

Tariffs and Growth in Late Nineteenth Century America

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Abstract:

Were high import tariffs somehow related to the strong U.S. economic growth during the late nineteenth century? This paper examines this frequently mentioned but controversial question and investigates the channels by which tariffs could have promoted growth during this period. The paper shows that: (i) late nineteenth century growth hinged more on population expansion and capital accumulation than on productivity growth; (ii) tariffs may have discouraged capital accumulation by raising the price of imported capital goods; (iii) productivity growth was most rapid in non-traded sectors (such as utilities and services) whose performance was not directly related to the tariff.

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In the late nineteenth century, the United States experienced rapid economic growth and emerged as a world industrial power. During this period, the United States also maintained high import tariffs that kept out foreign manufactured goods. That the high tariffs were accompanied by rapid growth and industrialization was noted by contemporary proponents of protectionism and has been a source of controversy ever since.

Few observers have argued outright that the high tariffs caused such growth. Yet the association between high tariffs and rapid output growth is frequently noted in such a way as to leave the distinct impression that such causation is highly likely, or at least that the nineteenth century experience demonstrates that protectionism was not a bad economic policy. This interpretation has received increasing popular expression in recent years, partly in an effort to enlist history on the side of those advocating the adoption of protectionist trade policies today, such as Pat Buchanan. This line of reasoning about America's past is also frequently invoked among those sympathetic to "economic nationalist" policies, such as journalists James Fallows and Michael Lind.

That there is a correlation between high tariffs and economic growth in the late nineteenth century cannot be denied.¹ But correlation is not causation. There is no reason for necessarily thinking that import protection was a good policy just because the economic outcome was good: the outcome could have been driven by factors completely unrelated to the tariff, or perhaps could have been even better in the absence of protection. To understand the relationship between tariffs and growth, therefore, requires investigating the possible mechanisms by which the tariff could have generated such benefits and assessing whether such benefits were likely to have materialized and have been of economic importance.

¹ Indeed, O'Rourke (2000) finds the correlation to be robust in cross-country growth regressions, even after controlling for additional factors such as initial income, the savings rate, and country fixed-effects.

This paper examines the proposition that high tariffs helped promote U.S. economic growth in the late nineteenth century. The paper first considers the views of those who suggest that the tariffs were beneficial and sets out some simple facts regarding economic growth during this period. Those having a favorable impression of the tariff's contribution have tended to present statistics that overstate late nineteenth century U.S. growth in comparison to other periods and countries. The data presented here indicate that growth then was driven largely by labor force expansion and capital accumulation, while productivity growth was undistinguished when put in a comparative perspective. The paper then examines various channels by which high tariffs could have stimulated capital accumulation and productivity growth. It is difficult to attribute much of a positive role for the tariff because import tariffs probably raised the price of imported capital goods, thereby discouraging capital accumulation. Furthermore, productivity growth in nontraded sectors, rather than in manufacturing, was the driving force behind the United States's overtaking of the United Kingdom in per capita GDP during this period. The paper concludes that trade protection was probably not a key factor behind U.S. economic growth in the late nineteenth century.

Recent Interpretations of Late Nineteenth Century Trade and Growth

In recent years, several authors have drawn attention to the relationship between import tariffs and U.S. economic growth in the late nineteenth century, while stopping short of concluding that tariffs were responsible for that growth. Economic historian Paul Bairoch (1993, pp. 52-53) took himself as iconoclastic for stating that "the best 20 years of American economic growth [1870 to 1890] took place in a period when its trade policy was protectionist." He interpreted this fact as indicating that protectionism did not have a negative impact for the United States, although he cautions that "the

success of the United States was not due entirely to its tariff policy.”² Historian Alfred Eckes (1995, pp. 50, 56) presents a battery of statistics all of which lean toward illustrating how the late nineteenth century period of high tariffs was accompanied by strong economic performance. Although he does not contend that tariffs were responsible for the economic boom, he writes that “home market protection is not necessarily inconsistent with high domestic and export growth” and that “protectionism apparently did not significantly harm U.S. economic growth or retard export expansion.” Economist Ravi Batra (1993, p. 132) also refers to this period in arguing that “the period in which American had its highest tariff rates, and the smallest involvement with international trade, was also the one in which the country had its greatest economic success.”

Other popular writers have given prominence to this interpretation. Patrick Buchanan (1998, p. 224) contends that “Behind a tariff wall . . . the United States had gone from an agrarian coastal republic to become the greatest industrial power the world has ever seen – in a single century. Such was the success of the policy called protectionism that is so disparaged today.” Journalists Michael Lind and James Fallows have expressed similar views. According to Lind (1994, p. 22), “during the era of greatest free trade in continental Europe, 1873-1890 (a peak not reached again until the 1960s), Europe was plunged into a depression as devastating as that of the 1930s – partly, it seems, because of free trade . . . During this time, the United States, with its tariffs at historic highs, enjoyed one of its greatest bursts of sustained growth.” James Fallows (1993, pp. 193-94) states that free trade theories “fail a test of history They do not explain how the industrial old guard – first England, then America – rose to power. Indeed those countries developed fastest when they paid least attention to today’s . . . [orthodox

² In his chapter for the Cambridge Economic History of Europe, Bairoch interrupts his discussion of U.S. trade policy during this period to mention the rapid concurrent economic growth. “Without linking the two things,” Bairoch (1989, p. 142) wrote, “it is important to note” that growth was strong during this period of high tariffs. Yet one wonders why this was worth mentioning unless Bairoch indeed believed that they were linked in some way.

free-trade] principles of economic growth.”

To some extent, an agenda lies behind these interpretations of the past. Batra and Buchanan advocate a return to higher tariffs today. Lind (1995, pp. 322ff) calls for imposing a “social tariff” in the amount of the difference between domestic and foreign wages. Fallows and Eckes do not set forth explicit policy views, but Fallows writes sympathetically about activist government policies that he believes have been pursued by Asian countries, while Eckes is concerned about the adverse impact of import competition on American industry. Cutting across this spectrum is the belief that the link between high tariffs and rapid growth in the late nineteenth century holds important lessons for today.

Nineteenth Century Growth in Comparative Context

The relationship between tariffs and economic growth during the late nineteenth century is quite intriguing and clearly deserves closer scrutiny. What are some of the basic facts about U.S. growth during this period?

To say that the United States economy grew rapidly during the late nineteenth century is to make a comparative statement – compared to other countries during the same period, or to the U.S. economy during a different period, the economy performed well. Those attempting to demonstrate that protection was not bad (and possibly beneficial) have made both comparisons, one point of reference being the “free trade” United Kingdom of the late nineteenth century, then the leading industrial nation, and the other the “free trade” United States of the late twentieth century.

Did protectionist America outperform free trade Britain in terms of long-run economic growth in the late nineteenth century? Table 1 presents a simple comparison of the economic growth performance of the U.S. and U.K. economies during the period 1870 to 1913, using data conveniently available in

Maddison (1995).³ Over this 43 year period, real GDP grew much more rapidly in the United States than in the United Kingdom: nearly 4 percent per year in the United States versus nearly 2 percent in the United Kingdom, according to Maddison's figures. Bairoch (1993, p. 50) states that these are "facts that constitute real paradoxes for the supporters of free trade."

Yet these figures can be dissected to reveal the underlying sources of growth. The impressive U.S. economic expansion was partly due to a rapid increase in population. Even after accounting for this fact, however, per capita GDP grew more rapidly in the United States, at about 1.8 percent per year compared with 1.0 percent in the United Kingdom. The more rapid per capita income growth in the United States was, in turn, fueled by rapidly growing capital accumulation. The pace of capital accumulation in the United States exceeded that in the United Kingdom by a factor of more than 3 during this period. After accounting for capital accumulation, the total factor productivity "residual" appears, somewhat surprisingly, to have been roughly comparable in the two economies. In other words, the rate of productivity growth, measuring the change in the efficiency with which economy is using its resources, was about the same in the two economies.

The conclusion that one draws from this growth-accounting exercise is similar to that of Krugman's (1994) discussion of the East Asian miracle. Extensive growth was due to the mobilization of resources – using greater amounts of labor and capital – to increase production. Growth in per capita income was more the result of capital deepening, arising from high rates of saving and investment in which current consumption was sacrificed for future production, than achieving greater productive

³ Consideration of a long period, such as 1870 to 1913, is necessary to avoid confusing short-term business cycle fluctuations with long-run growth trends. This choice of years is dictated by the following: 1870 is roughly when the best estimates of U.S. GDP begin, and 1913 is the year before the outbreak of World War I. During this period, U.S. import tariffs were high and stable and U.K. import tariffs were low and stable. The period from 1913 to 1950 is generally set aside due to the shocks of two world wars and the great depression.

efficiency. In the end, productivity growth in the “protectionist” United States was roughly the same as that in the “free trade” United Kingdom.

What about comparing the late nineteenth century “protectionist” United States with the late twentieth century “free trade” United States? Table 2 compares the 43 years after 1870 with the 42 years after 1950. Real per capita income grew slightly more rapidly in the post-World War II period, but the biggest difference between the periods is the source of growth — productivity rather than capital accumulation. The key factor in postwar economic growth has been achieving greater economic efficiency with existing resources rather than increasing the quantities of those resources.

Contrary to the presumption of those cited earlier, therefore, a simple analysis of the data does not give the impression that late nineteenth century U.S. economic performance was extraordinary in comparison to the late nineteenth century United Kingdom or the late twentieth century United States. Late nineteenth century U.S. growth was largely due to the rapid growth of the labor force and the accumulation of capital, with productivity growth similar to that in the United Kingdom. Late twentieth century economic growth, judging from the increase in per capita income and in total factor productivity, appears to have been superior to that in the late nineteenth century.

Those seeking to leave a different impression have bolstered their case by choosing to compare selected sub-sample periods. In the post-war era, for example, productivity growth slowed considerably after 1973. One can give an unfavorable impression of the “free trade” era by setting the post-1973 period against the late nineteenth century. For instance, Eckes (1995, p. 53) compares the growth of U.S. GNP and per capita GNP between 1972 and 1992 (“the interval of relatively free trade”) and 1890 and 1910 (“the protectionist period”). The selection of these dates stacks the deck against the free trade period. The twenty years after 1890 was a period of strong growth, yet the period 1870 and 1890 – also part of the high tariff period but not included in Eckes’s sample – saw slower economic growth. The

economically-disappointing twenty years after 1972 are included in his sample, yet the low tariff, rapid growth period of 1950 and 1972 was not included. Batra (1993, p. 148) similarly argues that the 1950 and 1972 period should not be considered part of the “free trade” period because the United States, in his view, was a “closed” economy prior to 1973 but an “open” economy thereafter. Apparently some arbitrary threshold in the trade to GDP ratio was crossed in that particular year and, as he puts it, “the U.S. economic debacle began in 1973, the first year of America’s transition into free trade.”⁴

But to judge the matter in terms of actual trade policy, the entire post-war period belongs to the “free trade” period because the U.S. move to more open trade policies can be dated from around World War II. Average U.S. tariffs fell sharply from over 50 percent in the early 1930s to just above 10 percent by the early 1950s, then falling gradually to about 5 percent today. The United States led the formation of the General Agreement on Tariffs and Trade (the precursor to the current World Trade Organization) in 1947 to negotiate the reduction of tariff and non-tariff barriers to world trade. To say that this period, and the high growth that came with it, “doesn’t count” as part of the free trade epoch is to adopt an arbitrary standard of when “free trade” began and to ignore the actual policies pursued.

Yet this whole exercise rests on the dubious assumption that one can judge a trade regime simply by examining the economic growth that occurs on its clock. A major problem with this approach is that the effects of trade policy on growth are probably swamped by other policies and unrelated factors so that one cannot isolate the true impact of trade policy. The simple growth accounting exercise also leaves one uninformed about the effects of trade policy on growth (although it can prove useful, as above, in characterizing the actual growth experience). Just as the positive correlation between tariffs and growth in the late nineteenth century does not necessarily imply that tariffs caused that growth, the

⁴ Here he differs from Buchanan (1998, p. 64), who views 1967 as “the year” in which the United States entered the “free trade” era.

late twentieth century correlation between low tariffs and growth does not necessarily imply that free trade was responsible for that growth.

The standard theory of international trade generally suggests that free trade will lead to higher real incomes than protection, but says little about the rate of growth per se. One cannot infer the relationship between trade and income through a simple correlation of the two because higher income may lead to greater trade rather than the other way around. Frankel and Romer (1999) recently overcame this simultaneity problem by using geographic characteristics of countries (notably distance) that are uncorrelated with income but are good proxies for trade and find that more trade is indeed associated with higher income.⁵ Whether openness to trade generates stronger growth (as opposed to higher income) is an unresolved empirical question. Several studies (such as Sachs and Warner 1995) have found that openness is correlated with higher economic growth in the postwar period (after controlling for other factors), but Rodriguez and Rodrik (2000) have recently cast doubt on the robustness of these findings.

Such problems do not mean that we should throw up our hands in despair of ever saying anything about the effects of tariffs on growth. Tariffs could have promoted or attenuated capital accumulation and productivity growth through several channels. Even if definitive statements about those channels are beyond our grasp, they can be explored to evaluate their potential economic significance.

Tariffs and Capital Accumulation

To say that the United States experienced strong economic growth in the late nineteenth century because it rapidly accumulated capital begs the question: why did the United States accumulate capital so rapidly, and could the tariff have promoted this accumulation?

The standard interpretation of late nineteenth century capital formation comes from the careful

⁵ Irwin and Terviö (2000) find that this relationship holds prior to World War I (in 1913) as well.

work of Davis and Gallman (1978). Davis and Gallman showed that the share of capital formation in GNP rose significantly between the ante-bellum period and the late nineteenth century. Net investment as a percent of GNP rose from about 10 percent prior to the Civil War to nearly 20 percent in the late nineteenth century (Davis and Gallman 1978, p. 2), with a significant part of the rise occurring during the Civil War decade. They sought to explain the increase in the capital stock through increases in the demand for capital and the supply of savings. The demand for capital appears to have arisen largely in non-traded sectors. While the aggregate capital-output ratio rose throughout the nineteenth century, Davis and Gallman (1994, p. 206) write that “the increases in the agricultural and industrial sectors were modest and were concentrated rather late in the period.” They note that “this was not true of the service sector There the increase began early and was very pronounced — a reflection of the marked shift in final demand toward the capital-intensive railroad and urban-housing components of the sector.”⁶

Davis and Gallman concluded that investment demand-side changes were not sufficient to explain most of the increase in savings and investment. Consistent with the fall in the real price of capital goods and in real interest rates over the century, they argue that a shift in the supply of savings dominated any shift in demand. Davis and Gallman produce no single explanation for why the savings rate rose so much over the course of the nineteenth century. Part of the increased savings was a shift from unconventional to conventional forms of savings (i.e., from breaking and clearing new farm land to savings from property income) as the urban population grew relative to the rural population. The rising share of property income in total income contributed as well to the higher savings rate. The development of financial capital markets also figures prominently in their explanation; as they (1994, p. 208) put it, “improvements in capital markets and financial intermediation, by reducing overhead and

⁶ They also note that labor-saving or capital-using technological change does not appear to have been significant enough to account for the rise in the capital-output ratio.

transactions costs and providing insurance against risky outcomes, made substantial contributions to the increase in the savings-investment rate.”

Taking the Davis-Gallman story as our benchmark, the question then becomes: how did the tariff affect the process and direction of capital accumulation? A tariff on imported manufactured goods could have accelerated capital accumulation by expanding the domestic production of such goods and thereby increasing the demand for capital. That this mechanism was a significant factor can be questioned on several grounds. Davis and Gallman found that the biggest rise in the capital-output ratio occurred in the non-traded sector, such as railroads and housing, with only a modest change in the manufacturing sector. Late nineteenth century U.S. tariffs also appear to have been structured to protect relatively labor-intensive manufactures, such as cotton textiles and leather, rather than capital-intensive manufactures, such as iron and steel and machinery (Irwin 2000b). The political justification for this tariff structure was that the high wages of American workers required protection against the low wages paid by foreign manufacturers. Such a tariff could have redistributed income from capital to labor and thereby reduced the incentive to accumulate capital. A tariff-induced increase in the demand for capital also implies that the return to capital and the price of capital goods would rise. Yet this period witnessed sharp declines in the relative price of capital goods and in real interest rates, so most evidence points to capital accumulation as having been a savings-driven rather than a demand-driven phenomena.

Williamson (1974) proposed two different channels by which high tariffs may have helped stimulate post-Civil War capital accumulation. First, the tariff helped generate large fiscal surpluses that could have “crowded in” private investment. James (1984) found some evidence that the government’s fiscal surpluses, devoted largely to reducing the Civil War debt burden, indeed promoted domestic investment. While there was no direct evidence on the substitution of government debt for private securities, James found indirect evidence through the interest rate. Had no debt been retired after the

Civil War, James estimates that the capital stock could have been 5 to 10 percent lower than its actual level in 1890, and GNP growth could have been 0.1 to 0.2 percentage points lower than the 4.9 percent rate registered between 1870 and 1890. As a result, the level of GNP could have been 2 to 4 percent lower by 1890 if no debt had been retired. This evidence, however, does not so much demonstrate that protective tariffs spurred capital accumulation as that the fiscal surpluses did. The government clearly could have devised a different tax structure to yield the large tax revenue that it received (including revenue tariffs and the income or excise taxes that had been imposed during the war), but just found import tariffs to be politically expedient.

Williamson's second channel was a change in the structure of domestic prices whereby the higher Civil War tariffs raised the prices of manufactured consumer goods relative to those of capital goods between the 1840s and the 1870s. The lower relative prices of capital goods encouraged the greater use of such goods and thereby promoted capital deepening. If the tariff had this effect, however, the level of capital might be affected but not (transition effects aside) the growth rate since the tariff was not increasing thereafter.

It is not clear, however, that such a relative price shift can be attributed to the tariff. Williamson (1974, p. 657) argues that final manufactured goods were more heavily taxed by the tariff code than capital goods in part because, "with the outstanding exception of railroad rails, finished capital goods were rarely traded in this phase of American development." In contrast, De Long (1998) argues that capital goods were internationally traded and were taxed at roughly the same rate as final manufactured products. He calculates that the average tariff on capital goods around 1890 was around 40 percent, about the same rate as levied on nonagricultural consumer goods. De Long (1998, p. 369) concludes that "the tariff made a wide range of investment goods – from British machine tools and steam engines to steel rails to precision instruments – more expensive." (This raises the possibility that the reason for the

lack of trade in capital goods noted by Williamson was due to the tariff itself.) Higher prices for foreign and domestic capital goods would depress the rate of capital accumulation, significantly so according to De Long (1998, p. 370): “if this is indeed the plausible range [of effects], then the damaging effects of the tariff on investment were extremely important for nineteenth century growth. In the long run, a reduction in the real investment share of national product of 2 to 4 percent carries with it a reduction in the capital-output ratio of 10 to 20 percent – and a reduction in productivity and real wages of 5 percent or more.” Thus, tariffs on imported capital goods could have proven very harmful to capital accumulation and economic growth.⁷

Two final channels should be considered. The tariff could have promoted foreign direct investment in the United States as foreign producers, hampered from exporting to the U.S. market, sought instead to make capital investments there. The importance of this “tariff-jumping” channel can be questioned because of the small contribution of foreign investment to total capital accumulation in the period after the Civil War; almost all of U.S. domestic investment was financed by domestic savings (see Lipsey 1994). Foreign investment played a somewhat more important role in the financing of the railroads, but this investment does not appear to have depended upon the tariff. And by the 1890s, the United States had joined the United Kingdom in becoming a capital exporter. Finally, the tariff could have shifted the distribution of income in the United States toward high-savings households, thereby adding to the supply of savings and contributing to capital accumulation. Williamson (1979) has

⁷ Collins and Williamson (1999) report regressions that indicate higher tariffs were associated with lower relative prices of capital goods in a panel of countries prior to 1950 (although they report that this finding is not robust to the exclusion of the United States). In their data set, the United States exhibits “a rising relative cost of capital goods between the 1870s and just prior to World War I” (p. 5). Their data (based on Kuznets) show a 6.8 percent increase in the relative price of capital to consumption goods between 1870-74 and 1895-99. Other data points to a falling relative price of capital and investment goods during this period. Williamson (1979, p. 233), for example, has referred to data (based on Gallman) in which the relative price of investment to the GDP deflator falls 10.9 percent between 1874 and 1897.

suggested that changes in income distribution do not explain the higher post-Civil War savings rates, so the marginal effect of the tariff on income distribution probably did not play a major role.

To conclude, there is no solid link between the tariff and capital accumulation. High savings rates appear to have been the principal factor behind the rapid accumulation of capital, the demand for which arose mainly in the non-traded sector, not in manufacturing. To the extent that tariffs raised the price of capital goods, capital investment would have been discouraged.

Tariffs and Productivity

The effect of import tariffs on domestic productivity growth is also, a priori, ambiguous. The tariff could have contributed to higher aggregate productivity by shifting resources from low to high productivity sectors, or could have detracted from efficiency by shielding high-cost producers from import competition.

One popular argument is that tariffs on imported manufactured goods contributed to aggregate productivity growth by shifting resources from agriculture to manufacturing, where productivity growth was faster. Table 3 presents data on total factor productivity (TFP) growth by sector and shows that productivity growth in manufacturing did exceed that in agriculture during the late nineteenth century. This implies that a tariff-induced shift of productive factors to manufacturing could have raised economy-wide TFP growth.⁸

But a simple back-of-the-envelope calculation suggests that the elimination of the import tariff could not have reduced TFP growth substantially. The United States imported \$315 million of

⁸ The TFP figures derived from the Maddison data are not comparable to those from the Kendrick data due to different weighting schemes applied to the productive inputs in calculating productivity. The Maddison data on Tables 1 and 2 are internally consistent and comparable. The Kendrick calculation is closer in spirit to the multi-factor productivity calculated by the Bureau of Labor Statistics, although they also are not computed the same way. For the period 1950 to 1992, the BLS reports average annual multi-factor productivity growth of 1.2 percent. See [/www.stats.bls.gov/](http://www.stats.bls.gov/)

manufactured goods in 1869. In that year, the United States produced \$1,395 million of value added in manufacturing with 2.1 million workers (or \$680 in value-added per worker in manufacturing).⁹ If the elasticity of import demand was -2.6 (as estimated for 1869 to 1913 by Irwin 1998), then the elimination of a 40 percent import tariff on manufactured goods would increase the value of manufactured imports by \$328 million, bringing total imports to \$643 million. These additional imports would have displaced 0.48 million workers in manufacturing, about 24 percent of manufacturing workers and about 4 percent of the total labor force.¹⁰ If those workers were shifted from manufacturing, where TFP was growing 1.2 percent a year, to agriculture, where such productivity was growing 0.8 percent a year, economy-wide TFP growth would fall from 1.50 percent to 1.48 percent a year, a minuscule decline. The cumulative effect (from 1870 to 1913) would be to lower the level of 1913 GDP by a slight 0.8 percent.

A variant on this exercise focuses not on productivity growth but on the comparative level of labor productivity in manufacturing and agriculture. Table 4 presents the ratio of U.S.-U.K. labor productivity by sector over this period based on the work of Broadberry (1997). Whereas U.S. labor productivity in agriculture was comparable to that in the United Kingdom, U.S. labor productivity in manufacturing was roughly twice that in the United Kingdom throughout the late nineteenth century. One reason why the United States caught up to (and eventually surpassed) the United Kingdom in per capita GDP is that American workers shifted from agriculture to manufacturing. Indeed, Table 5 shows that the share of labor in agriculture dropped from 50 percent in 1870 to 32 percent by 1910.

The tariff cannot take much credit for this shift because the level of import protection was roughly constant from the Civil War through this period, so its effect is already built into the 1870

⁹ Data from the U.S. Bureau of the Census (1975), pp. 666, 890.

¹⁰ This effect is somewhat overstated because imports are measured by gross value whereas production is measured by value-added.

figure. We can, however, ask how eliminating the tariff would have affected the ratio of U.S.-U.K. per capita GDP through the sectoral allocation of labor in the United States. As suggested above, eliminating the tariff on imported manufactured goods would have displaced about 4 percent of the labor force. Shifting 4 percent of the labor force from manufacturing to agriculture in 1870 would have reduced U.S. GDP relative to that of the United Kingdom from 92 percent to 88 percent. Posed in this way, the static labor reallocation brought about by the tariff is relatively modest, and is nowhere close to explaining much of the United States's overtaking the United Kingdom in per capita GDP.

Could the level of labor productivity in manufacturing have depended upon the tariff? One could argue that the tariff would move resources into manufacturing and raise that sector's productivity due to external economies of scale. (Without the tariff, this argument goes, perhaps U.S.-U.K. relative labor productivity would not have increased from 183 percent in 1870 to 203 percent in 1910.) To invoke the possibility of external economies, however, quickly moves the debate into an even vaguer realm of speculation because such effects are not readily identifiable. De Long (1998, p. 372) considers the possibility of such dynamic specialization gains in manufacturing but, as he points out, "the key problem is that the United States levied its heavy tariffs on those manufactured capital goods whose accumulation is the trigger for advances in knowledge and TFP."

Could the tariff have advanced manufacturing productivity by promoting the development of infant industries that initially required protection from foreign competition? U.S. tariffs protected manufacturers across-the-board, however, and for every case in which domestic industries improved their competitive position vis-a-vis foreign rivals (for reasons not necessarily due to tariff protection), there are other cases in which industries remained relatively inefficient (such as textiles, silk, and

woolens).¹¹ The tinplate industry blossomed after receiving tariff protection in 1890 and became a celebrated example which plausibly met the stringent conditions for beneficial infant industry protection. Upon closer examination, however, this industry failed to emerge primarily because of high tariffs on iron and steel intermediate inputs and finally succeeded because those prices fell to international levels, not because of tariff-induced learning effects (Irwin 2000a).

Most arguments favorable to protective tariffs stress the special importance of the manufacturing sector, but that sector's role may be exaggerated. Table 3 indicates that TFP growth in the non-traded sector, such as transportation, services, utilities, and communications, was much more rapid than in traded sectors such as agriculture or manufacturing. The rapid productivity growth in these non-traded sectors is usually explained by particular technological innovations, none of which depended even indirectly on the tariff (or even necessarily on the strength of manufacturing). Table 4 suggests that the pace of productivity growth in these non-traded sectors was higher in the United States than in the United Kingdom. U.S. productivity in construction, utilities, transportation and communication, and distribution essentially doubled relative to that in the United Kingdom between 1870 and 1910. It is difficult to conceive how this striking development was brought about by high import tariffs. The non-traded sector also accounted for a rising share of the U.S. labor force, increasing from 31 percent of employment in 1870 to 43 percent in 1910, as shown on Table 5. The non-traded sector therefore played a very important role in the United States overtaking the United Kingdom in per capita GDP around the turn of the century.

¹¹ Baldwin (1969, p. 303) has pointed out that "if the infant industry argument for tariff protection is worthy of its reputation as the major exception to the free-trade case, it should be possible to present a clear analytical case, based upon well-known and generally accepted empirical relationships unique to infant industries, for the general desirability and effectiveness of protective duties in these industries." Baldwin makes the compelling case that there does not exist a clear case for using tariffs to promote infant industries.

In sum, many of the links between tariffs and productivity are elusive. For every speculative argument that tariffs could have promoted higher productivity through this or that channel, there is an equally strong, equally speculative counter argument. Tariffs might have promoted the high productivity manufacturing sector, but also could have harmed efficiency by shielding inefficient firms from import competition. Tariffs might have assisted externality-generating industries, but also could have enabled imperfectly competitive domestic manufacturers to exercise market power (“the tariff is the mother of the trust,” as it was put by contemporaries). Even if these factors are hard to evaluate, the simple calculations here suggest that higher productivity arising from inter-sectoral resource shifts due to the tariff alone was not a key factor in late nineteenth century U.S. growth.

Conclusions

The U.S. experience in the late nineteenth century is often appealed to as evidence that high tariffs can prove beneficial to economic growth and development. Upon closer scrutiny, it is difficult to establish this claim. That tariffs coincided with rapid growth in the late nineteenth century does not imply a causal relationship. To provide compelling evidence of a causal relationship requires the identification of the particular channel or mechanism through which the beneficial effect of the tariff purportedly operates. The simple calculations performed here suggests that U.S. economic growth during this period did not hinge on the tariff. Determining the effect of the tariff on U.S. growth at the margin is exceedingly difficult, but that effect could well have been negative if high tariffs on capital goods impeded capital accumulation. Focusing on the tariff’s impact on agriculture and manufacturing also diverts attention from the importance of non-traded sectors in the late nineteenth century U.S. growth experience. The mundane non-traded sectors, such as utilities, distribution, and other services, accumulated capital more rapidly than manufacturing, achieved higher rates of TFP growth than manufacturing, and boosted U.S.-U.K. relative labor productivity in such a way as to help the United

States overtake the United Kingdom in per capita GDP. These non-traded sectors were a key feature of U.S. economic development during this period.¹²

¹² Non-traded sectors have also played a key role in productivity convergence in recent times. Bernard and Jones (1996, p. 1216) examine sectoral productivity measures for 14 OECD countries during 1970-1987 and find that “for all measures of productivity, the manufacturing sector shows little or no convergence, while other sectors, especially services, show strong evidence in favor of convergence.”

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Table 1: Comparative Growth Performance: United States and United Kingdom, 1870-1913

(annual average percentage growth)

	United States	United Kingdom
Real GDP	3.94	1.90
Population	2.09	1.21
GDP Per Capita	1.81	1.01
Non-Residential Capital Stock	5.53	1.73
Total Factor Productivity	0.33	0.31

Source: Maddison (1995), p. 255.

Table 2: Comparative U.S. Growth Performance, 1870-1913 & 1950-1992

(annual average percentage growth)

	1870-1913	1950-1992
Real GDP	3.94	3.22
Population	2.09	1.25
GDP Per Capita	1.81	1.95
Non-Residential Capital Stock	5.53	3.21
Total Factor Productivity	0.33	0.98

Source: Maddison (1995), p. 255.

Table 3: U.S. Total Factor Productivity Growth by Sector

(average annual percentage change)

	1869-1909	1879-1909	1889-1909
Agriculture	0.8	0.6	0.4
Manufacturing	1.2	1.1	0.9
Mining	--	1.5	1.0
Transportation	2.8	2.6	2.1
Utilities and Communications	2.0	2.3	3.0
National	1.5	0.6	1.3

Source: Kendrick (1961), pp. 331, 362, 396, 464, 540, 580.

Table 4: Comparative U.S./U.K. Labor Productivity Levels, by Sector (U.K. = 100)

	1869/1871	1899/1901	1909/1911
Agriculture	86.9	106.3	103.2
Mining	103.1	147.3	162.0
Manufacturing	182.5	196.5	202.7
Construction	95.5	139.7	198.5
Utilities	55.8	128.1	149.5
Transport & Comm.	110.0	226.8	217.4
Distribution	66.9	107.1	120.0
Finance & Services	64.1	71.6	77.9
Government	114.3	111.2	95.8
Total of Above	92.0	110.6	120.6
GDP	89.8	108.0	117.7

Source: Broadberry (1997), p. 7.

Table 5: Sectoral Allocation of U.S. Labor Force (percentage)

	1870	1890	1910
Agriculture	50.0	42.8	32.0
Mining	1.5	2.0	2.8
Manufacturing	17.3	20.0	22.2
Construction	5.8	6.1	6.3
Utilities, Trans.& Com.	4.8	6.2	8.6
Distribution	6.1	7.7	9.1
Finance & Services	12.2	12.6	17.1
Government	2.3	2.6	1.9
Total	100.0	100.0	100.0

Source: Broadberry (1997), p. 11.