage Coeff.	-1.194	-2.358	-.782	-1.098	-3.808	-3.338
1^{st} Stage F	1.025	27.319	90.509	6.374	17.512	25.399
Obs.	262	262	262	262	262	262
Effective N	31	65	65	65	65	65
Std. Coeff.	-0.565	-0.411	-0.54	-0.389	-0.39	-0.421

Notes: Dependent variable is change in labor force to population among men ages 18-65 at the county level from 1900-1910, 1910-1920, 1920-1930, 1930-1940. Import data from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and author's calculations. Population data from IPUMS Ruggles et al. (2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as equation 9. Regressions weighted by start of period population. Standard errors in industry-year "shock-level" regressions (Borusyak et al., 2022) are clustered at the two-digit SIC level.

tively, each interacted with year dummies. Focusing on column 2, we see that controlling for tradable share-by-year fixed effects increases the responsiveness of labor force participation to import growth slightly. This suggests that the periods of highest import growth may have coincided with expanding economic conditions that would lead to understated labor force participation rate responses. In columns 3 and 4 we find that labor force participation rates and income fall in the face of import competition even accounting for time-specific shocks to the agricultural and manufacturing sectors.

In column 5, rather than exploiting start-of-decade tariff policy, we construct our measure of exposure using tariff rates and specific tariff shares midway through the decade. This accounts for the fact that tariff policy changes during each decade in our sample.[58] This leaves the point estimate unchanged relative to the baseline. Finally, in column 6 we introduce county fixed effects to account for persistent differences in labor market trends at the local level. This, too, leaves our results unaltered.

[58] As noted above, the Dingley Tariff was replaced by the Payne-Aldrich Tariff in 1909, which was replaced by the Underwood-Simmons Tariff in 1913, replaced by the Fordney-McCumber Tariff in 1922. Thus, for 1900-1910, we use tariffs as of 1905, for 1910-1920 we use 1915, and for 1920-1930 we use 1925. As Smoot-Hawley remains in place for the entirety of the 1930s, we continue to use 1930 for the 1930-1940 period.

Table D.10: Changes in Log Average County Income

	$\Delta Income_{ct}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta\ln(\widehat{Imports_{ct}})$	-0.047	-0.022***	-0.072***	-0.062**	-0.015**	-0.018***
	(0.051)	(0.006)	(0.009)	(0.023)	(0.006)	(0.004)
Spec. Change	Unw.	Share x Yr.	Ag x Yr.	Mfg x Yr.	Mid.	County FE
1^{st} Stage Coeff.	-1.194	-2.358	-.782	-1.097	-3.808	-3.339
1^{st} Stage F	1.025	27.303	90.095	6.37	17.502	25.397
Obs.	262	262	262	262	262	262
Effective N	31	65	65	65	65	65
Std. Coeff.	-1.063	-0.549	-1.838	-1.576	-0.332	-0.405

Notes: Dependent variable is change in log average county income among men ages 18-65 at the county level from 1900-1910, 1910-1920, 1920-1930, 1930-1940. Import data from *Statistical Abstract of the United States* and *Foreign Commerce and Navigation of the United States* and author's calculations. Population data from IPUMS Ruggles et al. (2020). Controls are measured at start of decade. Import growth is instrumented by ΔRP_{ct} as equation 9. Regressions weighted by start of period population. Standard errors in industry-year "shock-level" regressions (Borusyak et al., 2022) are clustered at the two-digit SIC level.