Trade Disruptions and America’s Early Industrialization

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Abstract: Between 1807 and 1815, U.S. imports of manufactured goods were severely cut by Jefferson’s trade embargo, subsequent non-importation measures, and the War of 1812. These disruptions are commonly believed to have spurred early U.S. industrialization by promoting the growth of nascent domestic manufacturers. This paper uses a newly available series on U.S. industrial production to investigate how this protection from foreign competition affected domestic manufacturing. On balance, the trade disruptions did not accelerate U.S. industrialization as trend growth in industrial output was little changed over this period. However, the unchanged trend in aggregate production masks a sharp divergence in the fate of infant industries (which boomed) and trade-dependent industries (which suffered). After the War of 1812, the composition of U.S. industrial output shifted from trade-dependent industries (such as shipbuilding) to domestic infant industries (such as cotton textiles), yet factors other than the trade disruptions themselves appear to have been responsible for this development.

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1. Introduction

Between 1807 and 1815, U.S. foreign trade was severely disrupted by Jefferson’s trade embargo, subsequent non-importation measures, and the British blockade during the War of 1812. These disruptions prevented foreign manufactured goods from reaching the U.S. market, thereby protecting nascent domestic industries from import competition. As a result, new manufacturing firms were established and existing domestic producers rapidly expanded output to replace previously imported goods. With the resumption of normal commerce after the war, however, a flood of imported manufactured goods (mainly from Britain) in 1815 and 1816 threatened to eliminate many of the new producers and set back any gains to domestic manufacturers. Once the import surge subsided, U.S. industrial output continued to expand through the ante bellum period.

While this version of events is widely accepted, an open question is whether the seven-year trade disruption – despite the setbacks in 1815 and 1816 – decisively accelerated America’s industrialization or merely provided a temporary and short-lived boost to domestic manufacturers. Limited data on early U.S. industries have prevented any clear cut answer from emerging. Economic historians have no reason to doubt that, by keeping British manufactured goods out of the U.S. market, the trade disruptions helped stimulate domestic production by import-competing industries. Older works testify to the blossoming of manufacturing around this period, but mainly provide descriptive evidence from the period.1 More recent research has

1 For example, Taussig (1931, pp. 16-17) observed that a “series of restrictive measures blocked the accustomed channels of exchange and production, and gave an enormous stimulus to those branches of industry whose products had before been imported. Establishments for the manufacture of cotton goods, woollen cloths, iron, glass, pottery, and other articles, sprang up with a mushroom growth. . . . It is sufficient here to note that the restrictive legislation of 1808-15 was, for the time being, equivalent to extreme protection.”
focused on indirect measures of manufacturing activity, such as incorporations or patents, in order to provide some limited quantitative evidence on the period. But the lack of economic data from the ante bellum period has impeded efforts to determine precisely how the trade disruptions affected the American economy.

This paper addresses the question of how the trade disruptions affected early U.S. manufacturing by using a new index of industrial production by Davis (2004). The index can be decomposed into its constituent elements, permitting a more refined look at the impact of trade disruptions on different parts of the early manufacturing economy, such as domestic infant industries (e.g., cotton textiles) and trade-dependent industries (e.g., shipbuilding).

On balance, the trade disruptions do not appear to have decisively accelerated U.S. industrialization; indeed, the trend growth in total industrial production is little changed over this period. However, the trend in aggregate industrial production masks a sharp divergence between the fate of infant industries (which boomed) and trade-dependent industries (which suffered). After the import surge in 1815 and 1816 temporarily reversed these fates, the trade disruptions may have left a permanent mark on the composition of U.S. industrial output. After 1817, when the trade situation had stabilized, the United States had nearly 20 percent more production in infant industries, and about 20 percent less production in trade-dependent industries, than otherwise would have been expected. Yet our analysis suggests that the trade shocks themselves had largely temporary effects on industrial production and therefore are not able to account for this permanent shift in resource allocation. Rather, other factors, such as technological changes,

\footnote{Lebergott (1984, p. 126), Rosenbloom (2004), and others have observed the striking inverse correlation between shipping volume and incorporations of cotton textile firms. In addition, Sokoloff (1988) notes a small wave of patenting activity around the time of the trade disruptions.}
shifts in the composition of demand, and the Tariff of 1816, may have played more important roles.

This paper is organized as follows. Section 2 sets out the historical background and describes the trade disruptions experienced during this period. Section 3 performs statistical tests on the Davis (2004) industrial production series to determine if movements in the series can be linked to changes in imports. Section 4 examines qualitative evidence that may clarify the findings of the statistical tests, and section 5 concludes.

2. Trade Disruptions and Domestic Industries

At first, U.S. foreign commerce benefitted from the war that broke out between Britain and France in 1793. As a neutral country, American merchants quickly took advantage of the void left by the combatants in shipping goods from North America and the Caribbean to Western Europe. U.S. re-exports boomed, growing from about $1 million in 1792 to nearly $40 million by 1800. As the European hostilities intensified, however, the United States gradually became embroiled in the conflict. The British and French navies began harassing American merchants, confiscating their ships and cargoes, and impressing their sailors as each country sought to strangle the economy of the other.

In response, President Thomas Jefferson requested that Congress enact a trade embargo in December 1807. The embargo prevented U.S. ships from sailing to foreign destinations and its purpose was to prevent further losses to the merchant marine while denying Britain and France much needed supplies. Jefferson hoped that this “peaceful coercion” would convince the two

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Adams (1980) and Goldin and Lewis (1980) examine the impact of this booming re-export trade on the American economy.
powers to change their policy and respect neutral shipping. The embargo was a sharp blow to
trade: imports for consumption fell 60 percent in 1808 from the previous year; a larger fall was
prevented because American ships in Europe at the time the embargo was announced were
allowed to return home and unload their cargoes.

Although domestic opposition forced the embargo to be abandoned just fifteen months
later, in March 1809, a non-intercourse measure was then imposed banning trade with Britain
and France for part of 1809. This was suspended for most of 1810, but in 1811 a non-
importation measure was put in place against Britain. When these measures failed to ease
tensions on the Atlantic, Congress declared war on Britain in June 1812. The conflict severely
disrupted trans-Atlantic trade. The United States maintained its embargo against Britain, but a
British blockade of the North American seaboard thwarted American attempts to continue
trading with other parts of the world. The war and blockade almost completely eliminated U.S.
foreign trade in 1813 and 1814. The value of U.S. imports for consumption fell from $70 million
in 1812 to $13 million in 1814, a decline of over 80 percent. The Treaty of Ghent ended the
conflict in December 1814 and normal trade was restored in the spring of 1815. The resumption
of commerce brought a flood of imports into U.S. ports: the value of imports surged to $79
million in 1815 and then $134 million by 1816, before falling back.

Figure 1 illustrates the volatile path of U.S. trade over this period by presenting three
measures of the volume of U.S. imports. The first measure is the tonnage of ships engaged in
foreign trade entering U.S. ports, perhaps the best measure of import volume during this time.
The tonnage of ships entering the United States fell 50 percent in 1808 from the previous year
and fell nearly 90 percent between 1811 and 1814. The second measure is North’s (1966)
measure of real imports, defined as the value of imports divided by a price index of imports.
This series is highly correlated with shipping volume (correlation coefficient of 0.91), but is more volatile and suggests that the embargo did not have a great impact on trade.

The third measure is the official value (real) British exports to the United States. U.S. import data are not sufficiently detailed during this period to provide a picture of how imports of manufactured goods were affected in particular by the trade disruptions. Real British exports to the United States may be the best measure of U.S. imports of manufactured goods because such imports came overwhelming from Britain. As figure 1 illustrates, imports from Britain fell to extremely low levels from 1811 until 1815, suggesting that the United States was cut off from virtually all imports of manufactured goods. The U.S. trade that did take place during this period was largely with countries in the Caribbean rather than in Europe and thus probably did not consist of industrial products.

As noted in the introduction, the lack of economic data from the ante bellum period has hampered efforts to determine how these severe trade disruptions affected early American industry. However, Davis’s (2004) recently constructed index of industrial production for the 1790-1915 period provides a clearer view of the state of U.S. manufacturing during this time. This annual index incorporates 38 physical-volume series in the pre-Civil War period to gauge manufacturing activity in a manner similar to how the Federal Reserve Board’s index currently measures U.S. industrial production. While Davis’s original index possesses complete coverage from 1826 on, moderate attrition occurs further back in time. Consequently, we have constructed a version of the original Davis index whose coverage preserves comparability of index changes over time. Specifically, the special variant of the index includes only industries that existed on the eve of the embargo (and whose annual direct or indirect output measures were available before 1808) or that emerged as entirely new industries between the embargo period and the base
1850 census year of the index. These selection criteria retained 28 of the 38 original antebellum industries in the original Davis index, representing 61.4 percent of the value-added weight of the 1850 base year.

Figure 2 presents the industrial production index from 1790 to 1840. The shaded portions indicate the period of disrupted trade. While there appears to be some acceleration in industrial production around this time, it is not particularly pronounced. The lack of a distinct effect of the trade disruptions on total industrial production may be due to its differential, and perhaps offsetting, effects on different types of industries. For example, the highly controversial Jeffersonian embargo drew strong opposition from ship builders and fish preservers in New England, who were dependent on foreign trade, while new iron and glass manufacturers around Philadelphia supported the measure.

Indeed, while manufacturing was a very small part of the overall economy, it encompassed a variety of industries. This diversity is illustrated in a report on domestic manufactures by Albert Gallatin, President Jefferson’s Secretary of the Treasury, in April 1810. Gallatin’s (1810, p. 124) report distinguished between three categories of industry. The first category comprised eight commerce and trade-dependent industries: manufactures of wood (ships, furniture, etc.), leather, soap and tallow candles, spermaceti oil and candles, flaxseed oil, refined sugar, coarse earthenware, and powders (snuff, hair, etc.). The second category included eleven industries that were “firmly established” and supplied “a considerable part of the consumption of the United States” but still faced foreign competition in the domestic market: cotton, wool, and flax manufactures, iron, hemp products, hats and straw bonnets, paper and printed books, spirits and malt liquors, gunpowder, window glass, jewelry and clocks, lead, and wax candles. The third category consisted of seven industries in which some progress had been
made in establishing domestic production, but where imports satisfied almost all domestic consumption: paints and colors, chemical preparations and medicinal drugs, salt, copper and brass manufactures, plated ware, calico printing, other earthen and glass wares.

The components of the Davis index can be separated into two categories – commerce and trade-dependent industries and domestic import-competing “infant” industries – that roughly correspond to Gallatin’s designation. (For our analysis, Gallatin’s second and third categories are combined because, on the eve of the embargo, few if any domestic industries were truly free from any import competition.) The 28 quantity-based components in this index of early American output correspond closely with the 26 industries cited by Gallatin in his three categories of industry. Commerce and trade-dependent industries include merchant shipbuilding, refined sugar, sperm- and whale-oil refining, wheat flour milling, fish curing, whale bone and copper. Domestic infant industries include domestic cotton consumption (a proxy for textile output), newspaper circulation, coal production, hog packing, navy vessels, music organs, hand fire engines, firearms, die-sinking, salt production, army wool stockings, cloth regalia, and army boots and shoes.

Figure 3 shows the markedly different effect of the trade disruptions on these two categories of domestic output. Trade-dependent industries were adversely affected by both the embargo and the wartime blockade, but much more severely by the latter. These trade-dependent industries experienced a drop in production of nearly 70 percent between 1811 and 1814. However, production quickly rebounded after the war. Among the domestic infant industries, there does not appear to have been much import substitution during the 1807-1809 embargo, but a substantial amount during the war. Infant industry production nearly tripled between 1811 and 1814, but fell back once normal commerce resumed.
In terms of the 1850 value-added weights, the relative value-added weights are split rather evenly among Gallatin’s classifications of (1) trade-dependent industries (eight series, representing 32 percent of the index’s value added), (2) “firmly established” domestic industries (14 series, 27 percent), and (3) import-competing “infant” industries (five series, 41 percent).

Thus, in comparing the structure of industries around 1808 to that in 1850, trade-dependent industries accounted for about 32 percent of production was in trade-dependent industries, 27 percent in infant industries, and the remainder in other domestic industries.

The trade shocks of the 1808 to 1814 period clearly had important, temporary effects on industrial production across these differently situated categories, but did it have more permanent effects as well? Did the trade disruptions decisively accelerate production by import-competing industries or just boost their fortunes temporarily? And was the damage done to trade-dependent industries persistent or transitory as well?

3. The Effect of Import Shocks on Industrial Production

The main question that we seek to answer is whether the trade disruption had temporary or permanent effects on the component levels of industrial production. If trade shocks had transitory effects on production, then temporary protection from imports would boost the level of

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industrial production in the short-term, but it would then revert back to the level dictated by its trend growth. If trade shocks had permanent effects on production, then temporary protection from imports would lead to a persistently higher level of output.\(^5\)

This section considers three different methods of examining this question: unit root tests, linear trend regressions, and estimates of the reduced-form relationship between trade shocks and production. Unit root tests indicate whether any random shock to industrial production is persistent or not; the linear trend regressions can determine whether the level of industrial production shifted after the trade disruptions; and finally the reduced-form regressions specifically examine the link between industrial production and the volume of imports. Each of these approaches give us somewhat different information on the questions raised above.

\textit{A. Unit Root Tests}

As a first pass at this question, we can test for a unit root (stochastic trend) in the industrial production indices. The unit root test helps indicate whether any random shock to production, without reference to trade shocks in particular, has permanent or temporary effects on the level of production. If the test fails to reject the hypothesis of a unit root, then the shocks to output are persistent and have a permanent effect on the level of production. If the test rejects the existence of a unit root, then the alternative could be that industrial production is characterized by temporary deviations from a deterministic trend, although rejection of a specific null hypothesis does not imply acceptance of any particular alternative (Perron 1989).

Table 1 presents augmented Dickey-Fuller (ADF) unit root tests for the three industrial

\(^5\) For example, Rosenbloom (2004) argues that the expansion of U.S. textile production in the early nineteenth century is best understood as a path-dependent process initiated by the protection provided by the trade disruptions of this period.
production series. The coefficient of interest is that on the lagged level of production ($\alpha$) and the null hypothesis of a unit root is that $\alpha = 0$. If the absolute value of the t-statistic on $\alpha$ exceeds the ADF critical value, then the hypothesis of a unit root can be rejected. For total industrial production during the sample period 1790-1830, the ADF test statistic indicates that the hypothesis of a unit root can be rejected at the 5 percent level, which suggests that shocks to industrial production are temporary, not permanent. This is also indicated by the large size of the coefficient $\alpha$, indicating that the series exhibits substantial mean reversion. For infant industry production, however, we cannot reject the hypothesis of a unit root, in which case some fraction of an innovation is permanent. These are precisely the industries in which temporary protection might be thought to lead to permanent gains to output and is consistent with the path dependence or hysteresis story. However, the t-statistic is very close to the ADF test statistic and the unit root hypothesis can be rejected at the 10 percent level. Finally, in the case of trade-dependent industries, the hypothesis of a unit root can be rejected at the 5 percent level, also suggesting that random shocks are temporary.

Thus, we conclude that there is little evidence that disturbances to total and trade-dependent industrial production are permanent, although this possibility cannot be ruled out in the case of infant industry production.

B. Linear Trend Forecast

If innovations to production are not permanent, then an alternative specification is to consider industrial production as stationary fluctuations around a deterministic trend with a stationary autoregressive component, such as:

\[
\log y_t = \mu + \beta t + \alpha \log y_{t-1} + \gamma_1 \text{DISRUPTION} + \gamma_2 \text{RESUMPTION} + \gamma_3 \text{POSTWAR} + e_t
\]

where $y_t$ is industrial production, $\mu$ is a constant, $t$ is a time trend, and $e_t$ is a random error term.
This specification includes three dummy variables that allow for shifts in the level of production during the embargo and blockade years (DISRUPTION, taking the value of one in 1808 and from 1812-1814), during the readjustment to international trade (RESUMPTION, taking the value of one in 1815 and 1816), and during the post-war period (POSTWAR, which takes the value of one for the period from 1817 to 1830). The reason for separating 1815 and 1816 from the postwar period is that imports were unusually high in those years, reflecting the readjustment of commerce to peace. The behavior of imports and industrial production in these two years was not representative of the postwar period, but by 1817 both had stabilized. The sample stops at 1830 because the growth of U.S. industrial production begins to accelerate at this point and the trade disruptions were probably too distant from this period, given the many subsequent intervening factors, to be related to it.

Table 2 presents the results from estimating this equation using the three industrial production series from 1790 to 1830. For total industrial production, in the first column, the coefficients on the dummy variable for the trade disruption and resumption periods are negative, but small and not statistically significant. This suggests that the trade disruptions had little impact on overall industrial production. However, the coefficient on the dummy variable for the postwar period is negative and statistically significant. The coefficient implies that total industrial production was 6 percent lower after 1816 than might otherwise have been expected. If this negative effect can be linked to the trade disruptions, it suggests that the harmful impact of the disruptions on trade-dependent industries exceeded the beneficial impact on infant industries, perhaps because the output of trade-dependent industries exceeded that of infant industries.

As expected, the results are quite different for infant and trade-dependent industries. During the trade disruption period, infant industry production was 32 percent above, while trade-
dependent production was 53 percent below, what might otherwise have been expected. When trade resumed in 1815 and 1816, infant industry production plunged 56 percent (combining the disruption coefficient of +0.33 and the resumption coefficient of -0.22) while that of trade-dependent industries rose 69 percent. From 1817 until 1830, the level of infant industry production was 17 percent above what might have been expected prior to the trade disruptions, while trade-dependent production was 19 percent below what would have been expected.

This regression suggests that infant industries came out of the war with a significantly higher level of production than might otherwise have been anticipated. A result of virtually the same magnitude comes from asking whether infant industry production was higher in 1820 or 1825 than one would have anticipated based on a simple linear extrapolation of its trend growth from the period prior to the trade disruption. Figure 4 illustrates this by comparing actual and predicted infant industry production based on a simple forecast of production using only a constant and time trend from 1800 to 1807. In this regression, the coefficient on time is 0.045, with a standard error of 0.007, with an adjusted $R^2$ of 0.89.$^6$ In 1820, actual infant industry production is 13 percent above the forecast production. For the period 1820 to 1825, on average, the actual is 15 percent above the simple forecast. In 1816, actual production is almost the same as predicted production, but imports were abnormally high in both 1815 and 1816 as trade was adjusting to the end of the war.

This evidence suggests that the United States emerged from the trade disruption period with a different allocation of resources between these two industrial sectors, but not more

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$^6$ Data from the 1790s is not used in this regression because the trend rate of growth was much higher during that decade; the coefficient on time from 1790 to 1807 is 0.12 with a standard error of 0.01.
industrial production overall. The next question is whether the change in industry composition can be linked to the trade disruptions themselves.

C. Effect of Trade Shocks

To examine the impact of trade disruptions on industrial production directly, we turn to some reduced-form estimates of the relationship between the two. In many ways, the question of how import shocks affect industrial production is analogous to how oil price shocks affect GDP, the subject of a much recent research. As described in Hamilton (2003), this research usually starts with a simple autoregressive distributed lag specification such as:

\[
\Delta \log y_t = \mu + \alpha \Delta \log y_{t-1} + \beta_0 \Delta \log (TON_t) + \beta_1 \Delta \log (TON_{t-1}) + \beta_2 \Delta \log (TON_{t-2}) + \epsilon_t,
\]

where $y$ is industrial production, $TON$ is the tonnage of ships engaged in foreign trade entering U.S. ports, and $\epsilon$ is a random error term. The coefficient $\beta_0$ captures the contemporaneous effect of the trade shock on industrial production. By recursive substitution, the effect of a change in tonnage at time $t-1$ on industrial production at time $t$ can be represented as $\alpha \beta_0 + \beta_1$, the effect of a change in tonnage at time $t-2$ on industrial production at time $t$ can be represented as $\alpha^2 \beta_0 + \alpha \beta_1 + \beta_2$, the effect of a change in tonnage at time $t-3$ on industrial production at time $t$ can be represented as $\alpha^3 \beta_0 + \alpha^2 \beta_1 + \alpha \beta_2 + \beta_3$, etc. The sum of these effects gives us the total impact of a change in tonnage on industrial production.

Equation 2 is frequently estimated by ordinary least squares. However, a potential concern is that changes in industrial production and tonnage could be driven by a common factor.

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7 The interactions of the dummy variables with time are not statistically significant, suggesting that there was no acceleration of growth in industrial production during those periods, i.e., the level of production was affected, not its growth rate. In addition, other variables, such as the average tariff rate or annual estimates of gross domestic product (a potential demand-shift variable), are not statistically significant and do not greatly affect these estimates.
such as demand shocks. For example, an increase in domestic demand for manufactured goods could lead to an increase in imports and an increase in domestic production. Therefore, following Hamilton (2003), we attempt to isolate the component of the change in trade that can be attributed strictly to exogenous, non-demand factors – namely, the embargo and war – by creating a quantitative dummy variable for the change in the log of shipping tonnage for the years 1808 and 1813 to 1815. This quantitative dummy variable is not a zero-one variable, but one that takes the actual value of the change in those specific years and is zero otherwise. Because these shocks (all negative, except for 1815) are being driven strictly by American or British policy decisions, all are likely to be exogenous to other factors driving industrial production, such as demand or supply shocks. This quantitative dummy variable and its lags are used as instruments in an instrumental variables estimation of equation (2).

Table 3 presents the OLS and IV estimates of equation (2) for the effect of changes in shipping tonnage on total industrial production, domestic infant industry production, and trade-dependent production. The first two columns relating to total industrial production show that the coefficient on contemporaneous tonnage is not associated with any significant change in industrial production. The coefficient on lagged tonnage suggests that a ten percent reduction in shipping volume results in a 0.41 percent increase (OLS estimate) or a 0.48 percent increase (IV estimate) in industrial production in the next year. This implies a relatively modest effect, but a larger and more prolonged disruption to imports would obviously have a substantial impact on industrial output. The difference between the OLS and IV results is not large, suggesting that identification in the OLS case is really being driven by the few but large shocks around 1808 to 1815. The coefficient on the second lag on tonnage is very small and statistically insignificant.

The results are strikingly different for infant and trade-dependent industries. In contrast
to the total industrial production regressions, the explanatory power of the regressions for these industries is very high, particularly for a first-difference regression. In the IV case for infant industries, the coefficient on contemporaneous tonnage indicates that a 10 percent decrease in tonnage increases production by 2.1 percent. However, the coefficients on the one and two year lags on tonnage carry the opposite sign of the impact coefficient and are sizeable enough to more than offset the initial impact of the shock. One year after a 10 percent negative tonnage shock, infant industry production is just 0.8 percent higher and two years after the shock it is essentially back to where it started.

In contrast, for trade-dependent industries, a 10 percent reduction in tonnage reduces output in these industries immediately by about 4.7 percent (IV coefficient). The coefficients on the lags are again the opposite sign of the impact coefficient, but the magnitudes are less. The implication is that, one year after a 10 percent negative tonnage shock, production by trade-dependent industries is 1.5 percent lower and two years after production is 1.4 percent lower. The greater impact of a tonnage shock on trade-dependent industries than infant industries might be explained by the fact that a reduction in trade has a direct effect on exports, whereas imports may be imperfect substitutes for domestic production and hence have a more muted impact.

Figure 5 depicts the dynamic forecasts of infant and trade-dependent production from a 10 percent negative tonnage shock at time $t = 1$. Due to the use of annual data and only two lagged values on tonnage, the responses are very choppy and do not display any new information beyond two periods after the shock ($t = 3$). But the figure does illustrate that, according to the results on Table 3, shocks to trade-dependent industries appear to be more persistent than in the case of infant industries.

As a check on these results, Tables 4 and 5 present estimates using the change in the log
of real imports and the change in the log of the official value of British exports to the United
States (i.e., real imports from Britain) instead of shipping tonnage. The British export variable
could be a better measure of imports of manufactured goods than overall tonnage or real imports.
Nonetheless, the results using real imports and real British imports are quite similar to those
using tonnage. In particular, in both cases, a negative shock to imports has a small positive effect
on overall industrial production, a larger positive but mean-reverting impact on infant industries,
and a larger negative but less mean-reverting impact on trade-dependent industries.

D. Interpretation of the Results

The previous subsection concluded that, after 1817, the United States had a level of infant
industry production that was about 17 percent higher than one would have anticipated based on
prewar trends. In addition, the level of trade-dependent industry protection was about 19 percent
lower than one would have anticipated. Although this description of the data was not directly
tied to the trade disruption itself, it is very tempting to make that attribution. However, the
reduced-form estimates linking the trade shocks with industrial production produced only small
effects; the estimates suggested that trade shocks had only temporary effects on the level of
infant production and small permanent effects on the level of trade-dependent production.

If trade shocks themselves do not appear to have been responsible for the changes in the
composition of industrial production, several other factors could have intervened in the
immediate post-war period to alter the mix of production between infant and trade-dependent
industries. Likely candidates include the tariff of 1816, technological changes, and the changing
composition of international demand.

The tariff of 1816 explicitly aimed to protect domestic industries from foreign
competition and, by changing the structure of duties across different goods, could have shifted
the composition of imports away from manufactured goods. Although Figure 1 shows that the volume of imports (shipping tonnage) returned to its pre-trade disruption level by 1816, the measure of import volume here comprises all imports, not manufactured goods. With the exception of 1815 and 1816, real imports from Britain, perhaps the best proxy for imports of manufactured goods, never reached their pre-trade disruption peak (1806) from 1817 through the 1820s. As a result, there may have been a permanent reduction in the volume of imported manufactured goods. For example, the value and volume of imports of cotton textiles from Britain was much lower in 1816 and 1817 than it had been in 1815 or even prior to the war (although determining whether this was due to the postwar recession or the tariff of 1816 is difficult).  

The problem with attributing great importance to the Tariff of 1816 is that its duties were lower than those in effect during the previous four and a half years and were only slightly higher than those in effect prior to the War of 1812. Congress doubled existing import duties in 1812 and maintained those duties for more than a year after the end of the war. (Although it is commonly believed that the import surge of 1815 could have been prevented had the Tariff of 1816 been enacted more quickly, the surge in that year actually paid the higher wartime duties that remained in effect until the end of June 1816.) Thus, in the case of cotton textiles, the pre-war duty was 17.5 percent, then raised in 1812 to 35 percent until the Tariff of 1816, which reduced the duty to 25 percent (with a minimum valuation provision, although this was not thought to have been binding on British imports until about 1820). The duty on manufactured glass (not windows or bottles) was 22.5 percent prior to the war, 45 percent during the war, and

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8 See Irwin and Temin (2001), Table 4 and Figure 5.
20 percent in the Tariff of 1816. Thus, the Tariff of 1816 was not markedly higher than pre-war tariffs and may not have shifted policy so decisively as to bring about the reallocation of production between infant and trade-dependent industries.9

The rise in infant industry production, most notably cotton textiles, may be due to technological change. The biggest development during this period was the introduction of the power loom. The significance of the power loom will be discussed in the next section, but it brought about a rapid shift from household to factory weaving of cloth. Zevin (1971, p. 136) notes that in 1815 less than one seventh of the cloth produced from New England yarn was woven in factories, but that it was one hundred percent by 1824. The enormous substitution of factory weaving for home weaving raised domestic production permanently, even if imports remained at high levels. Partly for this reason, Zevin (1971, 128) concluded that “while the tariff may have had demand augmenting effects which contributed to the cyclical recovery from the postwar depression, 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.”

Another possible explanation for the compositional shift in industrial production is the

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9 In forming the tariff of 1816, Congress relied heavily on the report prepared by Alexander Dallas, the Secretary of the Treasury in the Madison administration. Like Gallatin’s 1810 report, Dallas considered three classes of industry, (i) mature industries that were “firmly and permanently established” and supplied most of domestic consumption, (ii) industries “recently or partially established” which supplied part of domestic consumption but, “with proper cultivation, are capable of being matured to the whole extent of demand,” and (iii) industries “so slightly cultivated as to leave the demand of the country wholly or almost wholly dependant upon foreign sources for supply.” Examples from the first class included wood, hats, iron castings, window glass, leather, paper and printing. Examples from the second class included: course cotton and woollen goods, larger iron goods, and beer and spirits. Examples of the third class included: fine cotton goods, linens and silk goods, woollen blankets and carpets, china and earthenware, other glass products. Ironically, Dallas then proposed the highest duties on the first class of permanently established goods, lower duties on partially established goods, and even lower duties in which the U.S. was almost completely dependent upon imports.
change in domestic and international demand after the war. For more than a decade prior to the
disruptions to U.S. trade, Britain and France were engaged in a protracted war. This war raised
the demand for U.S. ships and other exported goods to abnormally high levels. After the war, as
European demand for these products fell to normal levels, U.S. production by these trade-
dependent industries fell permanently as well. The shipbuilding industry, one of the largest
trade-dependent industries, illustrates this phenomena. The industry boomed after 1793 as a
result of the European conflict and the rise of U.S. re-export trade. But from 1817 through 1824,
domestic production of ships fell back to the levels last seen during the early 1790s. As a result
of the end of the Napoleonic wars, there was a permanent reduction in demand for U.S. ships and
shipping services that, per se, had nothing to do with the trade disruptions of the 1808 to 1814
period.

Since neither the tariff nor the technological change nor the demand explanations are
directly testable with the data at our disposal, we are left with some ambiguity about the precise
impact of the trade disruptions on the allocation of resources across manufacturing industries.
We know that infant industry production was much higher after the war, and trade-dependent
production was much lower after the war, but our efforts to link this to the trade disruptions did
not succeed. It seems likely that many factors other than just the trade shocks were confronting
producers at the time.

However, we can conclude that trade disruptions did not accelerate U.S. industrialization
overall. A piece of evidence consistent with this conclusion is that, as Davis (2004) reports, U.S.
total industrial production relative to that of the United Kingdom (using the Crafts and Harley
1992 index) does not show a pronounced acceleration during the 1810s or 1820s. Rather, U.S.
relative industrial output surges in the early 1830s and again in the mid 1840s.
4. What Differentiated Successful and Unsuccessful Industries?

The quantitative evidence presented above can be supplemented with qualitative evidence on specific industries. This qualitative evidence is suggestive about some of the factors that differentiated industries that grew during the trade disruption and continued to flourish after the war from those that grew during the disruption but floundered in the postwar period, or from those that failed to grow at all.

The industries that capitalized on the brief trade disruption appear to be those with low barriers to entry. In the U.S. context, these were industries that were not capital-intensive or those with demanding technology requirements. In many instances, low barriers to entry also meant low barriers to exit, and thus some other element – either domestic technology or human capital – was also required if the industry “stuck” in the United States after the resumption of foreign commerce.

The cotton textile industry is one that many have believed benefitted permanently from the stimulus of the trade disruption (see, for example, Rosenbloom 2004). Although Jefferson’s trade embargo does not appear to have assisted the industry much, there was much greater entry into the industry from 1810, particularly during the War of 1812 (Ware 1926, pp. 36-39). According to Gallatin’s 1810 Report on Manufactures, the number of operational spinning mills grew from 15 before 1808 to 62 in 1809, with many more under construction. As noted above, however, the most important change in the cotton textile industry after the War of 1812 was the introduction of the power loom, which shifted the industry from simply spinning yarn to producing woven cloth fabric.

A comparison of the New England and Philadelphia cotton textile industries suggests that
the adoption of the power loom was critical to the survival of entrants in the postwar period of trade competition. The New England industry adopted the power loom and easily weathered the restoration of trade, while the industry around Philadelphia boomed with the trade disruption but, lacking significant investment in power looms, withered once normal commerce resumed. The 1810 Census records that 206 looms were in operation in Philadelphia, but only 140 – of which just 65 were in operation – in 1820. Textile employment fell from 3,500 in 1816 to just 400 in 1819 and just 200 in the Census of 1820 (Scranton 1987, p. 88).\textsuperscript{10}

The question is: can the shift to power looms be attributed to the trade disruptions, or would this technological advance have take place anyway for other reasons? Francis Cabot Lowell, who observed first hand the introduction of the power loom in Lancashire after 1810, returned to the United States and helped organize the Boston Manufacturing Company in 1815 in Waltham, Massachusetts. The company was fully operational in 1816, and built another larger mill in 1818, producing sturdy, inexpensive coarse cloth. The power loom cut the cost of producing cloth by half, and the Boston Company was highly profitable to judge by the large dividend payouts during this period. Firms that adopted the power loom and flourished did so in the post-war environment in which cloth prices were lower due in part to trade competition and raw cotton prices were higher due to the resumption of exports.\textsuperscript{11} The success of the industry seems to owe much to the development of the power loom in Britain around 1810 and its rapid

\textsuperscript{10} As a result, “Philadelphia millmen, by 1820, looked back on the midteens as a set of golden years,” according to Scranton (1987, p. 76).

\textsuperscript{11} “The principal motive for introducing the power loom was a desire to regain competitive viability by cutting costs. The stimulus which brought this desire to the fore was the traumatic pressure which material and product price movements put on the manufacturers’ gross margins. The result of adopting the power loom was to lower direct operating costs by a very substantial margin.” Zevin (1971), p. 141.
diffusion to the United States.

If the rapid adaptation of this new innovation was an important factor in textiles, other industries failed because the requisite technology did not arrive on American shores. Pocket watches were very complicated products that were imported almost exclusively from Europe before the 1850s. Most advertised American “watchmakers” were in fact watch repairers or jewelry-makers. However, the embargo of 1807 encouraged Luther Goddard in Massachusetts to attempt to manufacture watches domestically in his repair shop. According to Bailey (1975, 190-5), Goddard made less than 500 or so watches between 1809 and 1817. The first watches made were of poor quality and took considerable time to build; he proved unable to compete effectively with European craftsmanship. Several decades passed before domestic production of watches was firmly established in the United States.

In the case of medicines, low barriers to entry combined with domestic human capital to ensure the continuing success of the industry after trade resumed. The production of medicines required relatively little physical capital and was often a side business of physicians. Liebenau (1987, p. 11) notes that the foundation for the U.S. pharmaceutical industry was “laid between 1818 and 1822 with the establishment of several chemical manufacturers.” America had been formerly dependent on British imports for medicine, but “with the economic disorder created by the war of 1812 and its aftermath, this pattern of dependence was broken.” Liebenau observes that the manufacture of most common medicines was within reach for most apothecaries, as there was little need for capital investment and only a general knowledge of pharmacy required to produce basic remedies such as quinine sulphate, opium powders, and calomel. Production of these medicines were not capital intensive, but rather human-capital intensive. And Philadelphia had large concentration of well-educated German immigrant physicians and chemists, which
contributed to the advances made by the industry at this time.

The glass industry – mainly engaged in the production of window glass – may also be one in which there were low entry barriers, but there was no special human capital or technological basis to production in the United States. Davis (1949, p. 37) estimates that the industry produced 5.0 million square feet of window glass in 1810 and just 5.4 million in 1820, not much of an advance. The industry expanded rapidly during the war, but “the end of the war not only put an end to rapid expansion of the glass industry but also brought distress to many of the glasshouses that had recently begun operations.” Between foreign producers and the facilities built by domestic firms, the industry suffered from excess capacity and prices fell steeply from 1815. This price collapse may have erased much of the progress of the industry in the interim. Although there were more factories after the war than before – 22 in 1810 and 34 in 1820 – industry output cannot be equated with the number of firms.

Capital-intensive industries, especially those that depended upon domestic supply networks for productive inputs, were unable to mobilize resources quickly and take advantage of the disruption to imports. For example, the iron industry does not seem to have benefitted greatly from the temporary trade disruption. There is little indication of whether the industry experienced a boom in output during the few years after 1810, but whatever expansion they experienced appears to have been short lived. There were fewer furnaces in Pennsylvania in 1818 than in 1810, according to Paskoff (1983, p. 75), and output was possibly lower as well. Even by the late 1820s the industry had not progressed much, perhaps because sufficient domestic demand was lacking to justify fixed investment in production or supply networks (until the railroads appeared on the scene).

Just as some of the production gains proved transitory for import-competing industries, so
were the production losses for export-oriented industries. The shipbuilding industry clearly lost from the trade disruptions as construction fell from 146,691 gross tons in 1811 to 32,583 gross tons in 1813. The War of 1812 was “particularly disastrous for the shipbuilders; for there was little demand for tonnage, excepting small privateers; navigation was disrupted; and owners were frequently unable to pay for vessels already building,” according to Hutchins (1941, pp. 185-187). “There is no evidence, however, that these fluctuations created such serious economic problems in the shipbuilding industry as were later to appear.” Industry demand had been quite cyclical in the past and “both labor and master builders became accustomed to this oscillation, and developed alternative interests to which they could turn.” Thus, when demand for ships boomed once again from 1815 until 1818, domestic construction quickly rebounded back to 155,579 tons. However, production remained relatively flat thereafter, off of its prewar trend, perhaps because (as suggested above) that demand before 1815 had been artificially high due to the stimulus of the European conflict.

This brief survey of industry-specific evidence suggests the following conclusions. Industries that grew rapidly with the trade disruption and survived the onslaught of post-war British imports, such as cotton textiles and medicines, not only had low barriers to entry (i.e., capital costs were not prohibitive or technology spillovers were extensive) but had some human capital or technological basis that allowed it to be established and retained in the United States. Industries with low entry barriers lacking these human capital or technological attributes (such as glass) may have received a boost with the trade disruptions but retreated with the resumption of commerce. Industries that could not even get started despite the trade disruption were capital-intensive (iron) or technologically sophisticated (watches) or lacked requisite domestic suppliers.
5. Conclusions

This paper has analyzed the impact of the disruptions to U.S. trade between 1807 and 1815 on import substitution by domestic manufacturers. The trade disruptions did not accelerate U.S. industrialization in the sense that total industrial production was little changed by these events. After 1817, however, the United States had a different mix of production between domestic infant industries and trade-dependent industries. According to our findings, this shift in production does not appear to be due to the trade disruptions themselves. Other factors, such as technological changes in cotton textiles and lower demand in shipbuilding, may account for this change.
References


Table 1: Augmented Dickey-Fuller Unit Root Test on the Log of Industrial Production

Estimated Equation: \( y_t = \mu_t + \beta t + \alpha y_{t-1} + \sum c_i \Delta y_{t-i} + e_t \)

<table>
<thead>
<tr>
<th>Series</th>
<th>1790 - 1830</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Production</td>
</tr>
<tr>
<td>( \mu ) (( t_\mu ))</td>
<td>1.48 (4.52)</td>
</tr>
<tr>
<td>( \beta ) (( t_\beta ))</td>
<td>0.04 (4.46)</td>
</tr>
<tr>
<td>( \alpha ) (( t_\alpha ))</td>
<td>-0.95* (4.52)</td>
</tr>
<tr>
<td>ADF 5% Critical Value</td>
<td>3.53</td>
</tr>
</tbody>
</table>
Table 2: Statistical Characteristics of Industrial Production

Dependent Variable: log of industrial production

Estimated Equation:

$$\log y_t = \mu + \beta t + \alpha \log y_{t-1} + \gamma_1 \text{DISRUPTION} + \gamma_2 \text{RESUMPTION} + \gamma_3 \text{POSTWAR} + e_t$$

<table>
<thead>
<tr>
<th></th>
<th>Total Industrial Production</th>
<th>Infant Industrial Production</th>
<th>Trade-Dependent Industrial Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\mu$</td>
<td>0.81* (0.17)</td>
<td>0.28* (0.06)</td>
<td>1.56* (0.60)</td>
</tr>
<tr>
<td>$\beta$</td>
<td>0.022* (0.005)</td>
<td>0.002 (0.006)</td>
<td>0.016* (0.005)</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>0.49* (0.12)</td>
<td>0.82* (0.07)</td>
<td>0.43* (0.22)</td>
</tr>
<tr>
<td>$\gamma_1$</td>
<td>-0.07 (0.06)</td>
<td>0.32* (0.11)</td>
<td>-0.53* (0.14)</td>
</tr>
<tr>
<td>$\gamma_2$</td>
<td>-0.07 (0.05)</td>
<td>-0.22 (0.13)</td>
<td>0.16 (0.26)</td>
</tr>
<tr>
<td>$\gamma_3$</td>
<td>-0.06* (0.03)</td>
<td>0.17* (0.08)</td>
<td>-0.19* (0.06)</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.99</td>
<td>0.98</td>
<td>0.72</td>
</tr>
<tr>
<td>LM ($\chi^2$)</td>
<td>3.95* (p = 0.03)</td>
<td>2.01 (p = 0.15)</td>
<td>0.63 (p = 0.53)</td>
</tr>
</tbody>
</table>

Notes: * indicates significance at the 5 percent level. Standard errors in parenthesis have been corrected for heteroskedasticity. The DISRUPTION period is 1808 and 1812 - 1814. The RESUMPTION period is 1815 and 1816. The POSTWAR period is 1817 - 1830. Number of observations is 40 (time period is 1790-1830).
### Table 3: OLS and IV Estimates of Effect of Shipping Shocks on Industrial Production

Dependent Variable: Change in log of industrial production

Estimated Equation: \( \Delta \log y_t = \mu + \alpha \Delta \log y_{t-1} + \beta_0 \Delta \log (\text{TON}_t) + \beta_1 \Delta \log (\text{TON}_{t-1}) + \beta_2 \Delta \log (\text{TON}_{t-2}) + \epsilon_t, \)

<table>
<thead>
<tr>
<th></th>
<th>Total Industrial Production</th>
<th>Domestic Infant Industries</th>
<th>Commercial/Trade-Related Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.044* (0.024)</td>
<td>0.044* (0.015)</td>
<td>0.043* (0.024)</td>
</tr>
<tr>
<td>( \Delta \log (\text{IP}_{t-1}) )</td>
<td>-0.056 (0.188)</td>
<td>-0.033 (0.192)</td>
<td>0.398 (0.225)</td>
</tr>
<tr>
<td>( \Delta \log (\text{TON}_t) )</td>
<td>0.008 (0.034)</td>
<td>-0.003 (0.033)</td>
<td>-0.209* (0.075)</td>
</tr>
<tr>
<td>( \Delta \log (\text{TON}_{t-1}) )</td>
<td>-0.041* (0.018)</td>
<td>-0.048* (0.014)</td>
<td>0.128 (0.091)</td>
</tr>
<tr>
<td>( \Delta \log (\text{TON}_{t-2}) )</td>
<td>0.002 (0.013)</td>
<td>0.006 (0.016)</td>
<td>0.134* (0.037)</td>
</tr>
<tr>
<td>Adjusted ( R^2 )</td>
<td>0.09</td>
<td>0.08</td>
<td>0.60</td>
</tr>
<tr>
<td>OLS</td>
<td>IV</td>
<td>OLS</td>
<td>IV</td>
</tr>
</tbody>
</table>

Notes: * indicates significance at the 5 percent level. Standard errors in parenthesis have been corrected for heteroskedasticity. Number of observations is 38 (time period is 1793-1830).
Table 4: OLS and IV Estimates of Effect of Real Import Shocks on Industrial Production

Dependent Variable: Change in log of industrial production

Estimated Equation: \( \Delta \log y_t = \mu + \alpha \Delta \log y_{t-1} + \beta_0 \Delta \log (M_t) + \beta_1 \Delta \log (M_{t-1}) + \beta_2 \Delta \log (M_{t-2}) + \epsilon_t \)

<table>
<thead>
<tr>
<th></th>
<th>Total Industrial Production</th>
<th>Domestic Infant Industries</th>
<th>Commercial/Trade-Related Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.046* (0.024)</td>
<td>0.043* (0.014)</td>
<td>0.014 (0.023)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.033 (0.021)</td>
<td>0.031 (0.025)</td>
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<tr>
<td></td>
<td></td>
<td>0.031 (0.025)</td>
<td>-0.008 (0.029)</td>
</tr>
<tr>
<td>( \Delta \log (IP_{t-1}) )</td>
<td>-0.087 (0.191)</td>
<td>-0.034 (0.194)</td>
<td>0.481* (0.140)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.538* (0.183)</td>
<td>-0.444* (0.158)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.135 (0.329)</td>
</tr>
<tr>
<td>( \Delta \log (M_t) )</td>
<td>0.002 (0.024)</td>
<td>0.005 (0.030)</td>
<td>-0.162* (0.037)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.227* (0.050)</td>
<td>0.405* (0.052)</td>
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<td></td>
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<td></td>
<td>0.511* (0.076)</td>
</tr>
<tr>
<td>( \Delta \log (M_{t-1}) )</td>
<td>-0.036* (0.004)</td>
<td>-0.048* (0.025)</td>
<td>0.149* (0.049)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.189* (0.070)</td>
<td>0.108 (0.078)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.087 (0.185)</td>
</tr>
<tr>
<td>( \Delta \log (M_{t-2}) )</td>
<td>-0.003 (0.007)</td>
<td>0.021 (0.031)</td>
<td>0.131* (0.035)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.079* (0.049)</td>
<td>-0.122* (0.048)</td>
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<td></td>
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<td></td>
<td>0.006 (0.091)</td>
</tr>
<tr>
<td>Adjusted R(^2)</td>
<td>0.08</td>
<td>0.04</td>
<td>0.70</td>
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<tr>
<td></td>
<td></td>
<td>0.64</td>
<td>0.72</td>
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<td>0.56</td>
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<tr>
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<td>OLS</td>
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<td>IV</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>OLS</td>
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</tbody>
</table>

Notes: * indicates significance at the 5 percent level. Standard errors in parenthesis have been corrected for heteroskedasticity. Number of observations is 38 (time period is 1793-1830).
Table 5: OLS and IV Estimates of Effect of Shocks to British Imports on Industrial Production

Dependent Variable: Change in log of industrial production

Estimated Equation: \( \Delta \log y_t = \mu + \alpha \Delta \log y_{t-1} + \beta_0 \Delta \log (BM_t) + \beta_1 \Delta \log (BM_{t-1}) + \beta_2 \Delta \log (BM_{t-2}) + \epsilon_t \)

<table>
<thead>
<tr>
<th></th>
<th>Total Industrial Production</th>
<th>Domestic Infant Industries</th>
<th>Commercial/Trade-Related Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.046* (0.015)</td>
<td>0.046* (0.015)</td>
<td>0.037* (0.023)</td>
</tr>
<tr>
<td></td>
<td>0.043 (0.026)</td>
<td>0.013 (0.028)</td>
<td>0.014 (0.027)</td>
</tr>
<tr>
<td>( \Delta \log (IP_{t-1}) )</td>
<td>-0.105 (0.202)</td>
<td>-0.098 (0.204)</td>
<td>0.471* (0.187)</td>
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<td>0.394* (0.195)</td>
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<td></td>
<td>0.080 (0.265)</td>
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<tr>
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<td></td>
<td>0.070 (0.283)</td>
</tr>
<tr>
<td>( \Delta \log (BM_t) )</td>
<td>-0.007* (0.004)</td>
<td>-0.009* (0.004)</td>
<td>-0.042* (0.024)</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>-0.054* (0.029)</td>
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<td>0.123* (0.023)</td>
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<tr>
<td></td>
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<td></td>
<td>0.129* (0.028)</td>
</tr>
<tr>
<td>( \Delta \log (BM_{t-1}) )</td>
<td>-0.013* (0.005)</td>
<td>-0.015* (0.004)</td>
<td>0.050* (0.027)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>0.034 (0.031)</td>
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<tr>
<td></td>
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<td></td>
<td>-0.035 (0.046)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>-0.031 (0.053)</td>
</tr>
<tr>
<td>( \Delta \log (BM_{t-2}) )</td>
<td>-0.003 (0.003)</td>
<td>0.002 (0.003)</td>
<td>0.046* (0.016)</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>0.042* (0.019)</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>-0.022 (0.014)</td>
</tr>
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<td>-0.020 (0.017)</td>
</tr>
<tr>
<td>Adjusted R(^2)</td>
<td>0.03</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>OLS</td>
<td>IV</td>
<td>OLS</td>
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<tr>
<td></td>
<td>IV</td>
<td>IV</td>
<td>IV</td>
</tr>
</tbody>
</table>

Notes: * indicates significance at the 10 percent level. Standard errors in parenthesis have been corrected for heteroskedasticity. Number of observations is 38 (time period is 1793-1830).
Figure 1: Volume Measures of U.S. Import Trade, 1790-1830

Figure 2: U.S. Industrial Production, 1790-1840

Source: Davis (2004). Shaded areas are periods of disrupted trade.
Figure 3: The Two Faces of U.S. Industrial Activity, 1800-1825

Source: Derived from Davis (2004). Commerce and trade-dependent industries include merchant shipbuilding, flour milling, sugar refining, whale refining, fish curing, and copper consumption (these follow Treasury Secretary Gallatin’s contemporaneous designations of industries dependent upon foreign markets). Domestic/infant industries constitute all other (17) components of series beginning on or before 1808.
Figure 4: Actual and Forecast Production by Infant Industries
Figure 5: Dynamic Forecast of Infant Production to 10% Negative Shock to Shipping Volume

A. Domestic and Infant Industry Production

B. Trade-Dependent Industrial Production