The Antebellum Tariff on Cotton Textiles Revisited

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Recent research has suggested that the U.S. cotton-textile industry would have been wiped out had it not received tariff protection throughout the antebellum period. We reaffirm Taussig's earlier judgment that the U.S. cotton-textile industry was largely independent of the tariff by the early 1830s. American and British producers specialized in quite different types of textile products that were imperfect substitutes for one another. Using data from 1826 to 1860, we estimate the responsiveness of domestic production to fluctuations in import prices and conclude that the industry could easily have survived even if the tariff had been completely eliminated.

America's industrialization in the early nineteenth century was spearheaded by the New England cotton-textile industry. The industry received a strong initial impetus from the Jeffersonian embargo and the wartime disruptions to commerce from 1807 to 1815. After the war the industry pressed for and received high tariffs to block import competition, and domestic output continued to expand.

The extent to which the industry depended upon the tariff, however, has been a source of debate. Frank Taussig opined that "the tariff of 1816 may be considered a judicious application of the principle of protection to young industries" in part because domestic producers became strong enough to survive without tariffs "almost certainly by 1832." By this time, Taussig concluded, "the cotton manufacture was in the main independent of protection, and not likely to be much affected, favorably or unfavorably, by changes in duties."[1]

Mark Bils and Knick Harley recently challenged Taussig's view that the tariff was not needed after about 1830. They went beyond Taussig's informed if informal discussion by explicitly considering the costs of producing cotton textiles in America and Britain in the 1830s and 1840s. Bils concluded that, even after two decades of protection, the domestic industry "was still unable to stand on its own . . . as of 1833, removing protection would have eliminated the vast majority of value added in the cotton textile indus-

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[1] Taussig, *Tariff History*, pp. 135–36.

try." With additional price and cost evidence, drawing principally on James Montgomery, Harley concurred and conjectured that removal of the tariff would have shrunk domestic output to about 10 percent of domestic consumption even as late as the 1850s.[2] The Bils and Harley approach, however, could present a misleading view of trade because cost comparisons may not focus on the relevant goods. For comparative purposes, the goods in England and America must be the same. Yet cotton textiles were heterogeneous goods, and Bils argued that relative costs varied with textile quality. If potential imports were of different quality than U.S. production, a cost comparison with typical American products may be misleading.

This article examines what previous researchers have ignored—namely, the historical record of how domestic production responded to changes in the relative price of imports. Rather than inferring the impact of the tariff from cost data, we allow time-series data on prices, domestic production, and imports from 1826 to 1860 to speak on the issue of the tariff's importance. These data allow us to estimate the sensitivity of domestic output to changes in the relative price of imports, whether due to changes in the prices of goods, the exchange rate, or the tariff rate.

We conclude that the findings of Bils and Harley exaggerate the importance of the tariff after 1830. Rather, American and British cotton-textile producers specialized in quite different varieties of cotton goods, and domestic producers were insulated from foreign competition by the different characteristics of their products. The relative unimportance of the tariff is suggested by the reduction in the cotton-textile duties in 1846 from nearly 60 percent to 25 percent. Imports soared by a factor of three and increased their share of the U.S. market from about 7 percent to about 15 percent, but there was no decline in domestic output. This simple experiment suggests that U.S. cotton-textile producers were not dependent upon the tariff and thus supports Taussig's view that the industry was well established by this time.

BACKGROUND

For most of the early nineteenth century, the U.S. tariff on imported cotton cloth was a combination of an ad valorem rate and a minimum valuation. The tariff of 1816, for example, generally regarded as the first "protective" U.S. tariff, consisted of a 20 percent ad valorem rate on imported textiles along with a 25-cent-per-yard minimum valuation. This scheme severely burdened textile imports that were priced under 25 cents per yard and thus shifted the composition of imports toward higher grade, higher priced products. The minimum valuation may not have been binding on British products, however, because goods worth less than 25 cents per yard were not

[2] Bils, "Tariff Protection"; and Harley, "International Competitiveness."

typical of British products during this time.[3] Taussig commented only that the minimum excluded coarser cloths; it was aimed at Asian cloth while not affecting imports from Britain.

This was a deliberate strategy by Francis Lowell. As explained by his colleague, Nathan Appleton, the minimum was designed to protect the fledgling industry in New England without antagonizing Southern cotton exporters to England. Cotton growers in the South exported raw cotton to Britain, and they were opposed to any tariff that would restrict the sales of their British customers to the United States. They worried about both loss of sales and further losses due to possible British retaliation. Lowell's tariff design shows that the sectional conflict over the tariff that would loom large at midcentury was already present at the start of New England industrialization, although in 1816 he had navigated the political shoals and crafted a tariff that did not founder on the rocks of sectionalism.[4]

After 1816, however, the minimum valuation became increasingly binding as British export prices of textiles fell steadily and as the minimum valuation was gradually raised in subsequent tariff acts. Table 1 summarizes the cotton-textile provisions of the tariff acts of this period. The minimum valuation, for example, was raised from 25 cents to 30 cents in the tariff of 1824, and the ad valorem tariff was increased from 20 percent to 25 percent. In 1828 the minimum valuation was raised again to 35 cents. By the 1840s the average British export price to the United States was around 13 cents per yard, yet the minimum valuation on printed cloth was 30 cents per yard. This minimum required that the 13-cent-per-yard import would be assessed at 30 cents; applying the 30 percent duty to that price implies a charge of 9 cents per yard, amounting to an ad valorem equivalent of over 60 percent.[5] The tariff rate fell dramatically under the Walker tariff of 1846, which eliminated completely the minimum valuation and cut the ad valorem tariff to 25 percent.

To determine the effective ad valorem rate on imports, the prices of the imported goods must be ascertained. Although U.S. trade statistics during this period reported only the total value of cotton imports (with some category breakdown, by country), Britain published statistics on the value and volume of its cotton-textile exports to various markets, including the United States. These data allow the unit value of British textile exports to be calculated, a useful summary statistic of the average export price to the United

[3] Stettler, *Growth and Fluctuations*, p. 212.

[4] See Temin, "Industrialization of New England."

[5] As Table 1 indicates, the Tariff of 1842 had a minimum valuation of 30 cents per yard of printed cloth and 20 cents per yard of white cloth. According to U.S. import statistics, the value of printed, stained, or colored cotton manufactures from Britain vastly exceeded that of white or uncolored cotton manufactures. See, for example, U.S. House of Representatives, "Commerce," p. 150.

TABLE 1
U.S. TARIFF ON IMPORTED COTTON CLOTH

Date of Tariff Act	Description	Minimum Valuation (cents per yard)	Ad Valorem Rate
27 April 1816	Cotton cloth (until July 1819)	25	25 percent
	Cotton cloth (after July 1819)	25	20 percent
22 May 1824	Cotton cloth	30	25 percent
19 May 1828	Cotton cloth	35	25 percent
14 July 1832	Cotton cloth, printed	35	25 percent
	Cotton cloth, white	30	25 percent
2 March 1833	Cotton cloth (after January 1834)		9/10 of excess of 1832 rate over 20 percent
	Cotton cloth (after January 1836)		8/10 of excess of 1832 rate over 20 percent
	Cotton cloth (after January 1838)		7/10 of excess of 1832 rate over 20 percent
	Cotton cloth (after January 1840)		6/10 of excess of 1832 rate over 20 percent
	Cotton cloth (after January 1842)		3/10 of excess of 1832 rate over 20 percent
30 March 1842	Cotton cloth, printed	30	30 percent
	Cotton cloth, white	20	30 percent
30 July 1846	Cotton cloth	None	25 percent
3 March 1857	Cotton cloth	None	24 percent

Source: Stettler, "Growth," p. 189.

States and to other markets.[6] Both price series show a steady decline during the 1815 to 1860 period, but prices were somewhat higher on goods destined for the U.S. market, consistent with the effect of the minimum valuation in shifting the composition of imports toward finer, higher-valued goods. Figure 1 presents our estimate of the ad valorem–equivalent import tariff on British textiles, which is calculated by applying the tariff rates in Table 1 to the export price series. As the minimum valuations rose and British export prices fell, the effective tariff rose to nearly 60 percent by the early 1840s.

The Walker tariff of 1846 appeared to pull the rug out from under domestic producers by eliminating the minimum valuation and applying a simple 25 percent ad valorem tariff. As Figure 1 demonstrates, the effective tariff plummeted from 57 percent to just 25 percent. Yet despite the sharp tariff

[6] The sources for the data are Great Britain, House of Commons (1847/48), p. 325; House of Commons (1951), p. 261; House of Commons (1856), p. 385; and Helm, "Cotton Trade," p. 435. These data were originally utilized by Stettler, "Growth," pp. 137, 168, 216–17, but we found two apparent errors in his series on the average prices of British textile exports to the United States. First, he seems to have taken the British export quantity from the column marked "cottons" and the value not from the adjacent column for cottons but from the final column for the declared value of all export categories (including cotton thread, twist, and yarn). While the other export categories are much less important than "cottons," it does raise the calculated average price and thus reduce the calculated average tariff. Second, even using the columns that Stettler selected, the unit value is not what he reports it to be due to an apparent arithmetic error for the years prior to 1855.



FIGURE 1
AVERAGE AD VALOREM U.S. TARIFF ON BRITISH TEXTILE IMPORTS, 1816–1860

Source: Author's calculation.

reduction, there was no absolute decline in output. According to the Lance Davis and Louis Stettler series on New England textile output, presented in Figure 2, production stalled briefly in 1847 but then resumed its growth.[7] Indeed, the uniformity of the growth in New England textile output in Figure 2 is striking. The tariff may have affected the level of American textile production to a slight extent, but it does not appear to have affected its growth.

As a result of the Walker tariff reduction, imports from Britain nearly tripled, soaring from 37 million yards in 1846 to 105 million yards in 1847, and then falling back to 71 million yards in 1848.[8] Figure 3 shows that the import market share jumped from roughly 5 percent in 1846 to about 15 percent in 1847 and then climbed to around 20 percent by the mid-1850s. But this growth in imports occurred without a decline in domestic production. As Taussig noted, "when the act of 1846 was passed, the protectionists predicted disaster; but disaster came not, either for the country at large or for the cotton industry" as production steadily increased.[9]

[7] Davis and Stettler, "New England Cotton Textiles Industry," p. 221.
[8] Stettler, "Growth," p. 168.
[9] Taussig, *Tariff History*, p. 140.

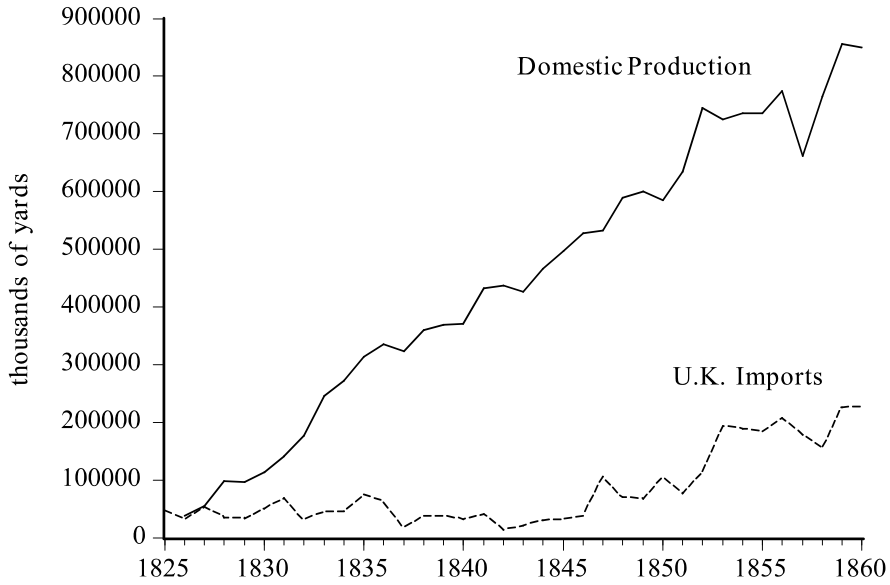


FIGURE 2
COTTON TEXTILES: NEW ENGLAND PRODUCTION AND U.K. IMPORTS, 1826–1860

Source: Davis and Stettler, "New England Cotton Textile Industry," p. 221; Great Britain, House of Commons, Sessional Papers 1847/48, 1851, 1856; and Helm, "Cotton Trade."

The Walker tariff reduction, however, could fail to indicate the true effects of the tariff on the domestic industry. The existing tariffs, which were on the order of 50 to 60 percent from the mid-1830s until 1846, may have been redundant if they forced the tariff-inclusive price of British goods above the autarky U.S. price, that is, the price determined by domestic supply and domestic demand.[10] In this case, even a substantial tariff reduction (such as that under the Walker act) would not affect domestic production until the tariff-inclusive price of British goods fell below the autarky U.S. price. Figure 4 illustrates this possibility: if the tariff pushed the consumer price of British goods well above the autarky price (P_A), then even a sharp reduction in import duties would reduce domestic output until the tariff-inclusive price of imported goods fell below P_A.

Harley's careful examination of prices on two comparable goods lends support to this interpretation: "Until the 1846 tariff reduction, purely domestic competition set American prices of both fabrics well below that at which British goods could be sold. After 1846 American prices of both types of

[10] Although the tariff never completely squeezed out all British textile imports, the import market share fell below 10 percent from the late 1830s until 1846. This could be interpreted as indicating that the tariff eliminated virtually all imports except the most specialized and expensive types of British cloth. See Feldman, "Redundant Tariffs," for a discussion of redundant protection.



FIGURE 3
IMPORTS OF COTTON TEXTILES FROM THE UNITED KINGDOM AS A SHARE OF THE U.S. MARKET, 1826–1860
(by volume)

Source: See Figure 2.

cloth usually approximated the British prices plus shipping and the tariff. In the early 1850s the American price briefly fell below the landed cost of British fabric (before duty), but usually remained at least 10 percent above the British price plus shipping."[11] If this is the case, then reducing the tariff from 60 percent to 25 percent might have had little effect on domestic production, but reducing the tariff from 25 percent to zero might have had an enormous effect on domestic production. To take into account the possibility of a discontinuous relationship between changes in the relative price of imports and domestic production due to redundant or excess protection, we test whether domestic textile production responded differently to fluctuations in import prices before and after 1846 and in other periods as well.

ESTIMATING THE IMPACT OF TARIFF CHANGES

Analytical Approach

To explore further the importance of the tariff to the domestic cotton industry, we employ a simple reduced-form model, based on a model devel-oped by Gene Grossman, to determine the effects of changes in the relative

[11] Harley, "International Competitiveness," pp. 566–68.

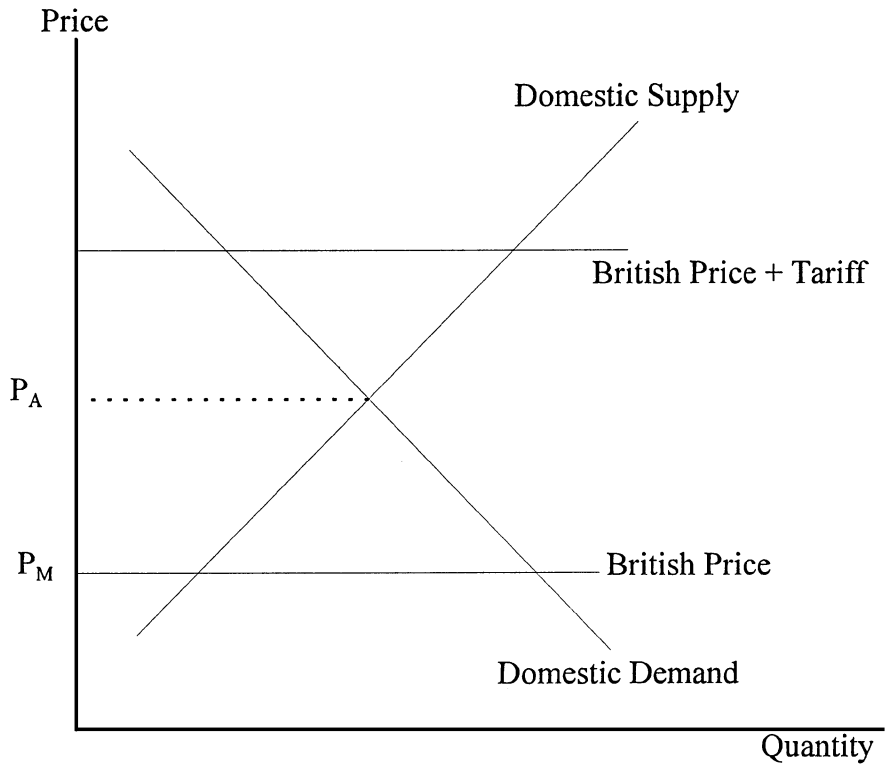


FIGURE 4
REDUNDANT TARIFF PROTECTION AND DOMESTIC OUTPUT

Note: See the text.

price of imports on domestic output.[12] In this model the price of domestic goods is endogenous, as is the quantity produced, and this enables us to estimate the effect of the tariff on domestic production without assuming that the domestic price was unaffected by the tariff. This framework enables us to examine the data in a more systematic way.

On the supply side, we assume that cotton textiles are produced with raw cotton (C), labor (L), and capital (K). The production function takes the following Cobb-Douglas form

$$Q = Ae^{\pi t}C^{a1}L^{a2}K^{a3} \qquad (1)$$

[12] Grossman, "Imports."

where Q is the quantity of textile production, π is the rate of Hicks neutral technological progress, and t represents time.[13]

Cotton is assumed to be a traded input and available to the industry at the exogenous price p_C, and labor is also assumed to be supplied at the exogenous price w. The quantity of cotton used and labor employed is found by setting the marginal value product of each equal to its price

$$C = (a_1 pQ / p_C) \tag{2}$$

$$L = (a_2 pQ / w) \tag{3}$$

where p is the price of textile output, p_C is the price of cotton, and w is the wage. Capital is a nontraded factor whose supply grows at the exogenous trend rate (including depreciation) of δ percent per year: $K = \overline{K}e^{\delta t}$

On the demand side, domestic textiles substitute imperfectly with foreign-produced textiles, which are perfectly elastic in supply and can be imported at exogenous price p^*. Domestic textiles also substitute imperfectly with the aggregate basket of domestic goods so that demand is characterized as

$$Q = Be^{\psi t}[Ep^*(1 + \tau) / p]^{b1}[p_A / p]^{b2} Y^{b3} \tag{4}$$

where ψ is the rate of secular demand shift, E is the exchange rate, p^* is the (foreign) import price of textiles, τ is the ad valorem tariff rate on imported textiles, p_A is the price of the aggregate basket of domestic goods, and Y is real national income.

The domestic price and production of textiles are both endogenous variables, and domestic production is the variable that we are most interested in explaining. Therefore, solving out for the reduced form equation and taking logs (and suppressing time subscripts) we have

$$\begin{aligned} \log Q = {} & \alpha_0 + \alpha_1 \log (Ep^*(1 + \tau) / p_C w) + \alpha_2 \log (p_A / p_C w) \\ & + \alpha_3 \log Y + \alpha_4 t + \epsilon \end{aligned} \tag{5}$$

Thus, domestic textile production is an increasing function of the tariff-inclusive import price, the price of aggregate goods, and national income, and a decreasing function of the price of cotton and the wages paid in the textile industry. We expect $\alpha_1 > 0$, $\alpha_2 > 0$, $\alpha_3 > 0$, while α_0 and α_4 can be of either sign. In this equation, the degree of import competition is fully captured by the domestic price of imported textiles, $Ep^*(1 + \tau)$. The quantity of textile imports does not appear because import volume is endogenous to

[13] Whereas the Cobb-Douglas specification imposes certain restrictions on the coefficients, the estimated reduced form is more general and does not imply any restrictions on the coefficients.

developments in the United States and elsewhere. The domestic price of textiles also does not appear because it too is an endogenous variable that is represented by the exogenous price of cotton and the wage rate in the industry.

As discussed earlier, if there were redundant protection that pushed the tariff-inclusive import price above the autarky price, we would not expect to find a relationship between the domestic price of imported textiles and domestic production of textiles. Harley's price comparisons indicate that tariffs were not redundant after the Walker tariff reduction of 1846, but that the tariff was redundant in 1845 (see his figure 3). Unfortunately, we do not know precisely when the tariffs became redundant. Harley argues that "for most of the antebellum period the tariff was completely prohibitive," but this is speculation because his close comparison of U.S. and U.K. prices on similar goods begins in 1845 and only shows one year (1845) of redundancy.[14]

Our Figure 3 shows that Britain's share of the U.S. cotton-textile market was about 20 percent as late as 1835, a finding that is hard to reconcile with a prohibitive tariff. If the tariff did become prohibitive in the antebellum period, however, Figures 1 and 3 indicate that it might have happened in the early to mid-1830s. Up to that point, the tariff was below 40 percent and the import market share was well above 20 percent, making it unlikely that domestic producers were fully insulated from changes in import prices. We explicitly test the hypothesis that domestic production responded differently to fluctuations in the relative price of imports in the period prior to the early 1830s and after 1846 by interacting that price with dummy variables for those periods when estimating equation 5.

Estimation Results

Equation 5 is estimated using annual data from 1826 to 1860. The quantity of domestic textile production (in yards) comes from Davis and Stettler.[15] This series is the aggregate output of textiles in New England, but New England accounted for over 70 percent of total U.S. output around this time.[16] New England also contained virtually all of the large-scale cotton production in the country that has been the focus of historical attention. The U.S. import price of British textiles is taken as the export unit value, as described previously. The tariff rate is based on our calculation in Figure 1. We ignore transportation costs, which, as Harley noted, added less than half

[14] Harley, "International Competitiveness," p. 560. We would also caution that, although Harley carefully compares the U.S. and U.K. prices on comparable goods, trade may not consist of those goods. In this case, while nothing is wrong with Harley's price comparison on its own, it simply may not be informative about the actual pattern of trade.

[15] Davis and Stettler, "New England Cotton Textile Industry," p. 221.

[16] Temin, "Industrialization," p. 122.

TABLE 2
REDUCED-FORM ESTIMATES OF DOMESTIC CLOTH PRODUCTION
(dependent variable: log of domestic production)

Variable	(1) OLS	(2) GLS	(3) GLS	(4) GLS
Constant	−10.62*	8.75*	8.23*	8.81*
	(4.94)	(3.25)	(3.45)	(3.27)
Log $(Ep^*(1+\tau)/p_C w)$	1.36*	0.25*	0.29*	0.27*
	(0.26)	(0.15)	(0.16)	(0.15)
Log $(Ep^*(1+\tau)/p_C w) \times$ *Year1826/31*	—	—	−0.01	—
			(0.01)	
Log $(Ep^*(1+\tau)/p_C w) \times$ *Year1846/60*	—	—	0.01	—
			(0.01)	
Log $(Ep^*(1+\tau)/p_C w) \times$ *Year1830/45*	—	—	—	−0.01
				(0.01)
Log $(p_A/p_C w)$	−1.88*	−0.32	−0.35	−0.32
	(0.35)	(0.19)	(0.23)	(0.22)
Log (Y)	1.53*	0.19	0.21	0.17
	(0.08)	(0.33)	(0.34)	(0.32)
Time	0.04	0.04*	0.04*	0.04*
	(0.04)	(0.01)	(0.01)	(0.01)
ρ	—	0.76*	0.73*	0.78*
		(0.07)	(0.08)	(0.06)
N	35	35	35	35
Adj. R^2	0.93	0.98	0.98	0.98
Standard Error	0.21	0.09	0.09	0.09
LM χ^2	5.77*	1.57	2.82	4.02

* indicates significance at the 10 percent confidence level.
Note: Standard errors have been corrected for heteroskedasticity. *Year1826/31* is a dummy variable for the years 1826–1831. *Year1846/60* is a dummy variable for the years 1846–1860. *Year1830/45* is a dummy variable for the years 1830–1845.

a cent per yard to the landed cost of British cloth; any changes in transportation costs are picked up by the time trend or are relegated to the error term.[17] The dollar–pound sterling exchange rate is that of the 60-day bills of exchange provided by Lawrence Officer (for publication in the millennial edition of Historical Statistics of the United States). The price of raw cotton is from the U.S. Bureau of Census (series E-126). U.S. labor costs in textile production are the average annual earnings per full-time worker developed by Robert Layer, which are highly correlated with the less-complete wage series by Robert Zevin.[18] The aggregate price index is Paul David and Peter Solar's consumer price index, and real U.S. GNP is by Thomas Berry.[19]

Table 2 presents the estimation results. The first column focuses on the OLS results. The coefficient α_1 is estimated to be 1.36, which indicates that a 10-percent reduction in the relative price of imports would be expected to reduce domestic output by about 14 percent. This is a very high elasticity.

[17] Harley, "International Competitiveness," p. 566.
[18] Layer, *Earnings of Cotton Mill Operatives*, pp. 46–47; and Zevin, "Growth."
[19] David and Solar, "Bicentenary Contribution"; and Berry "Production."

Consider the effects of the Walker tariff of 1846, which reduced the import tariff from 57 percent to 25 percent due largely to the elimination of the minimum valuations. This would be equivalent to a 26-percent decline in the price of imported textiles, calculated as $(1.25 - 1.69) / 1.69 = -0.264$. Such a change in relative prices would imply a 35-percent decline in domestic output, nowhere near what was actually observed during this period. The other elasticities also are estimated to be very large. However, the Lagrange multiplier test statistic for first-order serial correlation is significant. Serial correlation implies that OLS is not efficient, that the coefficients may be biased, and that the test statistics are invalid.

Column 2 presents generalized least squares (GLS) estimates that correct for serial correlation by allowing $\epsilon_t = \rho\epsilon_{t-1} + e_t$. These estimates are not unbiased but consistent and asymptotically more efficient than OLS. When this is done, the coefficient on the relative price of imports falls to 0.25. It also is estimated precisely in the sense that it allows us to rule out the hypothesis that the coefficient is large. It is not significantly different from zero (indicating the tariff has no effect on domestic output) but is significantly lower than one (wherein the tariff has a proportional effect on domestic output). If an elasticity of 0.25 is taken as representative, then even a large tariff change, such as the Walker tariff with its 26 percent reduction in the relative price of imports, would be expected to reduce domestic output by about 7 percent.

This modest effect is more consistent with the observed growth in domestic output of 1 percent in 1847. What accounts for the difference between the estimated and the actual change in output? In column 2 the key determinant of domestic output is simply the time trend, which indicates that output would increase 4 percent a year, on average, holding other factors fixed. Regardless of the relative price of imports, and apparently even changes in national income, there were strong factors pushing American output higher every year. (Excluding the time trend does not increase the estimated coefficient on income.) Therefore, the effect of the tariff-induced change in the relative price would be largely offset by the trend increase in domestic production.

Column 3 presents the results when the relative price of imports is interacted with dummy variables for two periods: 1826 to 1831, and 1846 to 1860. If the tariff was redundant in the period from 1832 to 1845 but not in the other periods, then the interaction terms would indicate a significant responsiveness of domestic production to fluctuations in import prices. The coefficient on the relative price of imports rises slightly to 0.29, but the coefficients on both of the interaction terms are small and statistically insignificant. This result suggests that there is no important difference in the response of domestic output to changes in import prices across these peri-

ods. Column 4 uses a single dummy variable for the period from 1830 to 1845 and yields a similar finding.

An alternative approach to solving out the endogenous variables and estimating a reduced form is to account for the endogenous variables by two-stage least squares estimation. This approach would take $Ep^*(1 + \tau)$ as exogenous but treat the domestic price of textiles (p) as endogenous and use as instruments such variables as the price of raw cotton and the domestic wage rate in the textile industry. The domestic textile price is that of Russian brown sheeting, in New York, taken from Zevin; the results are essentially unchanged if we use the alternative cotton-sheeting price series in the U.S. Bureau of Census (series E-128).[20]

Table 3 presents some econometric results from this specification. The first is a simple 2SLS regression, which yields an elasticity of domestic output with respect to the relative price of imports of 0.63. Yet this specification is also afflicted with serial correlation. Column 2 presents the instrumented GLS estimates that yield an elasticity of about 0.03, which is not significantly different from zero.

Column 3 presents the results that include the relative price of imports interacted with the time-period dummies. In contrast to the results in column 3 of Table 2, this column indicates that there is an important difference in the response of domestic output to changes in imports prices prior to 1831, although not after 1846. Summing the coefficients on the relative price of imports and the interaction term for the period 1826 to 1831 suggests an elasticity of 0.34 during this period. In the late 1820s, therefore, a 10-percent reduction in the relative price of imports would have reduced domestic output by 3.4 percent. The tariff stood at about 35 percent during this period, and if eliminated would have reduced the relative price of imports by 26 percent, implying a 9-percent reduction in domestic output. This is not small, but it hardly suggests that the domestic industry relied upon the tariff for its survival. This was precisely the period when Taussig suggested that the domestic industry had matured enough so that it no longer depended upon the tariff.

Consistent with the view that tariffs were redundant during the period from the early 1830s until 1846, the estimated coefficient on the import price is only 0.06 and is not significantly different from zero. Although the coefficient on the import price interacted with the dummy for the period after 1846 is also not statistically significant, it is about equal in size to the coefficient on the price of imports. The sum of these coefficients makes an elasticity point estimate of 0.10 and indicates that the response of domestic output may have been somewhat greater after 1846 than before. This elasticity implies that the elimination of the 25-percent Walker tariff sometime

[20] Zevin, "Growth," p. 134; and U.S. Bureau of the Census, *Historical Statistics*, series E-128.

TABLE 3
INSTRUMENTAL-VARIABLE ESTIMATES OF DEMAND FOR DOMESTIC CLOTH
(dependent variable: log of domestic production)

Variable	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS
Constant	–0.24	12.64*	11.88*	11.92*
	(7.44)	(1.62)	(1.96)	(1.81)
Log ($Ep^*(1+\tau)/p$)	0.63*	0.03	0.06	0.18*
	(0.21)	(0.06)	(0.08)	(0.07)
Log ($Ep^*(1+\tau)/p$) × *Year1826/31*	—	—	0.29*	—
			(0.15)	
Log ($Ep^*(1+\tau)/p$) × *Year1846/60*	—	—	0.05	—
			(0.07)	
Log ($Ep^*(1+\tau)/p$) × *Year1830/45*	—	—	—	–0.14*
				(0.07)
Log (Y)	1.61	–0.05	0.04	0.03
	(1.10)	(0.23)	(0.27)	(0.26)
Time	0.02	0.04*	0.04*	0.04*
	(0.05)	(0.01)	(0.02)	(0.01)
ρ	—	0.78*	0.78*	0.74*
		(0.06)	(0.05)	(0.06)
N	35	35	35	35
Adj. R^2	0.88	0.98	0.97	0.98
Standard Error	0.28	0.10	0.12	0.10
LM χ^2	17.31*	2.00	3.32	10.62

* indicates significance at the 10 percent confidence level.
Note: Standard errors have been corrected for heteroskedasticity. Instruments include log of income, log of price of raw cotton, log of wages in textile industry, the tariff inclusive price of imports, and a time trend. *Year1826/31* is a dummy variable for the years 1826–1831. *Year1846/60* is a dummy variable for the years 1846–1860. *Year1830/45* is a dummy variable for the years 1830–1845.

after 1846, by reducing the relative price of imports by 20 percent, would have cut domestic output by about 2 percent, a very small effect.

Column 4 presents the alternative results with the relative price of imports interacted with a time dummy for the years 1830–1845.[21] The coefficient on the relative price of imports is 0.18, indicating that, except during the period from 1830 to 1845, a tariff reduction that led to a 20-percent decrease in the relative price of imports would have reduced domestic output by less than 4 percent. The sum of the coefficients on the relative price of imports and the interaction term indicate that, in the period from 1830 to 1846, the sensitivity of domestic production to import prices fell from 0.18 to 0.05. This is also consistent with the view that tariff protection during this period was redundant and insulated domestic producers from import-price fluctuations.

To sum up, the Table 3 results show that domestic production was sensitive to import-price fluctuations before the early 1830s, not very sensitive

[21] In the regressions we report, our results are not very sensitive as to whether we choose to begin or end our dummy variables with the year 1845 or 1846.

to such fluctuations from the early-1830s until 1845, and slightly more sensitive again after 1846. The lack of sensitivity of domestic production in the 1830s until 1845 could be due to excess protection, even though British imports were never driven to zero during this time. Yet even when tariffs were not prohibitive and domestic production was sensitive to changes in the relative price of imports (in the late 1820s and after 1846), the magnitude of this sensitivity is very small. Even if the tariff had been abolished in the late 1820s, the results suggest that domestic production would not have fallen by a substantial amount. If this was true in the late 1820s, when the industry was still relatively young, it was both true and clear to most observers in later decades when the industry was much larger and more firmly established.

INTERPRETING THE RESULTS

What accounts for this lack of sensitivity to the tariff? Harley suggests that the tariff was prohibitive through most of the antebellum period, which could account for the insensitivity. But as the previous section showed, this probably was true only from the early 1830s until 1845. We argue instead that the muted relationship between domestic production and import prices even before 1830 is due to the fact that the product mixes of domestic and foreign producers were quite different. This implies that there were limited opportunities to substitute the products for one another in consumption and therefore could explain why the tariff was not of critical importance to the industry at this time.

Britain specialized in finer cotton goods whereas America specialized in heavier, standard cloths. As Zevin noted, "imports from Britain and the products of New England mills tended to fall into quite distinct product classifications . . . . The imports were largely ginghams, woven in intricate patterns to which the power looms had not yet been adopted. New England power looms were supplying plain weaves—sheeting, shirting, and, somewhat later, twills —usually made of lower count yarns than the British cloths."[22] In fact, the mean count of yarn spun in England was over 50 in the early 1830s, whereas the mean count in New York was under 20. Indeed, there was virtually no overlap in the counts spun in the two countries: over 90 percent of textile production in Lancashire was above 20 count, and more than 80 percent of output in New York was below 20 count at this time.[23] As a result, any growth in imports did not come at the expense of domestic production.

This does not mean that the U.S. industry was completely unaffected by the surge in imports from Britain that resulted from the 1846 tariff reduc-

[22] Zevin, "Growth," pp. 126–27.
[23] Temin, "Product Quality," p. 896.

tion. The tariff affected the mix of traded goods at the margin, forcing some domestic adjustments. Domestic producers of higher quality, higher-count goods were forced to adapt to the new competition by shifting their product mix toward lower-count, lower-quality goods. Stettler reported that the ratio of low- count to high-count yards produced by his sample of firms rose from 2.07 in 1843/44 to 2.58 in 1847/48. He noted that high-count mills increased their output rapidly in 1843/44 (after the tariff increase in 1842) and much less rapidly in 1847/48 (after the tariff reduction in 1846). But the imports triggered only minor adjustments for the industry as a whole because most U.S. firms were not producing finer goods.[24]

For their part, British producers did not shift away from specializing in finer products and begin producing coarser products simply because the American market opened up. Britain apparently did attempt to export some plainer cloth, but the venture did not succeed. Edward Stanwood observes that "large quantities of plain cloth were imported in 1847, but the quality was so distinctly inferior to that of the domestic goods that the venture resulted in a loss. In fact, except for fine goods, laces, embroidery, and the like, the American manufacturer had the market in full control."[25] The price of cotton textiles exported to the rest of the world was about five cents lower than those exported to the United States in the late 1830s, but was only about two cents cheaper in the late 1840s. This indicates that Britain was not exporting to other markets large quantities of the lower-count goods that American producers had specialized in. Therefore the scope for British producers to adjust their export mix to the United States by shifting down to lower-count goods was limited. Because the United States only took about 10 percent of Britain's textile exports during this period, it was probably not worthwhile for British producers to shift their product mix and take on American producers. Finally, although textile imports from China and India rose after the 1846 tariff reduction, the amounts were very small in comparison to imports from Britain.

Our conclusion is in accord with the previous historical literature, which was skeptical of the tariff's importance to the industry. Caroline Ware concluded that coarse goods "never really needed protection, and since 1833 even high tariff advocates had admitted that they could stand alone, for ordinary 'domestics' could be made sufficiently cheaply in the United States

[24] Stettler, "Growth," p. 224. There may have been a slightly greater concentration of finer good producers in Pennsylvania, which would have implied some regional variation in the adjustment to the lower tariff. The number of yards per pound, an indication of the cloth quality, was similar in all states in 1831, except for Pennsylvania. Temin, "Product Quality," p. 895. There was also a slight fall in Pennsylvania's share of U.S. cotton manufactures between the 1840 and 1850 censuses. But Scranton's account of the textile industry in Philadelphia does not assign a large role to the tariff there. One prominent cotton mill closed at the end of the 1840s, but its owner died, and it is hard to know if the tariff reduction mattered. Scranton, *Proprietary Capitalism*, pp. 91–92.

[25] Stanwood, *American Tariff Controversies*, Vol. 2, pp. 90–91.

to complete successfully with the producer of other countries in foreign markets."[26] One contemporary observed in 1850 that "the business of cotton manufactures was by that time so firmly established as to be little affected by changes in legislation in regard to duties on the coarser fabrics required for domestic consumption, to which American machinery had been adapted."[27] Bils and Harley rejected this consensus on the basis of comparative cost data. But, as discussed earlier, using cost data to determine the competitive position of the domestic industry can be problematic. Indeed, after examining the Montgomery cost data that Harley relies on, Samuel Batchelder conceded that costs appeared to be lower in Britain than in American for everything but motor power, yet still concluded that "it is questionable whether heavy goods, such as drilling and sheeting, which make up a very large proportion of the consumption of this country, can be produced cheaper than in the United States."[28] Both Bils and Harley noted prominently that costs varied with product quality, but they did not draw out the implications of this view correctly. In comparing the costs of production for comparable goods in America and Britain, for example, Harley did not ask if the British products were typical of their exports to the United States. Neither Bils nor Harley described the range of quality produced and exported by the two industries in any detail, relying instead on simple models in which costs rose with quality. This led them to miss the evidence that imported British textiles and domestically produced cloth were far from perfect substitutes.

THE TARIFF OF 1816

We have shown that, by the late 1820s, the tariff was not critical to the American cotton industry. But Appleton claimed that the Tariff of 1816 was a crucial factor in the industry's earlier development. What can we say about this earlier period? We cannot use econometric techniques for the earlier period both because the data are very scanty and because the vagaries of war and peace introduced a lot of noise into any time series.

Some available data are shown in Table 4. Prior to 1815 various parliamentary reports presented data on the value of British imports, but not the volume of those imports and not for all years. There are no comparable data on the value of domestic output, but Zevin presents the volume of output from the New England cotton industry from 1805.[29] We calculate the value of domestic textile production by taking Zevin's series on domestic produc-

[26] Ware, *Early New England Cotton Manufacture*, p. 106.

[27] Quoted in Copeland, *Cotton Manufacturing Industry*, p. 15.

[28] Batchelder, *Introduction*, p. 91. Montgomery's cost estimates were also disputed by Justitia, *Strictures*.

[29] Zevin, "Growth," p. 123.

TABLE 4
U.S. CLOTH PRODUCTION AND SELECTED IMPORTS, 1805 TO 1819
(thousands of dollars)

Year	New England Production	Imports from Britain	Imports from India	Imports from China
1805	978	13,110	1,965	1,716
1806	1,353	22,140	3,524	2,091
1807	1,738	21,214	3,982	1,698
1808	4,073	21,927	4,165	2,510
1809	6,418	29,663	639	452
1810	13,984	32,340	3,277	3,207
1811	15,251	n.a.	3,819	2,723
1812	20,087	n.a.	0	227
1813	31,514	n.a.	1,150	478
1814	44,453	n.a.	0	9
1815	47,160	21,185	4	207
1816	16,355	11,199	2,291	1,985
1817	69,739	8,434	820	1,058
1818	122,600	10,922	1,480	1,032
1819	164,027	4,903	2,812	1,016

Sources: New England production (in yards) from Zevin, "Growth,"p. 123, multiplied by the domestic price of Russian brown sheeting from U.S. Bureau of the Census, Historical Statistics, series E-128. Imports from Britain: from Stettler, "Growth," p. 108, and Great Britain, *Accounts . . . 1847/48*, converted into dollars using exchange rate on bills of exchange provided by Lawrence Officer. Other imports from U.S. Congress, *American State Papers*, vols. 1, 2.

tion in yards and multiplying it by the domestic price of textiles given in the U.S. Bureau of the Census (series E-128).

Imports from other countries are harder to find. They were taxed at an ad valorem rate, as shown in Table 1, and the government lumped all imports subject to a given tariff rate together. In other words, there is no way to distinguish cotton-textile imports from India from other imports from India taxed at the same rate. American imports from India and China were probably not very diverse, however, and it is likely that the primary imports from these areas subject to the tariff applicable to cotton textiles were in fact cotton textiles, as Stettler assumed.[30] The data in Table 4 record the total imports from India and China subject to the tariff at the rate paid by cotton textile imports. If inaccurate, they are overestimates of the cotton imports.

It is apparent that the imports were very substantial compared to domestic production at the beginning of the century. Most of the cotton textiles consumed in the United States before the Embargo of 1808 were imported. Domestic production outside the Waltham-style firms in Massachusetts is omitted from Table 4, but it cannot have been large enough to alter this conclusion. This condition, in any case, was short lived.

[30] Stettler, "Growth," p. 214.

Domestic production began to rise rapidly starting soon after the Embargo of 1808 was instituted in December of that year and continuing under the protection afforded by wartime conditions. Imports from India and China fell in 1809 and following years, although they revived briefly in 1810/11 as the embargo was relaxed. In the years before hostilities between Britain and the United States, imports from Britain continued unabated. They presumably fell sharply during the War of 1812. In the protected environment of international hostilities, the modern cotton-textile industry of New England grew by an order of magnitude from 1809 to 1815.

With peace, however, came disaster, as domestic production fell by two-thirds in 1816. Although most historians talk of drastic price falls as British imports were sold at auction, the price of cotton cloth continued its downward trend without any break. The dramatic fall was in production. The New England cotton mills produced only about one-third as many yards of fabric in 1816 as in 1815; production collapsed back to the level of 1811.[31] It is not hard to see Francis Lowell and the Boston Associates anticipating disaster and ruin.

This shocking fall in production had several causes. According to Ware, "the combination of the post-war slump, the dumping of British goods on the American market after the peace, and the collapse of the western currency sent numbers of the old producers to the wall. 'Half the spindles' in the vicinity of Providence and Fall River were said to be idle in 1816."[32] The banking and currency problems in the western United States cut sharply into the domestic demand for textiles and left many manufacturers with debts from unpaid shipments. The import surge that followed peace in 1815 exacerbated the situation. The value of British cotton fabric exported to the United States in 1815 was over $20 million, almost half the value of domestic production in that year. We have not been able to find records of British cotton imports in the years just before 1815, but the imports fell by half from 1815 to 1816 and stayed far below the 1815 level. The imports shown in Table 4 from India and China were not large enough to have caused the dramatic contraction in domestic production, but they clearly show the effect of peace by rising sharply in 1816.

The dramatic (if short-lived) decline in U.S. production suggests that domestic producers might have been far more responsive to imports than they were two or three decades later, but even this is a highly tentative conclusion. Willard Thorp described the year 1815 as one of "financial panic" and 1816 as a "depression," and recorded prices did not collapse in 1815 or 1816 even though they were falling steadily from their peak on an annual basis in 1814.[33]

[31] Zevin, ("Growth," p. 123) recorded this fall in production without comment, and we must presume it is as well documented as the evidence of steady growth in Figure 2.

[32] Ware, *Early New England Cotton Manufacture*, p. 66.

[33] Thorp, *Business Annals*, pp. 117–18.

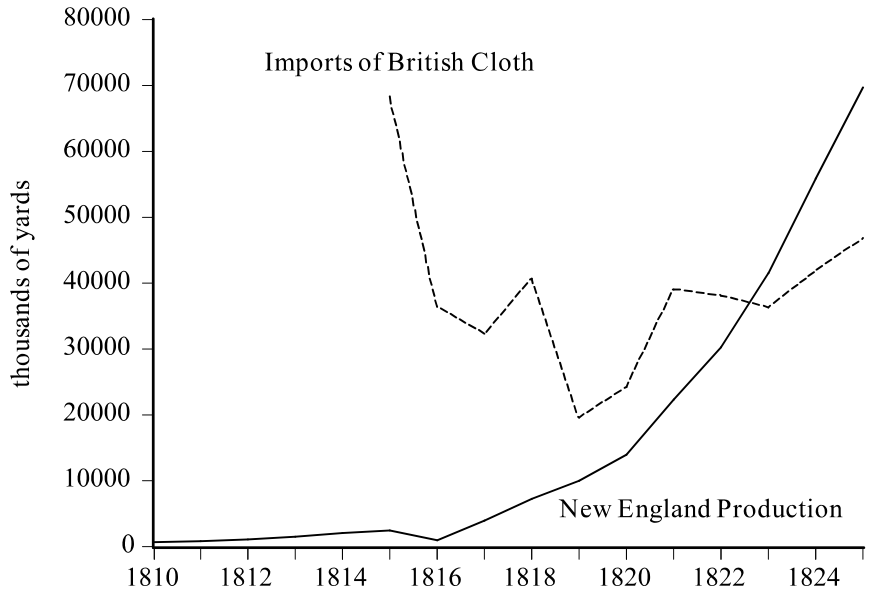


FIGURE 5
NEW ENGLAND COTTON CLOTH OUTPUT AND IMPORTS FROM BRITAIN, 1810–1825

Source: Zevin, "Growth," p. 123.

Although textile producers could not do anything about the general economic slump, they could try to stop imports. Lowell appealed to Congress for tariff protection, as recounted by Appleton. He got it, and cotton imports from Asia fell, although they did not vanish, as shown in Table 4. Instead, they fell back from their peak and did not share in the growth of demand as the United States grew. Imports from Britain fell as well, never again to rise to their value in 1815. Even in 1847, after the tariff had been reduced sharply, imports were only about half as large in value as they had been in 1815, although they did exceed the 1815 yardage for only the third time since 1815. As shown in Table 4, domestic production revived quickly and resumed its rapid expansion.

Figure 5 complements Table 4 in presenting the volume (thousands of yards) produced in New England and imported from Britain during this period. After 1815 imports fell sharply and then remained lower, while domestic production soared. By the early 1820s the volume of domestic production exceeded that imported for the first time.

We infer from these fragmentary data that the American cotton industry may have been protected by the Tariff of 1816. The tariff extended the protection afforded by embargo and war to enable the industry to grow. It is possible that the industrial growth achieved during the years of conflict with

Britain could have been erased by free trade after the end of hostilities. Because Lowell moved with great dispatch to forestall this eventuality and general economic conditions improved thereafter, this scenario is necessarily conjectural. There was only one year in which the industry faced foreign competition without a high tariff after its initial growth.[34]

CONCLUSIONS

This article has provided support for Taussig's judgement that American textile manufacturers were well established by the 1830s and not dependent upon the tariff for their survival. The effect of changes in the relative price of imports on domestic production (estimated using time-series data) appears to be small, even in the late 1820s and after the mid-1840s when potentially redundant tariff protection is not an issue. Part of the explanation for the relative unimportance of the tariff during this period is that, as historical contemporaries observed, British and American products were quite different from one another. We conclude that high tariffs were not an essential component of the survival and success of the later antebellum domestic cotton-textile industry, although the early cotton industry may have been protected by the Tariff of 1816.

[34] Indeed, Ware (*Early New England Cotton Manufacture*, p. 72) argued that "There is also no question that domestic sheetings were actually in need of no protection, for before the passage of the [1816] tariff the Waltham company was enlarging its business in order to meet a rapidly growing demand." Zevin ("Growth," p. 128) concluded that "the tariff made no significant contribution to the secular growth of American demand for New England mill products over the period from 1815 to 1833." Temin, "Product Quality," assumed the contrary, and this article revises part of that earlier paper.

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