Discussion Paper 42

Institute for Empirical Macroeconomics
Federal Reserve Bank of Minneapolis
250 Marquette Avenue
Minneapolis, Minnesota 55480

June 1991

# PRICE DEFLATION AND REAL TARIFF RATES: THE UNITED STATES, 1903 TO 1940

Mario J. Crucini*

Institute for Empirical Macroeconomics
Federal Reserve Bank of Minneapolis

and University of Rochester

ABSTRACT

This paper studies the time series and cross-sectional behavior of tariffs during the prewar period in a manner that recognizes their dual role: as an instrument of commercial policy and as an important source of government revenue. The fact that these objectives may be reinforcing or conflicting has made a critical difference in the choice of tariff rates across commodities and over time. Another interesting feature of prewar tariffs is that most import duties were specific, charging a nominal amount of domestic currency per physical unit imported. Existing historical accounts focus on dates of legislative change and miss the cyclical variation in tariff rates that results from the impact of changing prices on the real value of specific duties. These price effects are quantitatively important during the 1900 to 1940 period. For example, the Fordney-McCumber Act of 1922 which has been interpreted as very protectionist simply corrected the erosion of real tariff rates occurring during the inflation of World War I. The opposite is true of the infamous Smoot-Hawley Tariff Act; the deflation of the 1930s added considerably to the legislated increases. The implications of these findings for modelling the role of Smoot-Hawley in the Great Depression is also discussed.

---

*I am especially grateful to Marianne Baxter for productive discussions during the course of this research. This paper has also benefited from discussions with Stanley Engerman, Ronald Jones, James Kahn, and Robert King. I also thank seminar participants at the Federal Reserve Bank of Minneapolis, the University of Michigan, Ohio State University, the University of Pennsylvania, Queen's University, the University of Rochester, Virginia Politechnical Institute, and the University of Western Ontario. I have received encouragement and many useful comments from participants at the NBER Macroeconomic-History Conference, May 1991, including a thorough discussion of this paper by Rudiger Dornbusch.

This material is based on work supported by the National Science Foundation under Grant. No. SES-8722451. The Government has certain rights to this material.

Any opinions, findings, conclusions, or recommendations expressed herein are those of the author and not necessarily those of the National Science Foundation, the University of Minnesota, the Federal Reserve Bank of Minneapolis, or the Federal Reserve System.

"For to the legislator, as to the average taxpayer and to the main body of accounting practice, a dollar is always a dollar, regardless of its purchasing power."

Viner (1923, p. 518)

"The farmers were as helplessly ignorant concerning the cause of this price decline [from 1920-21] as they had been concerning the previous rise [World War I inflation]. They clamored vociferously for a remedy."

Taussig (1931, p. 453)

## I. Introduction

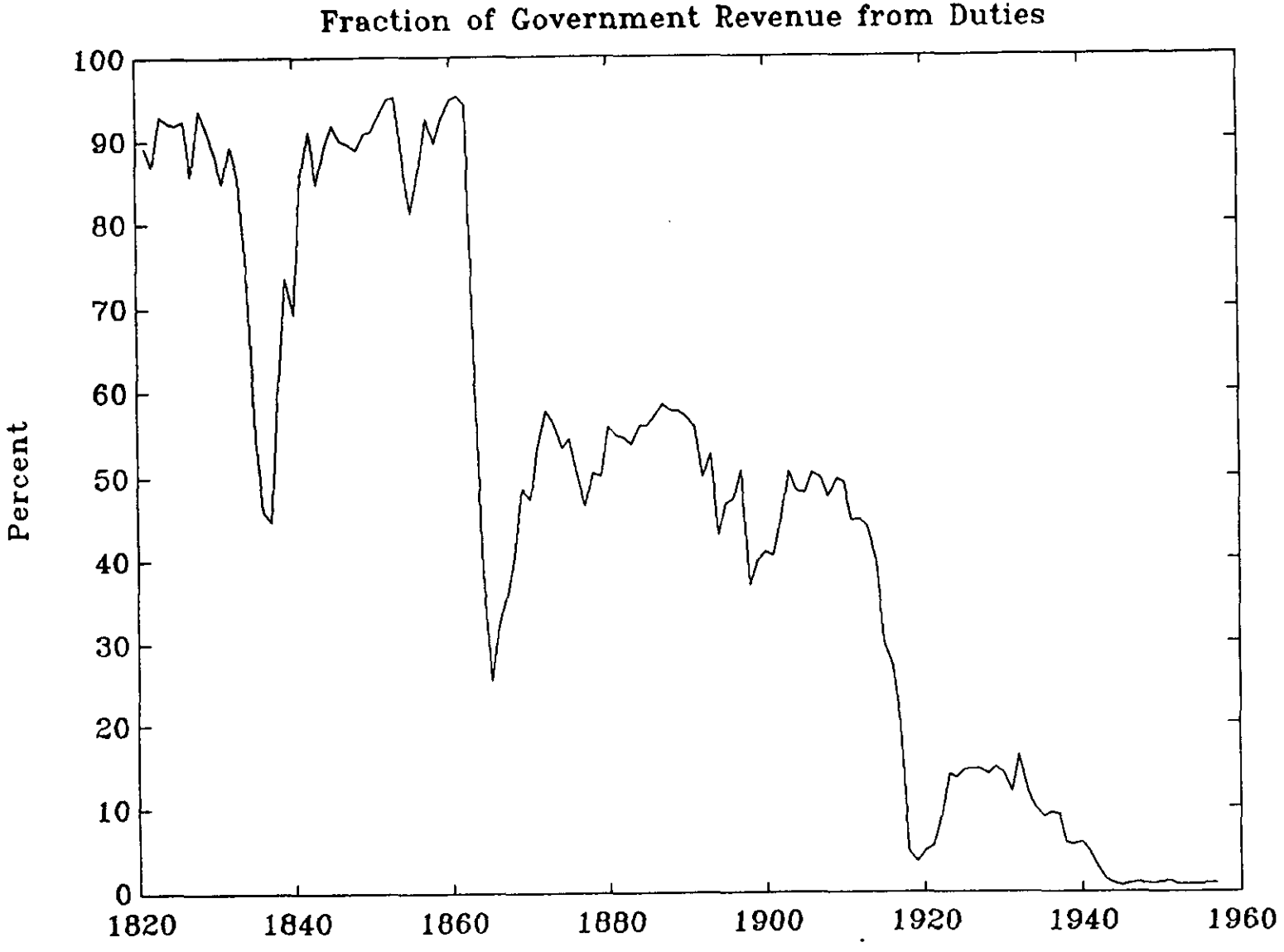
Conventional tariff barriers in the United States have fallen dramatically since the first round of GATT negotiations in Geneva in 1947. The average U.S. tariff rate has fallen from 25 percent in 1946 to 5 percent in 1986. While this is a remarkable accomplishment it is also true that non–tariff barriers have arisen to replace some of the conventional barriers to trade.

The same patterns of reversal in commercial policy during the prewar period have intrigued students of political economy. The declines in the average U.S. tariff rate from the late 1820's to the mid–1860's and from the late 1890's to about 1920 are of comparable magnitude to the postwar experience. During both of these periods the average tariff rate declined from about 50 percent to about 20 percent and each decline was followed by a return to the high levels of tariff rates that preceded them.

Despite the similarities between these historical experiences, there is a crucial difference. The contribution of customs duties to total government revenue has declined dramatically over time (see Figure 1). Up until the Civil War customs duties accounted for about 90 percent of federal revenue before falling to about 50 percent during the Civil War. The introduction of income taxes in 1913 reduced customs duties to a negligible fraction of government revenue except for a brief increase during the 1920's and 1930's.[1] The broadening of the tax base made it feasible to finance the existing level of government expenditure with substantially reduced tariff rates. Based on Ramsey (1927) principles,

[1] Gardner and Kimborough (1989) develop a model to describe the shifts in the tax base from customs duties to excise taxes to income taxes in the face of a rising permanent fraction of resources absorbed by the government.

**Figure 1**


Fraction of Government Revenue from Duties
Percent
100
90
80
70
60
50
40
30
20
10
0
1820
1840
1860
1880
1900
1920
1940
1960

this was likely a more efficient pattern of taxation as well. During the interwar period the government chose instead to increase tariff rates to their highest levels since the 1830's. As yet, no attempt has been made to determine the quantitative macroeconomic consequences of this sacrifice in efficiency.

The prewar period is also interesting in that two different types of tariffs were commonly employed. The first type of tariff was an ad–valorem tariff, which charged a fixed percentage of the nominal value of the imported good. The second type of tariff was a specific tariff, which taxed imports at a fixed nominal amount per physical unit imported. Under a specific tariff, a decline in the nominal price of an imported good causes an increase in the tariff as a percentage of the price of the good. Unfortunately, all readily available statistical sources express tariffs as a percentage of the import price regardless of the type of the duty levied. As a result, researchers have been placed in the unenviable position of treating legislative and price induced changes in real tariff rates symmetrically. This has led to confusion about the magnitude of legislative changes while leaving the substantial changes occurring between years of legislative amendment unexplored.

Historical accounts of legislative changes in tariff rates do not report the necessary information to resolve this confusion. Without exception, specific duties are compared across distant years without conversion to a common base price. This includes the studies of the Fordney–McCumber and Smoot–Hawley Tariff Acts by Cole (1922) and Berglund (1930) and the classic volume written by Taussig (1931), "The Tariff History of the United States". More recently, Dornbusch and Fischer (1984) argued that the Fordney–McCumber Act of 1922 increased duties by a similar amount to the increases accompanying the Smoot–Hawley Act while Haberler (1976) described Smoot–Hawley as imposing "sky–scraper" duties. The limited amount of available data has not inhibited the debate concerning the role of the Smoot–Hawley Tariff in the initiation and propagation of the Great Depression. At the extremes, Meltzer (1976) argued that Smoot–Hawley played a pivotal role in the deterioration of the downturn into the Great Depression while Eichengreen (1989) has suggested that Smoot–Hawley was stimulative even in the face of the foreign retaliation that took place.

This paper takes a detailed look at the time series behavior of both aggregate and

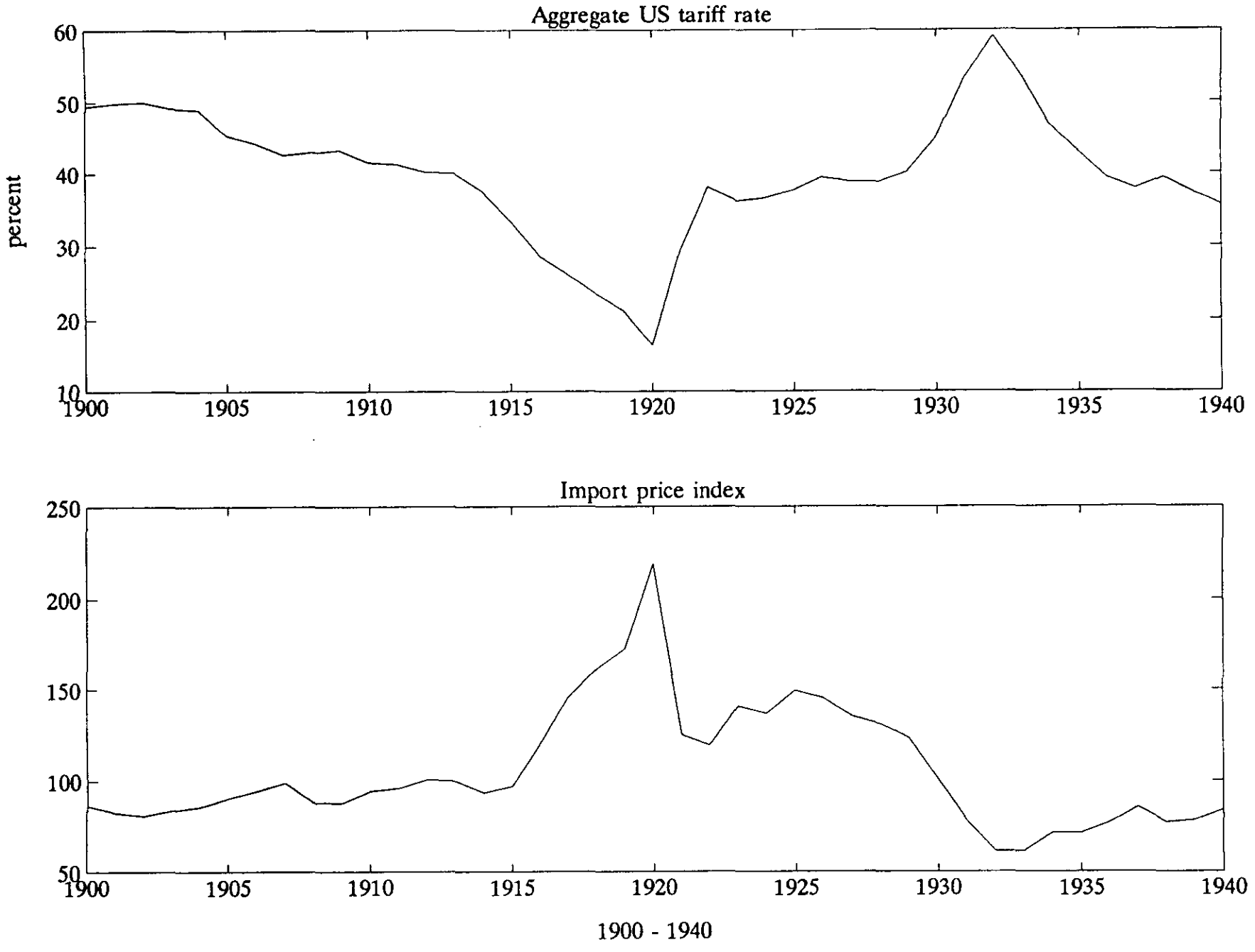
individual tariff rates over the 1903 to 1940 period. Time series provide a valuable supplement to cross–sections for two reasons. First, the chronological ordering allows changes in legislated rates to be related to other historical events. Second, the cyclical influence of nominal import prices on the real value of specific duties is made obvious.

The interaction of prices and specific tariffs shows up clearly in frequently used tariff indices. One such index is the aggregate tariff rate calculated as the ratio of customs duties collected to dutiable imports. Figure 2 plots this rate in Panel A, and the import price index in Panel B. If specific duties apply to a sufficiently broad class of imports the aggregate tariff rate and the import price index should move in opposite directions over time. Over the 1900 to 1940 period, the correlation between these two variables is -0.8 in levels and -0.9 in growth rates. Clearly, price effects are quantitatively important determinants of tariff rates over this period.

To produce a concrete assessment of the relative importance of price and legislative changes in explaining movements in ad–valorem–equivalent rates data on thirty–two individual imported commodities is collected. This level of disaggregation permits a decomposition of each ad–valorem–equivalent rate into the individual influences of legislation, aggregate prices and relative prices. It is found that legislated changes in tariff rates are of the same sign as changes in ad–valorem–equivalent rates, but are of insufficient magnitude to explain the observed movements in ad–valorem–equivalent rates. In addition there exists considerable variability in tariff rates between periods of legislative change. The effect of import prices on the real value of specific duties is responsible for both of these observations. The disaggregated data also reveals very different tariff histories across individual commodities which cannot be attributed solely to differences in legislated tariff rates.

Looking across commodities, there exists a strong positive correlation between the cross–sectional mean and the cross–sectional variance of the ad–valorem–equivalent tariff rates. Such a relationship arises naturally when many commodities are subject to specific duties and when general price variation is responsible for much of the movement in ad–valorem–equivalent rates. This finding casts doubt on the ability of a single aggregative index of tariff rates to capture the behavior of the relevant tax distortions affecting the

**Figure 2**


Aggregate US tariff rate
percent
60
50
40
30
20
10
1900
1905
1910
1915
1920
1925
1930
1935
1940
Import price index
250
200
150
100
50
1900
1905
1910
1915
1920
1925
1930
1935
1940
1900 - 1940

economy. Finally, the hypothesis that quantities imported should be strongly related to ad–valorem–equivalent tariff rates—rates which incorporate the effects of price level variation—but are not strongly related to the legislated tariff rates is examined. This hypothesis is supported by the data. Because legislated rates are an imprecise measure of the true distortion of the world price, estimation using this measure gives insignificant results.

The paper is organized as follows. Section II describes the data sources and discusses the construction of the dataset. In section III, the ad–valorem–equivalent rate on each commodity in the dataset is decomposed into the influences of price and legislation. We investigate the patterns in these components across commodities and over time. In the fourth section we use the results of section III to evaluate the adequacy of the aggregate U.S. tariff rate as a measure of the average marginal tariff rate. The final section summarizes the results and discusses directions for future research.

## II. Description of the data

The dataset consists of thirty–two imported commodities and the sample period runs from 1903 to 1940.[2] The data were gathered from the annual publication : "The Foreign Trade and Navigation of the United States", and include the following : the physical quantity imported, the nominal value of imports, ad–valorem–equivalent rates of duty, and the legislated rates of duty. Value of imports is measured as the foreign value or export value whichever is higher, converted to U.S. dollars at the prevailing exchange rate.[3]

The individual commodities were selected based on two initial criteria : (i) that the value of imports in 1929 exceeded one million dollars and (ii) that the categorical definition

---

[2] The starting date was determined by library resource constraints which had some gaps in the set of Foreign Trade and Navigation of the United States volumes. It is feasible, using a complete Congressional set of these volumes, to extend both the number of commodities and the length of the sample period.

[3] Foreign value is defined as : "... the market value or price at which the merchandise, at the time of exportation to the U.S. is offered for sale in the principal markets of the country from which exported, including the costs of containers or coverings and all expenses incident to placing the merchandise in condition ready for shipment to the U.S. as defined in section 402 of the tariff Acts of 1922 and 1930." (see Foreign Trade and Navigation of the United States).

of a given commodity be maintained throughout the sample period. The first constraint led to an original sample of over seventy commodities. It was only possible to satisfy the second criteria for twenty–nine of these because legislative changes in tariff rates frequently involved alterations in tariff categories. In addition, the first criteria resulted in a sample lacking in commodities subject to ad–valorem duties. While there were many commodities subject to this type of duty in the aggregate data, the value imported was typically low. To make the dataset more representative of the aggregate data, three commodities subject to ad–valorem duties were added without requiring that the first criteria be met.

Approximately forty–six–hundred different commodities were imported into the U.S. in 1929. Given the large number of individual commodities imported, it is important to evaluate whether the dataset is representative of the aggregate trade data. Table 1 reports the percentages of imports in each tariff schedule category for all U.S. dutiable imports and for those commodities included in the dataset. For nine of the fourteen categories, the data set includes at least one commodity. In five of these nine groups, the fraction of imports captured by the dataset is greater than twenty percent of the total. In the remaining four groups the value of imports in the dataset is a small fraction of the total value imported.

As would be expected, categories dominated by a few large imports receive better coverage than those that contain thousands of individual goods. For example, burlap accounts for almost sixty percent of the flax, etc., group. In contrast, tracing cloth is only about three percent of cotton manufactures. The textiles group more generally is difficult to represent with a small number of commodities because this group contained over eighteen–hundred individual commodities in 1929 with an average import value of only two–hundred thousand dollars. For similar reasons, the sample also under–represents chemicals, oils and paints, earths, earthenware and glassware, metals and manufactures thereof, and wool and manufactures thereof.

As another indicator of the breadth of the sample, Table 2 reports average tariff rates on a comparable basis to Table 1. Each average is calculated by dividing duties collected on commodities within the group by the total value of imports of these commodities. In almost every group sampled the average tariff rate is underestimated. In some cases it is

Table 1

Fraction of Dutiable Imports in 1929

| *Tariff Schedule* | Aggregate U.S. data | Dataset | Percent covered |
|---|---|---|---|
| *Chemicals, oils and paints* | 7.57 | 0.445 | 5.88 |
| *Earths, earthenware, glassware* | 3.79 | 0.185 | 4.87 |
| *Metals and manufactures thereof* | 10.56 | 0.104 | 0.98 |
| *Wood and manufactures thereof* | 1.19 | 0 | 0 |
| *Sugar, molasses and manufactures thereof* | 10.71 | 9.38 | 87.56 |
| *Tobacco and manufactures thereof* | 4.12 | 4.03 | 96.67 |
| *Agricultural products and provisions* | 20.37 | 4.98 | 24.47 |
| *Spirits, wines and other beverages* | 0.11 | 0 | 0 |
| *Manufactures of cotton* | 2.94 | 0.09 | 3.23 |
| *Flax, hemp, jute and manufactures thereof* | 8.87 | 5.28 | 59.51 |
| *Wool and manufactures thereof* | 8.34 | 0 | 0 |
| *Manufactures of silk* | 3.23 | 0 | 0 |
| *Paper and books* | 1.65 | 0 | 0 |
| *Sundries* | 16.53 | 4.06 | 24.54 |
| *Total* | 100.00 | 28.55 | 28.55 |

Source : *Statistical Abstract of the United States*, 1932.

Table 2

Average Tariff Rates in 1929

| *Tariff Schedule* | Aggregate U.S. data | Dataset | Difference |
|---|---|---|---|
| *Chemicals, oils and paints* | 30.70 | 18.25 | 12.45 |
| *Earths, earthenware, glassware* | 48.85 | 23.15 | 25.70 |
| *Metals and manufactures thereof* | 35.48 | 18.74 | 16.74 |
| *Wood and manufactures thereof* | 24.70 | 0 | NA |
| *Sugar, molasses and manufactures thereof* | 83.97 | 93.66 | -9.69 |
| *Tobacco and manufactures thereof* | 65.05 | 64.77 | 0.28 |
| *Agricultural products and provisions* | 22.90 | 25.75 | -2.85 |
| *Spirits, wines and other beverages* | 34.63 | 0 | NA |
| *Manufactures of cotton* | 36.46 | 29.44 | 7.02 |
| *Flax, hemp, jute and manufactures thereof* | 19.01 | 8.32 | 10.69 |
| *Wool and manufactures thereof* | 50.82 | 0 | NA |
| *Manufactures of silk* | 58.00 | 0 | NA |
| *Paper and books* | 25.32 | 0 | NA |
| *Sundries* | 37.55 | 26.08 | 11.47 |
| *Average* | 40.10 | 49.65 | -9.55 |

Source : *Statistical Abstract of the United States*, 1932.

NA : Not applicable; no commodity included in the dataset.

possible to trace the source of the differences to particular commodities excluded from the dataset which had tariff rates higher than the average within their group. For example, ferroalloys accounted for about twenty percent of the value of metals and manufactures thereof and had an average tariff rate of seventy–one percent compared to an average tariff rate for the group of about thirty–five percent.[4]

The types of duties levied differed across commodities and over time in both the dataset and the aggregate U.S. data. In total, nineteen commodities were subject to specific duties during the entire sample period while five were subject to ad–valorem rates (see Table 3). Only one good was subject to a combined duty over the entire sample period. For the remaining seven commodities, the form of the duty changed between specific, ad-valorem and combined duties. In addition, five goods in the sample were free of duty at some point in the sample period (not reported in Table 3). Consistent with the broader experience of imports, specific duties fell disproportionately on primary goods while ad–valorem duties tended to be levied on manufactured or semi–manufactured goods. The fact that approximately two–thirds of total customs revenue in 1930 came from imported goods subject to either specific or combined (specific rate plus an ad–valorem rate) duties is further evidence of the breadth of these nominal duties in the tariff schedules.

It appears that the choice between specific and ad–valorem duties was based entirely on enforcement considerations. Treasury officials and economists emphasized the fact that ad–valorem duties encouraged under–reporting of value and this is not possible with specific duties which charge a fixed nominal amount based on the weight (or other quantity measure) of the commodity.[5] Of course it would be unmanageable to set specific duties on every single good imported into the United States. Therefore, ad–valorem duties were applied to imports for which weight or volume was a poor indicator of value such as manufacturers and to commodities not elsewhere specified within a tariff schedule (for

---

[4] Other examples are the chemicals, oils and paints group, for which coal tar products accounted for about one–quarter of the value and had an average tariff rate of 51 percent, and pottery constituted about 5 percent of the value of earths, earthenware and glassware imported and had an average duty of about 60 percent, notably all ad–valorem rates.

[5] See Taussig (1931) p. 443-446.

Table 3

Types of Duties Levied

| Tariff Schedule Category | Specific duty | Pure Ad-valorem | Specific to Ad-valorem | Combined to Specific | Combined | Total |
|---|---|---|---|---|---|---|
| Chemicals, oils and paints | 1 | 1 | 2 | - | - | 4 |
| Earths, earthenware, glassware | 1 | - | - | - | - | 1 |
| Metals and manufactures thereof | - | - | 1 | - | - | 1 |
| Wood and manufactures thereof | - | - | - | - | - | - |
| Sugar, molasses and man. thereof | 4 | - | - | - | - | 4 |
| Tobacco and manufactures thereof | 4 | - | - | - | 1 | 5 |
| Agricultural products and provisions | 7 | - | 2 | - | - | 9 |
| Spirits, wines and other beverages | - | - | - | - | - | - |
| Manufactures of cotton | - | - | - | 1 | - | 1 |
| Flax, hemp, jute and man. thereof | - | - | - | 1 | - | 1 |
| Wool and manufactures thereof | - | - | - | - | - | - |
| Manufactures of silk | - | - | - | - | - | - |
| Manufactures of rayon | - | - | - | - | - | - |
| Paper and books | - | - | - | - | - | - |
| Sundries | 2 | 4 | - | - | - | 6 |
| All schedules | 19 | 5 | 5 | 2 | 1 | 32 |

example, other products of flax, hemp or ramie).

Despite the fact that the dataset contains on only thirty–two out of a possible forty–six–hundred imported goods, it is broadly representative of aggregate dutiable imports. The sample draws from most major import categories and although the average tariff rates in the dataset tend to underestimate those in the aggregate data, the sources of these discrepancies have been identified. Overall the dataset is well–suited for the exploration of the underlying sources of variation in individual and aggregate tariff rates.

## III. The mechanics of U.S. tariff rates

Most duties took one of three forms : specific, ad–valorem or a combination of the two. There were also duties which changed with the value of the commodity, but goods of different value can be thought of as different commodities. Specific duties were stated in terms of nominal domestic currency per physical unit imported while the more familiar ad–valorem duties were expressed as percentages of the value imported. In this section we discuss the implications of ad–valorem and specific duties for the evolution of individual and aggregate tariff rates.

The price faced by domestic consumers (and producers using imports as intermediate goods) will differ from the world price by the amount of the ad–valorem–equivalent tariff rate. Let $P_{jt}$ denote the nominal price of commodity $j$, in domestic currency, in period $t$, and let $Q_{jt}$ denote the physical quantity imported. Let $\tau_{js}$ denote the ad–valorem rate of duty on commodity $j$, legislated in period $s$, and let $\omega_{js}$ denote the specific duty on commodity $j$, again legislated in period $s$. The total duty collected on commodity $j$ in period $t$ is then :

$$C_{jt} = \tau_{js} \cdot P_{jt}Q_{jt} + \omega_{js} \cdot Q_{jt}$$

An ad–valorem–equivalent rate of duty can be constructed by dividing total duties collected by the value of imports :

$$\tau^*_{jt} = \frac{C_{jt}}{P_{jt}Q_{jt}} = \tau_{js} + \frac{\omega_{js}}{P_{jt}} \tag{1}$$

The ad–valorem–equivalent rate is the sum of the ad–valorem duty and the specific duty converted to an equivalent rate at the prevailing price of the good.

As is apparent from equation (1), the ad–valorem–equivalent rate of duty will change whenever the nominal import price changes, unless the specific duty is zero. The nominal price of the imported good may change because of a change in the good's relative price, or because of a change in the general price level. In the analysis of the aggregate tariff rate in section 4 below, it will be useful to know what proportion of the change in ad–valorem–equivalent tariff rates was attributable to each of these channels. Toward this end, let $\bar{P}_j$ denote the average nominal price of commodity $j$ over the period 1922–1931, let $P_t$ denote the GNP deflator in period $t$, and $\omega_j$ is the specific duty on commodity $j$ in 1922. Equation (2) below uses these definitions to decompose movements in the ad–valorem equivalent tariff rate for commodity $j$ in period $t$ into three components : (i) the component due to legislation; (ii) the component arising from movements in the general price level, and (iii) the component attributable to movements in the relative price of commodity j, which is computed as a residual, $R_{jt}$. Before describing the tariff histories of individual commodities in the dataset it is useful to discuss the potential influence of each of these three components on the ad–valorem–equivalent rate.

$$\tau^*_{jt} = \underbrace{\tau_{js} + \frac{\omega_{js}}{\bar{P}_j}}_{Legislation} + \underbrace{\frac{\omega_j}{\bar{P}_j}\left(\frac{1}{P_t} - 1\right)}_{Nominal\ price} + \underbrace{R_{jt}}_{Relative\ price} \tag{2}$$

The first component captures the influence of legislation and is the sum of the ad–valorem rate and the specific duty converted to an ad–valorem–equivalent rate at the base price of the good. The legislated rates of duty are reported for each commodity in the dataset in Table A – 1 of Appendix A. There were six major changes in tariff legislation in the period under study. The dates and names of these are : The Tariff Act of 1909, the Underwood Act of 1913, the Emergency Tariff Act of 1921, the Fordney–McCumber Act of 1922, the Smoot–Hawley Act of 1930 and the Reciprocal Trade Agreements Act of 1934. For most commodities in the dataset, the legislative changes are confined to these years or a subset of them; for a few others (eg. sugars) duties were changed in other years as well. If import prices were constant or specific duties were zero, the ad–valorem–equivalent tariff rates would equal legislated rates and would change only when legislation was changed — six times during the 1903 to 1940 period.

The second component of the ad–valorem–equivalent rate is the influence of the general price level. The general price level is normalized to average one over the base period so that the effect of the general price level will be zero on average over the same period. The coefficient in front of the braces converts general price changes into effects on the ad–valorem–equivalent rate. For example : if prices fall by twenty percent and the coefficient (base period specific rate) is fifty percent, the increase in ad–valorem–equivalent rate is ten percent. The impact of the relative price of the import good is given by the residual term in equation (2). Unlike the general price effect, the relative price effect will rarely be similar across commodities. In particular, the relative price components of two different tariff rates will only be identical in the unlikely case in which both goods have the same legislated duties and the relative price of these two goods remains fixed over time.

Each component of the ad–valorem–equivalent rate is unique in an important sense. The legislative component is unlike the price components because it changes only at discrete points in time. The nominal price component differs for the relative price component in that it moves all ad–valorem tariff rates in the same direction, while the relative price component potentially moves individual ad–valorem rates in opposite directions.

The factors that influence the aggregate U.S. tariff rate, $\tau_t^*$, can be expressed as import–share–weighted versions of the factors discussed in reference to equation (2) where the shares, $s_{jt}$, are permitted to vary across commodities $j$ and over time $t$ :

$$\begin{aligned}\tau_t^* &= \sum_j s_{jt}\tau_{jt}^* \\ &= \sum_j s_{jt}(\tau_{js} + \frac{\omega_{js}}{\bar{P}_j}) + \sum_j s_{jt}\frac{\omega_j}{\bar{P}_j}(\frac{1}{P_t} - 1) + \sum_j s_{jt}R_{jt} \qquad (3)\end{aligned}$$

If trade shares never changed ($s_{jt} = s_j$) and there were no specific duties levied ($\omega_{jt} = 0$), the aggregate tariff rate would change only when legislation changed (as indexed by $s$) : $\tau_t^* = \sum_j s_j\tau_{js}$. More generally, substitution responses will reduce import shares of goods subject to increased duties and conversely; making the aggregate tariff rate much less volatile than individual rates. In addition, if relative price movements do not possess a large common component the last term will be negligible and nominal price effects will dominate.

A. Cross–sectional heterogeneity in tariff rates

To get a sense of the diversity of tariff rates both across commodities and over time, Table 4 presents the sample average, maximum, and minimum, ad–valorem–equivalent rates of duty for each of the thirty–two commodities in the dataset. The averages are taken over the entire sample from 1903 to 1940. The Table also reports the year in which the maximum and minimum values of tariff rates were achieved. The average tariff rate was less than thirty percent for fifteen commodities and exceeded sixty percent for five more, with the remaining twelve tariff rates falling between these ranges. Notably, the minimum and maximum tariff rates rarely occurred in years in which legislation was passed. From the discussion above, it is apparent that the lack of correspondence between the dates of legislative change in tariff rates and the extreme levels reached by observed ad–valorem–equivalent rates is due to general price level movements and/or relative price movements. For eleven commodities the highest rates were reached following the severe deflation from 1930 to 1933, two or three years after the passage of the Smoot–Hawley Tariff Act while eight commodities achieved their lowest tariff rates following the rapid wartime inflation, in 1919 or 1920, six or seven years after the passage of the Underwood Act of 1913. For these commodities, the general price movements determine the timing of the minimum and maximum tariff rates. The remaining forty–five extrema occur in other years, none of which coincide with dates of legislative change in the appropriate direction (e.g., a maximum tariff rate occuring in the year of a legislated increase in the duty). For these commodities it is the evolution of their own relative prices that determined the peak or trough in the ad–valorem–equivalent rate.

B. The tariff histories of individual commodities

The tariff decomposition developed in the previous section is used to construct time series for each of the three components of the ad–valorem–equivalent tariff rate : legislation, the general price level and individual relative import prices. Generally, the benchmark line for the legislative component of the ad–valorem–equivalent tariff rate will not equal the average rate over the entire sample period, but rather it will match the average rate over

Table 4
Tariff Rates across the 32 commodities

| Commodity | Average | Maximum | Year | Minimum | Year |
|---|---|---|---|---|---|
| Almonds | 40.47 | 90.00 | *1932* | 10.43 | *1920* |
| Brazil & Cream | 13.20 | 39.89 | *1933* | 0 | 1903 |
| Bristles | 5.37 | 9.39 | **1909** | 1.40 | 1937 |
| Burlap | 13.40 | 27.47 | **1909** | 0 | 1915 |
| Castor beans | 16.89 | 29.90 | *1933* | 4.88 | *1919* |
| China clay or kaolin | 27.88 | 48.30 | *1932* | 10.25 | *1919* |
| Cigar & cheroots | 70.27 | 99.29 | 1904 | 5.58 | 1935 |
| Cigar filler, stemmed, Cuba | 49.97 | 75.56 | 1904 | 29.99 | **1921** |
| Cigar filler, unstemmed | 68.20 | 102.00 | 1935 | 40.59 | **1922** |
| Cigar filler, unstemmed, Cuba | 43.70 | 61.94 | 1904 | 26.26 | **1921** |
| Cigar leaf wrapper | 136.23 | 262.73 | 1906 | 73.00 | 1938 |
| Cigarette paper | 45.65 | 60.00 | **1922** | 0 | 1903 |
| Coconuts | 12.20 | 35.00 | 1938 | 0 | 1917 |
| Dates | 31.08 | 52.29 | 1915 | 14.31 | 1907 |
| Diamonds | 16.98 | 20.00 | **1913** | 10.00 | 1903 |
| Egg yolk, dried | 60.63 | 335.20 | 1934 | 10.00 | 1917 |
| Egg yolk, nspf | 37.44 | 143.70 | 1934 | 29.84 | 1928 |
| Feathers, ostrich | 19.07 | 20.00 | **1909** | 15.00 | 1903 |
| Feathers, for beds | 19.08 | 20.00 | **1909** | 15.00 | 1903 |
| Flaxseed | 29.39 | 99.00 | *1932* | 6.33 | *1919* |
| Matches in boxes | 36.98 | 115.52 | 1935 | 4.88 | 1918 |
| Mercury | 21.64 | 68.93 | *1932* | 6.33 | *1903* |
| Quebracho | 12.43 | 28.14 | **1913** | 0 | 1915 |
| Soap, Castille | 14.64 | 19.51 | 1905 | 10.00 | 1915 |
| Sugar, Cuban, 95° | 57.72 | 217.00 | *1932* | 8.26 | *1920* |
| Sugar, Cuban, 96° | 61.77 | 223.00 | *1932* | 8.71 | *1920* |
| Sugar, Cuban, 97° | 57.49 | 220.40 | *1933* | 9.24 | *1920* |
| Sugar, Cuban, 100° | 37.78 | 141.00 | *1932* | 7.02 | *1920* |
| Toilet water, perfumed | 32.90 | 50.00 | **1909** | 21.31 | 1939 |
| Tracing cloth | 26.70 | 50.84 | **1913** | 29.18 | 1937 |
| Vanilla beans | 11.59 | 50.10 | *1933* | 0 | 1903 |
| Walnuts | 47.47 | 124.30 | 1940 | 7.84 | 1929 |

Notes : The years of legislative change appear in boldface. The years in italics represent the local general price peak of 1919/1920 and local general price trough of 1932/1933.

the base price period from 1922 to 1931.[6] The base period was chosen to be long enough to capture average commodity prices while avoiding the effects of World War I and the Great Depression. The same base period was chosen for all commodities to achieve a simple and comparable benchmark for the complete dataset.[7] As such, the decomposition serves as a pedagogical device not a method for extracting legislative "intent" from observed ad-valorem-equivalent tariff rates. To conserve space, decompositions are presented for three of the thirty-two commodities in the sample, and each is discussed in detail.

The difference between a legislated rate and an ad-valorem-equivalent rate is well-illustrated by the tariff history of cigar filler, plotted in Figure 3.1. The legislated duty on this good remained at thirty-five cents per pound over the entire sample period but the ad-valorem-equivalent rate fluctuated substantially nonetheless.[8] Unlike the ad-valorem-equivalent rates on many commodities, which declined due to the price inflation from 1903 to 1919 the ad-valorem-equivalent rate on cigar filler actually rose in the first ten years of this period, reflecting a decline in the relative price of cigar filler. As a result, between 1903 to 1915 the ad-valorem-equivalent rate on cigar filler rose from about eighty percent to just under one-hundred percent. From about 1916 onward the relative and general price effects were reinforcing, serving to create two dramatic swings in the ad-valorem equivalent rate over the remainder of the sample period. Cigar filler, then, illustrates the importance of distinguishing between legislated rates and effective (ad-valorem-equivalent) rates.

The duties on imports of cane sugar from Cuba also reached impressive heights by 1932. The price of sugar was falling over much of the period which worked to increase the observed tariff rate (see Figure 3.2). The general inflation from 1903 to 1920 approximately cancelled this effect. As the severe deflation of 1930 to 1932 developed, the relative and

---

[6] To be more precise, this provides only an approximation since the ad-valorem-equivalent rate is defined as the specific rate divided by the import price. To match the average ad-valorem-equivalent rate one could use the average of the inverse import price. These two methods of computation will yield nearly identical results.

[7] The Tariff Commission study (1930) comparing the Fordney-McCumber and Smoot-Hawley Tariff Acts (used in studies by Eichengreen (1989) and Dornbusch and Fischer (1984)) uses a single year to benchmark prices.

[8] The legislated rate does not pass through the mean of the ad-valorem-equivalent rate because the price of cigar filler during the base period was above its average over the entire sample period.

**Figure 3.1**
**Tariff rate decomposition**
**Cigar Filler**

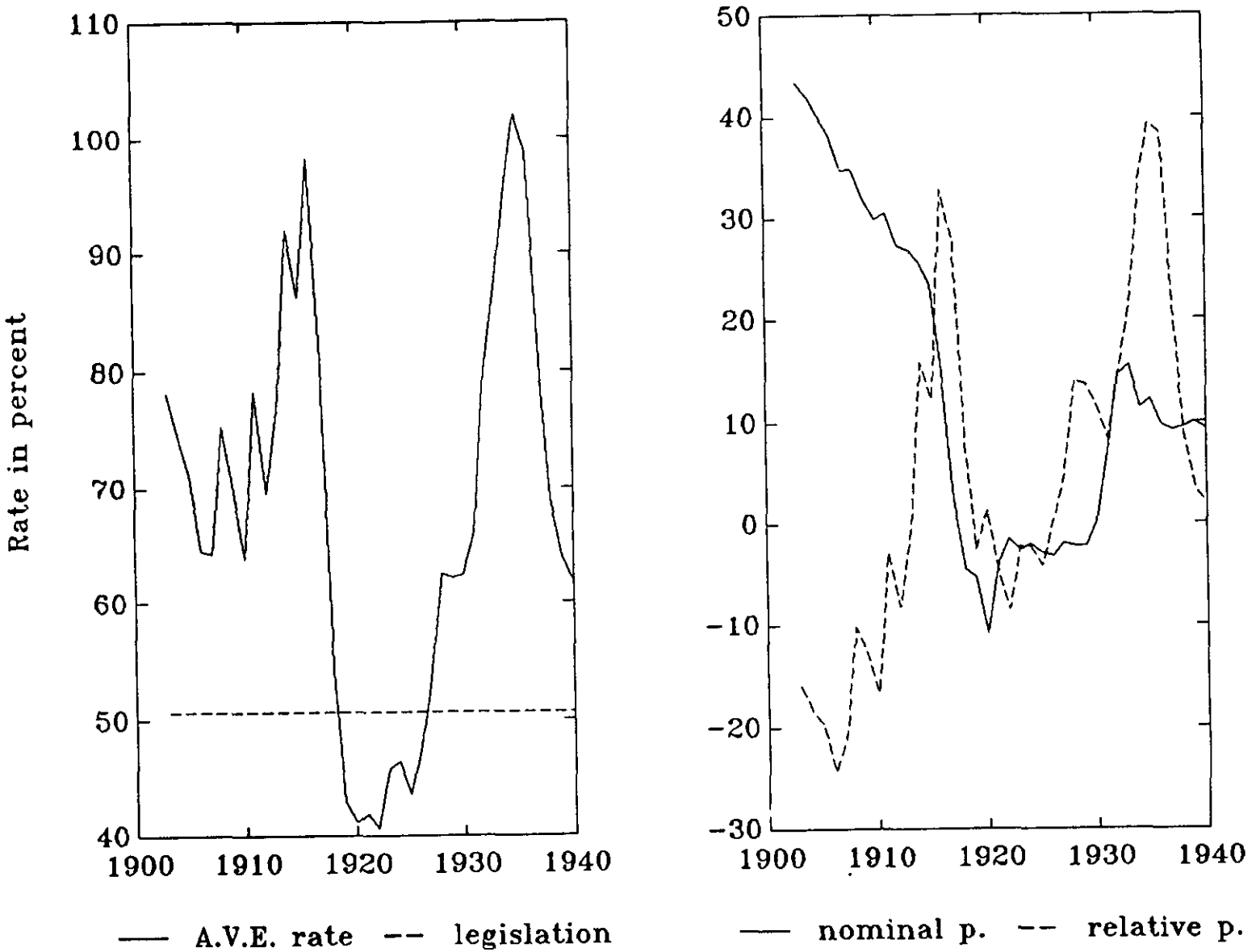


**Figure 3.2**
**Tariff rate decomposition**
**Cuban sugar (96°)**

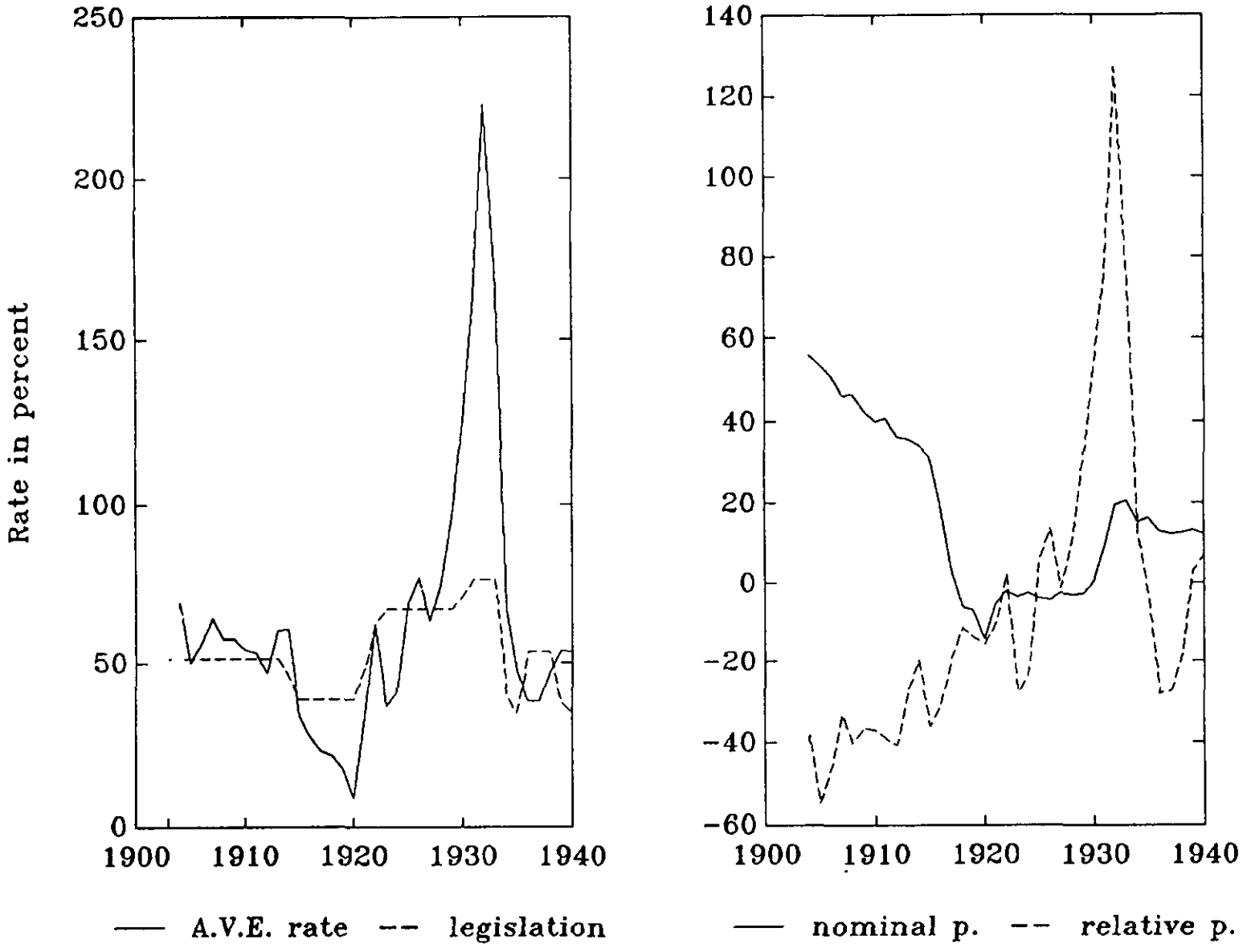
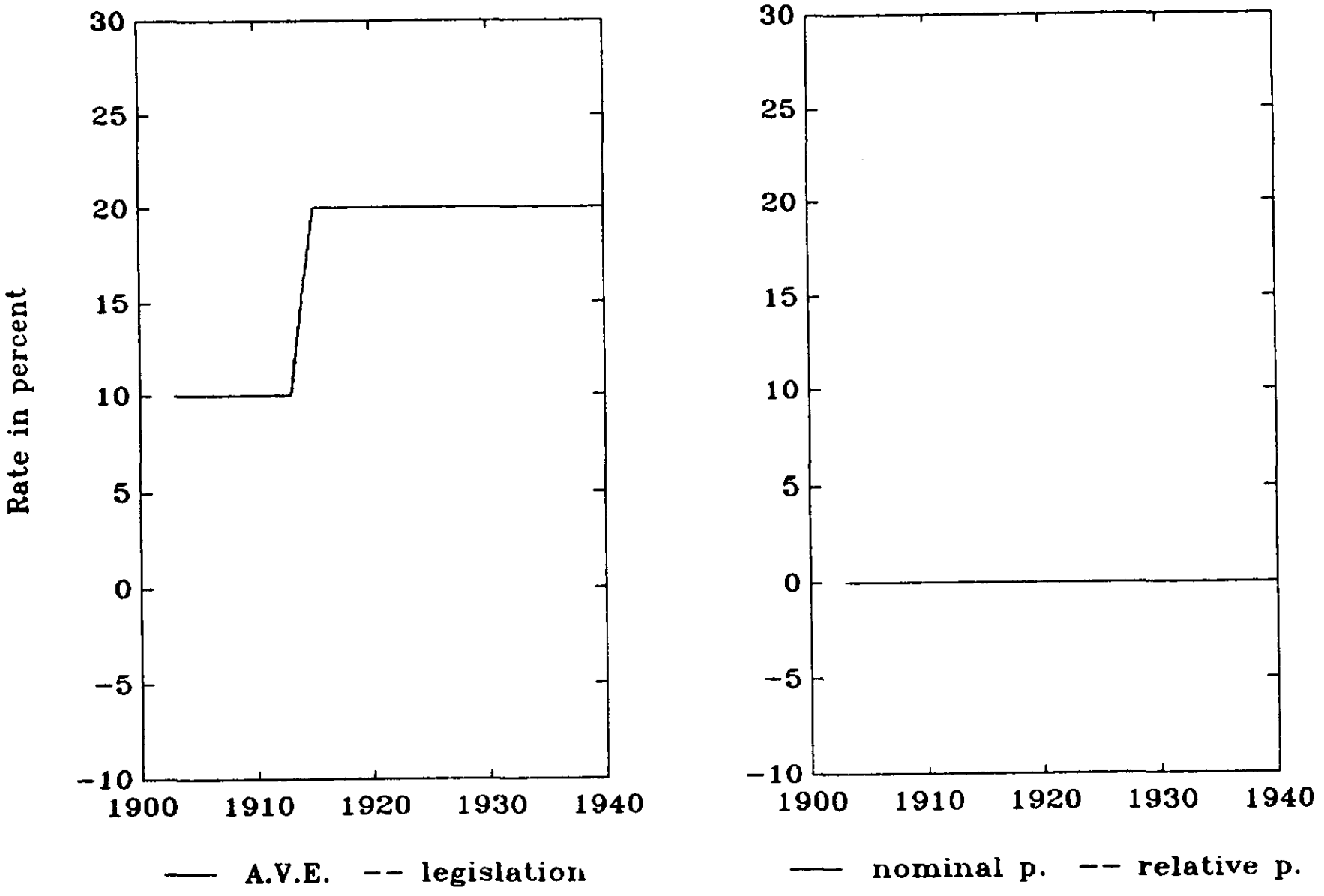


**Figure 3.3**
**Tariff rate decomposition**
**Diamonds**



general price effects became reinforcing and the ad–valorem–equivalent rate rose from about 100 percent to over 200 percent. An excellent contrast of the behavior of ad–valorem–equivalent rates when ad–valorem duties are used in place of specific duties is provided by diamonds. The legislated duty on diamonds was at an ad–valorem rate throughout the sample period and changed from ten percent to twenty percent in 1913. As Figure 3.3 shows, the legislated and ad–valorem–equivalent rates are identical when ad–valorem rates are used and there is no impact of price variation on real tariff rates.

It is clear from the time series behavior of ad–valorem equivalent tariff rates that specific and ad–valorem duties represent fundamentally different forms of taxation. Converting *duties to ad–valorem–equivalent rates obscures the sources and magnitudes of changes in* tariff rates. Changes in ad–valorem rates may always be found by looking at legislative Acts. Changes in the ad–valorem equivalent of a specific duty can only be summarized by a time series.

C. Decomposition of the variance of the tariff rates

The plots of the tariff rate decompositions indicated strong influences on ad–valorem–equivalent rates of both the general price level and individual relative import prices. A natural measure of the relative importance of these two factors is the fraction of variance in the observed ad–valorem–equivalent rates of duty due to each of these factors. In the decompositions that follow, the variances and covariances are computed for the change in the logarithm of the relative and general price components computed as described in the previous section. The path of legislation is omitted from the decompositions since the main impact of these changes is on the mean rather than the variability of ad–valorem–equivalent rates.

Table 5 reports the fraction of the variance of the ad–valorem–equivalent rate due to the variance of the general price level; the variance of the relative price; and the covariation between these two components. On average, more than eighty percent of the variance of the ad–valorem–equivalent tariff rate around its legislated value was due to relative import price changes, and about twenty percent was due to the changing general price level. These figures typically sum to more than one–hundred percent because of the negative

Table 5
Variance Decompositions

| Commodity | General Price | Relative Price | Covariation |
|---|---|---|---|
| Almonds | 0.1667 | 0.8628 | -0.0295 |
| Brazil & Cream | 0.0601 | 0.8278 | 0.1121 |
| Bristles | 0.3206 | 0.7432 | -0.0638 |
| Burlap | 0.1673 | 0.9571 | -0.1244 |
| Castor beans | 0.0953 | 0.8721 | 0.0326 |
| China clay or kaolin | 0.1865 | 0.8672 | -0.0538 |
| Cigar & cheroots | 0.1637 | 0.4741 | 0.3622 |
| Cigar filler, stemmed, Cuba | 0.2148 | 0.3898 | 0.3954 |
| Cigar filler, unstemmed | 0.1634 | 0.8426 | -0.0060 |
| Cigar filler, unstemmed, Cuba | 0.2156 | 0.3995 | 0.3849 |
| Cigar leaf wrapper | 0.1294 | 0.9514 | -0.0808 |
| Cigarette paper | 0.0000 | 0.0000 | 0.0000 |
| Coconuts | 0.1513 | 0.7299 | 0.1188 |
| Dates | 0.0776 | 0.7755 | 0.1469 |
| Diamonds | 0.0000 | 0.0000 | 0.0000 |
| Egg yolk, dried | 0.0038 | 0.9709 | 0.0252 |
| Egg yolk, nspf | 0.0114 | 0.8571 | 0.1315 |
| Feathers, ostrich | 0.0000 | 0.0000 | 0.0000 |
| Feathers, for beds | 0.0000 | 0.0000 | 0.0000 |
| Flaxseed | 0.0231 | 0.8836 | 0.0934 |
| Matches in boxes | 0.0414 | 1.0116 | -0.0530 |
| Mercury | 0.0645 | 0.9328 | 0.0027 |
| Quebracho | 1.2926 | 1.5094 | -1.8020 |
| Soap, Castille | 1.2572 | 1.7207 | -1.9779 |
| Sugar, Cuban, 95° | 0.1433 | 0.6719 | 0.1848 |
| Sugar, Cuban, 96° | 0.1774 | 0.6851 | 0.1375 |
| Sugar, Cuban, 97° | 0.2956 | 0.4949 | 0.2095 |
| Sugar, Cuban, 100° | 0.1281 | 0.6363 | 0.2355 |
| Toilet water, perfumed | 7.1884 | 12.6468 | -18.8353 |
| Tracing cloth | 0.0237 | 0.7944 | 0.1819 |
| Vanilla beans | 0.0462 | 0.9605 | -0.0067 |
| Walnuts | 0.2045 | 0.8803 | -0.0848 |
| Average | 0.2157 | 0.8408 | -0.0566 |
| Standard deviation | 0.3103 | 0.2787 | 0.5378 |

covariance between changes in the general price level and individual relative prices. The proportion of variance accounted for by these two components varies across the individual commodities but in all cases the relative price component explains the greatest proportion of the variance in the ad–valorem–equivalent rate.

As demonstrated earlier, the general price component differs across commodities by only a scale factor equal to the specific rate of duty in the year 1922. As a result, this component of the ad–valorem–equivalent tariff rate is perfectly correlated across all commodities. If relative prices never changed, the movements of the ad–valorem–equivalent rates around their legislated values would be perfectly correlated across all imported commodities. However, Table 5 reveals that relative price variation explains a much larger fraction of the variability of the ad–valorem–equivalent rates than does general price variation. The combination of the greater variability of the relative price component of the ad–valorem–equivalent rates and its lower correlation across individual commodities (compared to the general price component) is responsible for most of the heterogeneity in tariff histories across individual commodities in the dataset.

D. The changing cross–sectional mean and variance of tariff rates

The previous section showed that individual tariff rates varied substantially over time and that individual tariff histories contained a sizeable idiosyncratic component. In this section we examine the time series behavior of both the average and standard deviation of tariff rates in the cross-section. Figure 4 plots the cross–sectional mean and standard deviation of the ad–valorem–equivalent tariff rates for the commodities in our dataset; the correlation between these two time series is 0.76. One explanation for this positive relationship between the mean and variability of tariff rates is that legislators increased all duties in equal proportion. While this could explain the relationship for the years of legislative change, the statistical relationship is not confined to these years. Rather, this relationship stems from the fact that specific duties were the predominant source of tariff revenue for these commodities. To see this, consider the case in which all duties are specific and the ratio of future to current import prices is the same across goods and across time, $P_{jt+1}/P_{jt} = \pi$ for all $j$. Then, the relationship

between the cross–sectional mean and standard deviation can be derived as follows :

$$\sigma_t^2 = \frac{1}{n}\sum_j \left(\frac{\omega_{js}}{P_{jt}}\right)^2 - \left(\frac{1}{n}\sum_j \frac{\omega_{js}}{P_{jt}}\right)^2$$

$$\sigma_{t+1}^2 = \frac{1}{n}\sum_j \left(\frac{\omega_{js}}{\pi P_{jt}}\right)^2 - \left(\frac{1}{n}\sum_j \frac{\omega_{js}}{\pi P_{jt}}\right)^2$$

$$\sigma_{t+1}^2 = \left(\frac{1}{\pi}\right)^2 \sigma_t^2 \quad \text{and } \mu_{t+1} = \frac{1}{\pi}\mu_t$$

$$\text{or} \quad log\sigma_{t+1} - log\sigma_t = log\mu_{t+1} - log\mu_t$$

In the special case of constant relative prices, the correlation between the cross–sectional mean and standard deviation is unity. In practice, the relationship is weaker since relative prices and legislated rates of duty change over time. For the commodities in the dataset, the aggregate price level influence is sufficiently strong to generate the predicted pattern.

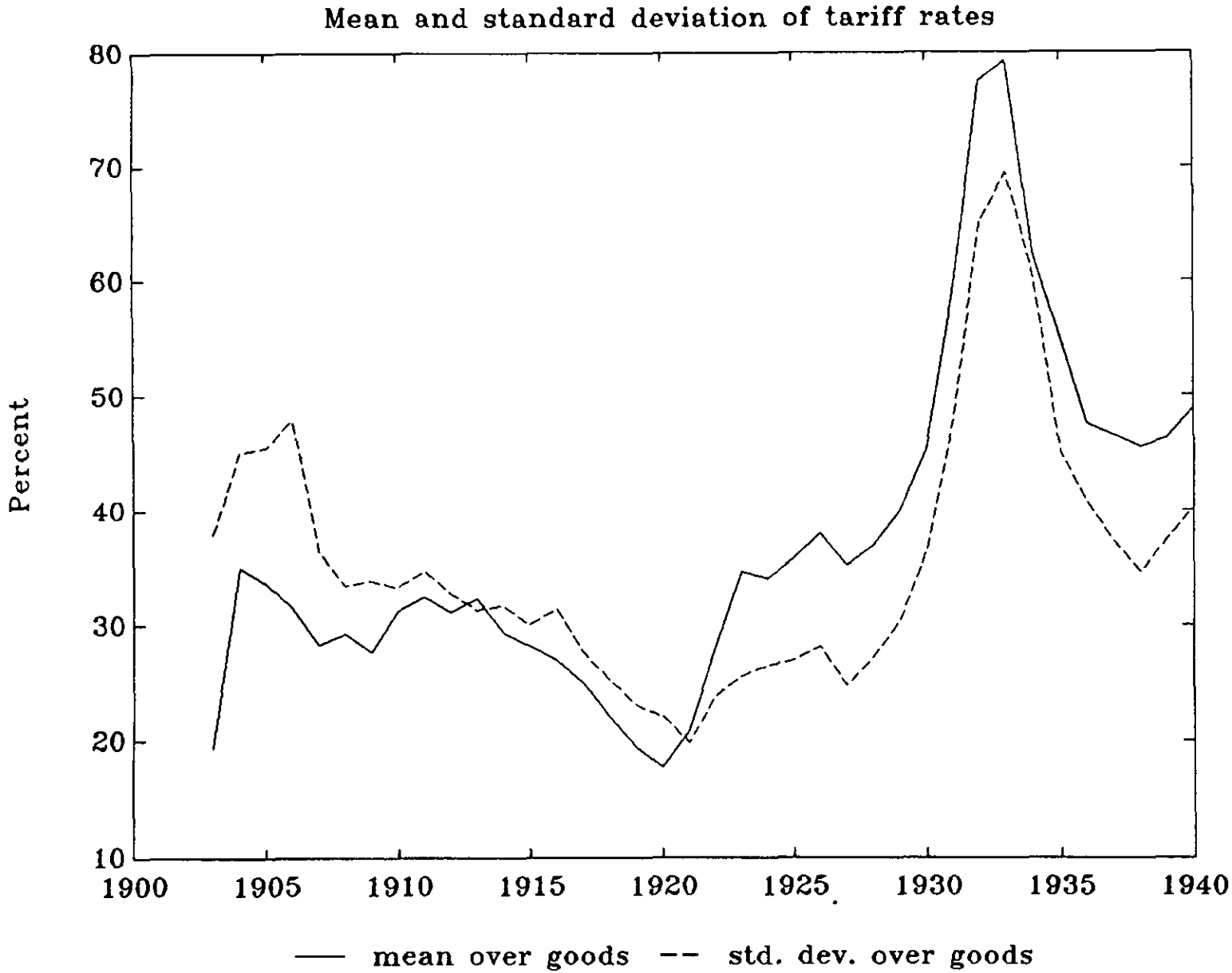
Under a system of specific duties cross–sectional differences in tariff rates at dates of legislative amendment will be reduced if followed by price inflation and increased if followed by price deflation. For example, the cross–sectional differences in tariff rates passed in 1913 were eroded by the inflation of World War I while those passed in 1930 were exacerbated by the deflation of the 1930's (see Figure 4). This provides part of the explanation for the greater number of commodities subject to prohibitive duties in the 1930's compared to the period immediately following World War I.

E. Effects of tariffs on individual imports

It is natural to suppose that the variation in ad–valorem–equivalent rates induced by specific duties and price level variation was reflected in variation in quantities imported. This section investigates this hypothesis. In addition we investigate whether legislated tariff rates alone are important determinants of the quantity imported.

Toward this end we compare two simple linear relationships in the standard deviations of the log differences of the data. The equations and estimation results are given by equations (4) and (5) below. Notation is as follows : $\sigma_z$ refers to the standard deviation of

**Figure 4**


Mean and standard deviation of tariff rates
Percent
80
70
60
50
40
30
20
10
1900
1905
1910
1915
1920
1925
1930
1935
1940
mean over goods
std. dev. over goods

the log difference of $z$ and the standard errors are in parentheses. As before, $\tau^*$ is the ad-valorem-equivalent rate of duty which will include variation due to legislative changes and price changes while $\tau_j^L$ is constructed, as in Section 3, to isolate the legislated changes in tariff rates. The variable $q_j$ is the physical quantity imported and $p_j$ is the price of import good $j$ relative to the GNP deflator. Although the domestic price of the imported good is the world price marked up by the amount of the tariff, we enter these two components separately in the regressions below in order to allow prices and tariffs to have different effects on imports. These difference may arise if different information is contained in prices and tariff rates, as discussed further below.

$$\sigma_{q_j} = 0.007 + 1.24\sigma_{p_j} + 4.43\sigma_{1+\tau^*_j} + \epsilon_j \tag{4}$$
$$(0.155) \quad (0.530) \quad (1.70) \qquad \bar{R}^2 = 0.32$$

$$\sigma_{q_j} = 0.113 + 1.55\sigma_{p_j} + 3.22\sigma_{1+\tau^L_j} + \eta_j \tag{5}$$
$$(0.183) \quad (0.566) \quad (4.63) \qquad \bar{R}^2 = 0.18$$

The most obvious difference between these two regressions is the relative size of the standard errors on the coefficients of the tariff variables. The standard error of the coefficient on the legislated tariff variable is almost three times that on the ad-valorem-equivalent tariff variable, which suggests that more precise measurement of the relevant tariff rate can sharpen inferences about the effect of tariffs on the quantity demanded. By including the influence of price movements on the real tariff rate, the ad-valorem-equivalent rate achieves this task.

The second notable feature of these results is that, in equation (4) the coefficient on tariff volatility is more than three times larger than the coefficient on price volatility. This is the same pattern of coefficients that arises in many import demand studies when the price and tariff rate variables are entered separately. Balassa (1967) attributed this difference to the possibility that importers regard price movements as more transitory than the changes in tariff rates and reallocate purchases accordingly. When specific duties are used, the ad-valorem rate is affected by movements in legislated rates, the general price level, and the relative price of imports. It is apparent from inspection of the plots of the ad-valorem-equivalent tariff rate decompositions that these three components are not equally

persistent. Given this observation our disaggregated data, along with the decompositions, could by used to construct a formal test of Balassa's conjecture about the different effects of price and tariff variation on the quantity of imports.

## IV. What does the aggregate tariff rate measure?

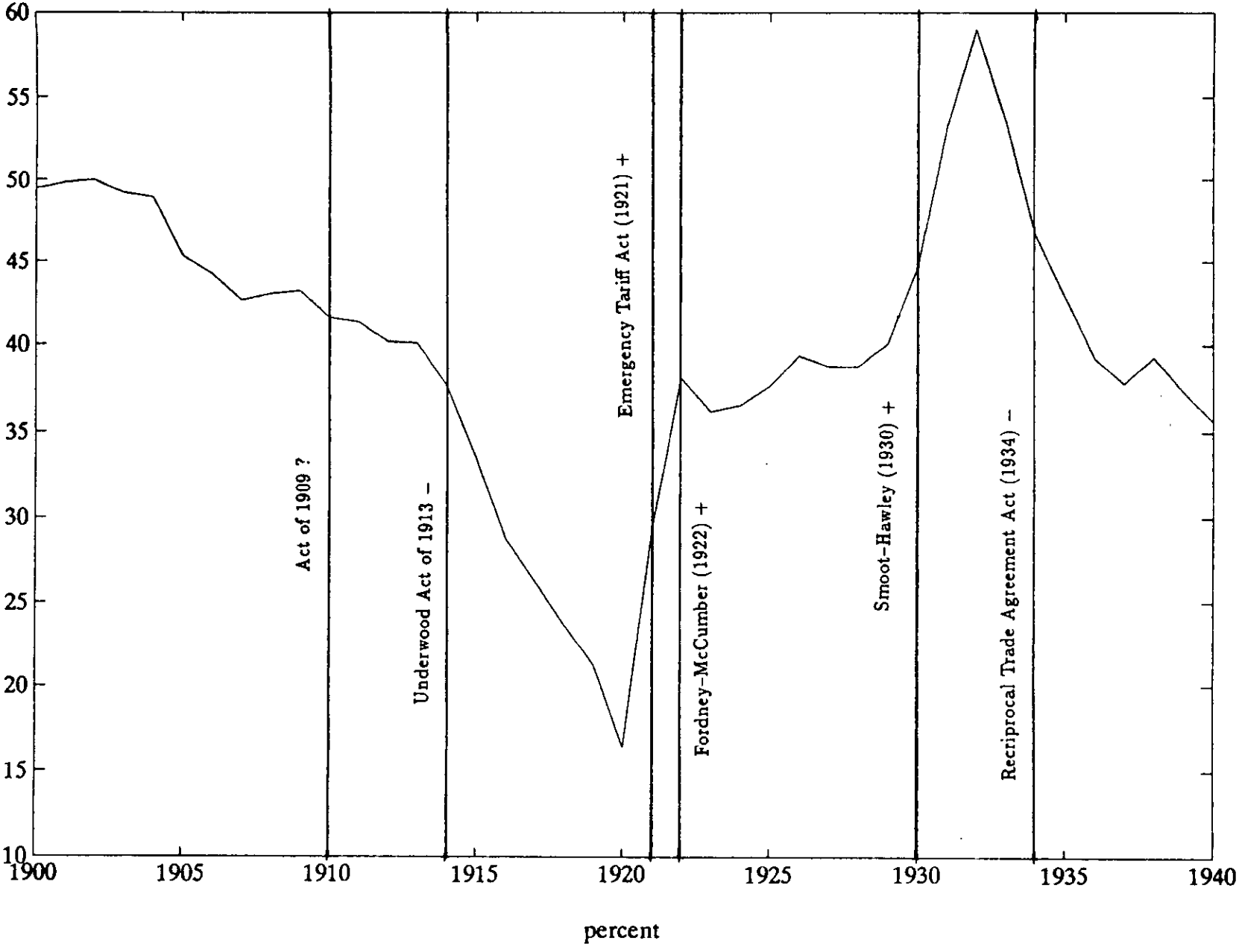
The aggregate U.S. tariff rate is commonly defined as the ratio of customs duties collected to either total imports or total dutiable imports. These variables have been used to proxy for the marginal U.S. tariff rate in recent studies by Dornbusch and Fischer [1984], Eichengreen [1989], Gardner and Kimborough [1988] and Ostry and Rose [1989]. In this section qualitative information available at the aggregate level is combined with data on individual commodities to address a number of important questions about the aggregate U.S. tariff rate. First, is the aggregate U.S. tariff rate informative about the overall intent of legislation? Second, do the influences of changing import shares or import prices play a pivotal role in driving the aggregate tariff rate? Third, how much cross–sectional information is sacrificed in the calculation of this rate?

### A. Legislated changes in tariff rates

For the commodities in the dataset, the peaks and troughs in the ad–valorem equivalent rate rarely occurred in years in which legislation was changed. This was due to the impact of prices on the ad–valorem rates when duties are specific. It is possible that the aggregate tariff rate, by averaging the idiosyncratic differences in tariff rates across individual commodities, will nevertheless exhibit peaks and troughs at dates of legislative change. However, this is not the case as Figure 5 indicates : a trough in the aggregate ad–valorem–equivalent rate occurs in 1920, seven years after the tariff reductions of 1913, and a peak occurs in 1932, two years after the passage of the famous Smoot–Hawley tariff bill.

**Figure 5**

Aggregate US tariff rate and dates of legislative change



B. Changing import shares

The influence of import shares on the aggregate tariff rate is difficult to assess independently of relative prices and tariff rates. If permanent increases in tariffs on a particular good lead to permanent decreases in the good's import share, the aggregate tariff rate will understate the true level of the distortion. If import shares change for reasons other than changes in the tariff rate (e.g., changing tastes or technology) then one can say very little about the accuracy of the aggregate tariff rate as a proxy for the marginal tariff rate.

The disaggregated data can be used to provide an indirect measure of the effect of import shares on the aggregate U.S. tariff rate. To evaluate the impact of changing import shares on measures of average ad–valorem–equivalent rates, we calculate the average tariff rate for goods in the dataset using both time–varying import shares and constant import shares.[9] The two series are plotted in Figure 6. The tariff rates calculated using constant and variable import shares are almost coincident over the entire period with the notable exception of the years surrounding the passage of Smoot–Hawley. During these years the average tariff rate calculated at constant import shares exceeds the variable–weighted average by about twenty-five percent. If agents substitute from highly taxed imports to imports subject to lower tax rates this is exactly the pattern we would expect to observe. Thus, judging by the thirty-two imports in the dataset, the change in the aggregate tariff rate during the period 1930 to 1931 may understate the impact of the Smoot–Hawley tariff by about twenty–five percent.

C. General price level changes

During the first half of this century there was substantial price level variation, including the inflation of World War I and the rapid deflation during the Great Depression. When specific duties are prevalent, the ad–valorem–equivalent rate will decline in proportion to increases in the nominal price, and conversely.

[9] The base period used here is the same as was used for the tariff decompositions. Import shares are averaged over the 1922 to 1931 period.

**Figure 6**

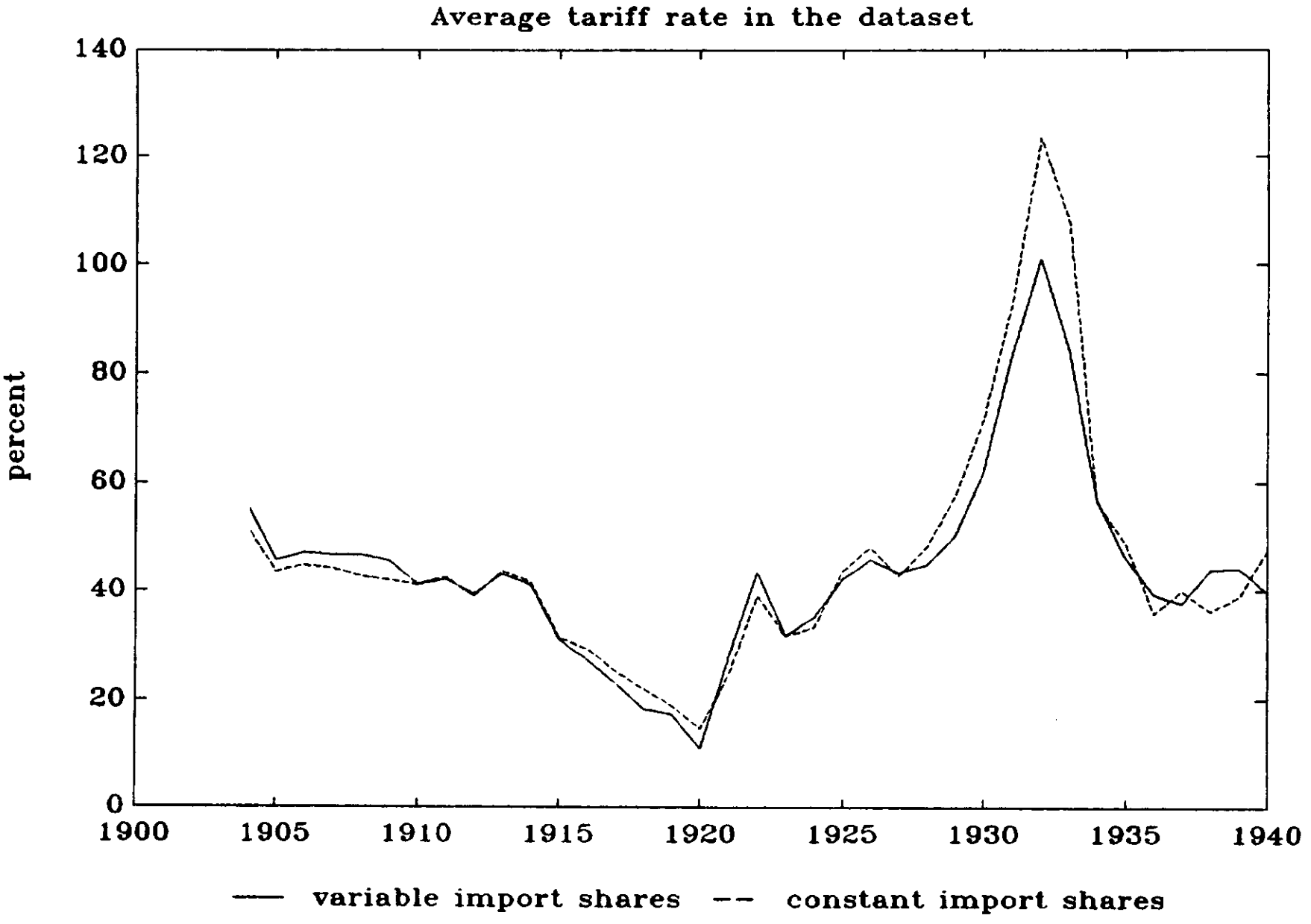

Average tariff rate in the dataset
140
120
100
80
60
40
20
0
percent
1900
1905
1910
1915
1920
1925
1930
1935
1940
variable import shares
constant import shares

**Figure 7**


US tariff and rate predicted by changes in import prices
percent
60
55
50
45
40
35
30
25
20
15
1900
1905
1910
1915
1920
1925
1930
1935
1940
___ actual US tariff rate --- predicted tariff rate

The importance of price movements in explaining the behavior of the aggregate tariff rate can be assessed in the following manner. Consider the hypothesis that legislative rates remained constant over the 1903 to 1940 period and that the large movements in ad-valorem equivalent rates were due entirely to the impact of movements in import prices on these nominally denominated duties. One way to evaluate this statement is to regress the aggregate tariff rate against a constant term and the inverse of the import price index. The predicted tariff rate from this regresssion is presented along with the actual aggregate ad-valorem equivalent rate in Figure 7. In this regression, movements in the import price index account for over sixty percent of the variation of the aggregate ad-valorem-equivalent rate around its average value. Combined with the information on the magnitude of price effects on individual ad-valorem-equivalent rates in the dataset it is reasonable to expect that one half of the movements in the aggregate tariff rate derive from changes in import prices. This estimate indicates a serious deficiency in accounts of the tariff history of the United States that focus only on years in which legislation is amended.

## V. Summary and conclusions

The Smoot-Hawley Tariff Act of 1930 raised duties to their highest levels in about 100 years. The deflation of the 1930's increased rates on commodities subject to specific duties even further. The scope of commodities affected was broad ranging from sugar to diamonds. In terms of the magnitude of the changes in duties and the levels reached, Smoot-Hawley was without historical precedent!

The heights reached by tariff rates in the 1930's represent the high-water mark of U.S. commercial policy, but it is essential to consider Smoot-Hawley in a broad historical perspective. The erosion of the real value of specific duties resulting from the inflation of World War I decreased the aggregate tariff rate from 33 percent in 1915 to 16 percent in 1920, its lowest level in over one hundred years. The legislated increases contained in the Tariff Acts of 1921 and 1922 returned the aggregate rate to the level existing before the War. In contrast, Taussig describes these pieces of legislation as "an extreme of protection which few had thought possible."[10] Finally, the "skycraper" description of Haberler is

[10] Taussig (1931), p. 453

more accurate for the level reached in 1932, two years after Smoot–Hawley. In fact, of the 21 point rise from 38 percent in 1922 to a century high of 59 percent in 1932 only 8 points — about one–third — of this change occurred between 1930 and 1931. Most of the increase resulted from declining import prices between 1926 and 1932.

The large increases in U.S. tariff rates during the interwar period and the retaliation that took place in the 1930's must have contributed something to the collapse of world trade during the Great Depression. Total imports of seventy–five countries fell from about 3 billion dollars (in old U.S. gold dollars) in January 1929 to just under 1 billion dollars in January 1933 while nominal income fell by about 50 percent percent in the U.S. (and by less in most other industrialized countries) over the same period.[11]

A factor which cannot be ignored when considering the impact of tariffs on the volume of world trade is the dramatic rise in the importance of the United States as a creditor nation during World War I. Between 1908 and 1919 the net foreign investment position of the United States changed from - 3.9 billion to + 6.4 billion. The increase of 10.3 billion represented 12 percent of Gross National Product in 1918.[12] Most of this increase resulted from extraordinarily large trade balance surpluses (primarily with the United Kingdom) during the War.

International markets provide not only trade in differentiated products but also trade over time. The ability to borrow and lend in international capital markets contributed to the rapidity with which allied countries built and restored their military capabilities. Following the War the need for capital was also great, but for a different reason. The devastation of Europe during the War initiated massive reconstruction. Neoclassical investment theory predicts that in such a situation physical capital should flow from the United States to Europe.[13] But the capital flows from the United States to the rest of the

---

[11] Trade figures are taken from Kindleberger (1973), p. 172

[12] Source : Historical Statistics of the United States : Colonial Times to 1970.

[13] Baxter and Crucini (1991) study the importance of this investment channel in understanding international savings and investment behavior during the postwar period.

world from 1920 through 1929 were about half the size of those during the War. Why were capital flows so small in the years following the War?

One possibility is that by continously increasing tariff rates during the interwar period, the U.S. depressed economic activity abroad. The reprecusions for the U.S. economy would involve a shrinking market for its exports and the inability of debtor countries to meet payments on their U.S. obligations. Retaliation by other countries only aggravated matters. Determining the quantitative effect of the consumption and production inefficiencies resulting from the increases in tariffs themselves, combined with the influence of these changes on international investment will form the basis for future research.[14]

The empirical analysis in this paper has revealed a very different tariff history than has previously been told. Tariff increases were not confined to changes in legislated rates but also resulted from declines in import prices. The passage of the Smoot–Hawley Tariff was important but it did not begin nor did it end the substantial rise in tariff rates in the United States between 1920 and 1932.

The Great Depression presents monetary phenomenon unique in United States history, but the exceptional declines in the stock of money or the dramatic reduction in the size of the banking system do not exhaust the phenomena unique to this period. In the 1920's and 1930's there were increases in tariff rates unprecedented in United States history. These changes in commerical policy came at a time when legislators had more efficient methods of taxation at their disposal such as the income tax. In spite of this, record high taxes on imports were chosen at a point in history when many countries needed U.S. capital. The tariff increases and the retaliation that followed provide a dramatic episode to study the macroeconomic effects of commerical policy. With the passage of time it is easy to forget that post–World War II trade liberalization was "driven by the pro–trade bias generated by the negative example of the Smoot–Hawley tariff".[15]

---

[14] Crucini and Kahn (1990) develop a dynamic mulitsector two–country model which focuses on the real trade effects of the path of tariffs and retaliation during the interwar period. Preliminary results indicate that both unilateral and retaliatory tariff increases reduce aggregate output in this neoclassical model. It would be a straighforward matter to incorporate real international bonds into this framework.

[15] Balassa (1988), p. 87

## Appendix A

## Data Appendix

All data is at the annual frequency.

Aggregate tariff rates. Years 1821 through 1957, series U19 (ratio to total imports) and U20 (ratio to dutiable imports). The Statistical History of the United States : Colonial Times to the Present. From 1958 through 1986, the Statistical Abstract of the United States, selected issues.

Value of dutiable imports. Sample : 1821 to 1957, series U17, The Statistical History of the United States : Colonial Times to the Present.

Wholesale price index. Years 1821 through 1890, Warren and Pearson, all commodities then Bureau of Labor from 1891 to 1957. Reported as series E 1 and E 13 respectively from The Statistical History of the United States : Colonial Times to the Present.

Government revenues. Sample 1821 to 1957, total receipts, series Y 259 and customs receipts, series 259 from The Statistical History of the United States : Colonial Times to the Present.

Individual commodity data. Quantities, values and legislated rates of duty as reported in Foreign Commerce of the United States, annual volumes from 1903 through 1940.

**Table A – 1**
**Tariff Schedule Changes 1903 to 1930**

| Date of Legislation | 1903 | 1909 | 1913 | 1921 | 1922 | 1929 | 1930 |
|---|---|---|---|---|---|---|---|
| Almonds | 6¢ | - | 4¢ | - | 14¢ | - | 16½¢ |
| Brazil & Cream | free | - | 1¢ | - | - | - | 4½¢/1½¢ |
| Bristles | 7½¢ | - | 7¢ | - | - | - | 3¢ |
| Burlap | 5/8 + 15% | 9/16 + 15% | free | - | 1¢ | - | - |
| Castor beans | 25¢ | - | 15¢ | - | 25¢ | - | - |
| China clay or kaolin | $2.50 | - | $1.25 | - | $2.50 | - | - |
| Cigar & cheroots | $4.50 + 25%$^p$ | - | - | - | - | - | - |
| Cigar filler, stem., Cuba | 50¢$^p$ | - | - | - | - | - | - |
| Cigar filler, unstem. | 35¢ | - | - | - | - | - | - |
| Cigar filler, unstem., Cuba | 35¢$^p$ | - | - | - | - | - | - |
| Cigar leaf wrapper | $1.85 | - | - | $2.35 | $2.10 | - | $2.275 |
| Cigarette paper | free | 60% | 50% | - | 60% | - | - |
| Coconuts | free | - | - | - | ½¢ | - | - |
| Dates | ½ | 1¢ | - | - | - | - | 1¢/2¢ |
| Diamonds | 10% | - | 20% | - | - | - | - |
| Egg yolk, dried | 10% | - | - | - | 18¢ | | 27¢$^a$ |
| Egg yolk, nspf | 10% | - | - | - | 6¢ | 6½¢ | 7½¢ |
| Feathers, ostrich | 15% | 20% | - | - | - | - | - |
| Feathers, for beds | 15% | 20% | - | - | - | - | - |
| Flaxseed | 25¢ | - | 20¢ | 30¢ | 40¢ | 56¢ | 65¢ |
| Matches in boxes | 8¢ | 6¢ | 3¢ | - | 8¢ | - | 20¢ |
| Mercury | 7¢ | - | 10% | - | 25¢ | - | - |
| Quebracho | ½¢ | ½¢/¾¢ | free | - | 15% | - | - |
| Soap, Castille | 1¼¢ | - | 10% | - | 15% | - | - |
| Sugar, Cuban, 95° | 1.65¢$^p$ | - | 1.23¢$^p$ | 1.96¢$^p$ | 2.16¢$^p$ | - | 2.4625¢$^p$ |
| Sugar, Cuban, 96° | 1.685¢$^p$ | - | 1.265¢$^p$ | 2.00¢$^p$ | 2.206¢$^p$ | - | 2.50¢$^p$ |
| Sugar, Cuban, 97° | 1.72¢$^p$ | - | 1.282¢$^p$ | 2.04¢$^p$ | 2.252¢$^p$ | - | 2.5375¢$^p$ |
| Sugar, Cuban, 100° | 1.36¢$^p$ | - | - | 2.16¢$^p$ | 2.39¢$^p$ | - | 2.65¢$^p$ |
| Toilet water, perfumed | 15¢ | 50% | 30% | - | - | - | - |
| Tracing cloth | 5¢ + 20% | - | 30% | 7¢ + 30% | 5¢ + 20% | - | - |
| Vanilla Beans | free | - | 30¢ | - | - | - | - |
| Walnuts | 5¢ | - | 4¢ | - | 12¢ | - | 15¢ |

Notes : $p$ refers to a 20% preference, $d$ - changed in 1931. Data sources : *Foreign Trade and Navigation of the United States* : years 1903 through 1940.

**Table A – 1**
**Tariff Schedule Changes 1931 to 1940**

| Date of Legislation | 1934 | 1936 | 1937 | 1939 | 1940 |
|---|---|---|---|---|---|
| Almonds | - | - | - | - | - |
| Brazil & Cream | - | $2\frac{1}{4}¢/\frac{3}{4}¢$ | - | - | - |
| Bristles | - | - | - | - | - |
| Burlap | - | - | | - | - |
| Castor beans | - | - | - | - | - |
| China clay or kaolin | - | - | - | $1.75 | - |
| Cigar & cheroots | $2.25 + $12\frac{1}{4}\%$ | *a* | $4.50 + 25\%^p$ | - | - |
| Cigar filler, stem., Cuba | 25¢ | *b* | $50¢^p$ | - | - |
| Cigar filler, unstem. | - | - | - | 35¢/30¢ | - |
| Cigar filler, unstem., Cuba | $17\frac{1}{2}¢$ | $35¢^p$ | - | - | - |
| Cigar leaf wrapper | - | - | $1.50 | - | - |
| Cigarette paper | - | - | 45% | - | - |
| Coconuts | - | - | - | $\frac{1}{4}¢$ | - |
| Dates | - | - | - | - | - |
| Diamonds | - | - | - | - | - |
| Egg yolk, dried | - | - | - | - | - |
| Egg yolk, nspf | - | - | - | - | - |
| Feathers, ostrich | - | - | - | - | - |
| Feathers, for beds | - | - | - | - | - |
| Flaxseed | - | - | - | - | - |
| Matches in boxes | - | $17\frac{1}{2}$ | - | - | - |
| Mercury | - | - | - | - | - |
| Quebracho | - | - | - | - | - |
| Soap, Castille | - | - | - | - | - |
| Sugar, Cuban, 95° *c* | * | * | * | * | 1.37775¢ |
| Sugar, Cuban, 96° *d* | * | * | * | * | * |
| Sugar, Cuban, 97° *e* | * | * | * | * | * |
| Sugar, Cuban, 100° *f* | * | * | * | * | * |
| Toilet water, perfumed | - | - | - | - | - |
| Tracing cloth | - | - | - | - | - |
| Vanilla Beans | - | - | 15¢ | - | - |
| Walnuts | - | - | - | - | - |

Notes : *a* - $4.50 + 25\%^p$ or $2.25 + 12\frac{1}{4}\%$. *b* - 50¢ – 20% or 25¢. Notes *c* through *f* refer to two–part duties on sugar. Volumes above a certain quota were subject to a higher duty. *c* - 1934 $1.846875, 1935-1937 - $0.8865, 1938-1939 - $0.9, 1940 - $1.37775 *d* - 1934 - $1.875^p, 1935-1937 0.90, 1938 - $1.4, 1939 - $2.0/$1.5, 1940 - $0.9/$1.4. *e* - 1934 - $1.89936^p, 1935-1938 $0.9135, 1939 - $1.5225/$2.03125, 1940 - $0.9135/$1.42225. *f* - 1934 - $1.9875^p, 1935-1937 0.954, 1938 - $1.489, 1939 - $2.125/$0.954, 1940 - $0.954/$1.489.

## Appendix B

### A Brief Tariff History of the United States 1789 – 1935

This appendix provides a summary of the voluminous material written by Taussig [1931] about the economic and political tariff history of United States.

From 1821 to 1986 data are available on the average rate of tariff in the United States, calculated as the ratio of total duties collected to either dutiable imports or total imports. Figures 4–A and 4–B plot these variables over the 1821 to 1900 and the 1901 to 1986 periods respectively. The vertical bars indicate dates at which tariff legislation was amended. The positive and negative signs and question marks next to the labels indicate the overall impression of each tariff act as increasing, decreasing or leaving unchanged some broad notion of protection. These impressionist views are extrapolated from Taussig's book on the tariff history of the U.S.

The first national tariff act that was "protective in spirit and intent" was that of 1789. This act imposed a general five percent duty and a few specific duties on such items as : hemp, manufactures of iron, glass, tea, coffee and sugar. Duties remained steady until 1809 when the Non–Intercourse Act was passed. This Act prohibited trade with England and doubled duties on all imports during the War of 1812. The duties were very restrictive serving to increase domestic production in import competing sectors — notably manufactures. The growth of manufacturing nutured by these tariffs was to prove a serious barrier to reductions in tariffs at the end of the War.

After the War, instead of returning duties to their pre–war levels, legislators passed still higher duties on the grounds that the huge War debts had to be reduced. When England returned to the world market, after the Napoleonic Wars, world prices fell dramatically and in 1819 prices began to fall even more rapidly in the United States. On the heels of this deflation came the Tariff Act of 1824 which increased duties on iron, lead, wool, hemp, cotton bagging, textile fabrics and woolens. The aggregate tariff rate increased about nine percent in 1824.

Over the period from 1824 to 1857 tariff rates were changed at average intervals of four years. As is apparent from Figures 4-A and 4-B, tariffs showed a rapid increase from 1821 to 1830, from 45 percent to a historic high of about 62 percent, followed by a gradual but dramatic decline to 19 percent in 1860. This remarkable decline was largely the result of the Tariff Act of 1833 which called for gradual declines in tariff rates such that by July, 1842, tariff rates would stand at less than 20 percent. This process of liberalization was briefly but sharply interupted when the Tariff Act of 1842 imposed generally higher tariffs. Following this, government surpluses leading up to 1857 motivated a tariff cut which brought the country closer to free trade than at any other point in the nineteenth century. The average rate of duty on dutiable imports was only 22 percent in 1857.

The period from 1861 to the beginning of World War I witnessed a return to the high level of tariffs of the early 1800's. As is evident from Figure 4 - A, in 1862 and 1865, average duties increased by 17 percent and 11 percent respectively. The higher duties were

accompanied by other taxes designed to help finance the Civil War. [16] From 1862 to 1914, liberalization was pursued three times, in 1872, 1894 and 1914. Tausigg does not mention any legislation that was obviously protective over this period so the fact that tariffs did rise, (see Figure 4 - A) even in the face of these three reductions, suggests that the impact of price deflation on specific rates of duty over the years 1890 to 1900 may have been responsible for the overall upward trend in effective protection.

From about 1900 to the end of World War II, the time series behaviour of the average tariff rate is markedly different from the earlier period. The movements in the tariff rate is dominated by low frequency movements, summarized by three massive swings. The first swing was sharply downward lasting from 1900 to 1920. During this twenty year period, there was no significant change in tariff legislation. Two exceptional circumstances of the period were : the United States involvement in the War and the rapid rise in import prices, particularly over the years, 1914 to 1919. The second swing in tariff rates involved an increase from a low of 16.4 percent in 1920 to a high of 59 percent in 1932. The major pieces of tariff legislation were : The Emergency Tariff Act of May 27, 1921, the Fordney–McCumber Act of September 19, 1922 and the Smoot–Hawley Act of June 1930. The last great movement in tariff rates occurred between 1933 and 1947 with only one revision to the tariff schedules in 1935. In 1935, the Trade Agreements Act was passed but it is doubtful that this Act was responsible for much of the reduction in duties since between 1935 and 1936 the average tariff rate fell by only about 7.5 percent, accounting for less than 20 percent of the overall decline from 1932 to 1945.

In summary, over the 1821 to 1945 period, the average rate of tariff on United States dutiable imports was about 40 percent. The highest rates were reached in 1830 (61.7%) and 1932 (59%) and the lowest rates were achieved in 1861 (19%) and 1920 (16%). In the postwar period, average tariffs rates have gradually declined over time from 25 percent in 1946 to 5 percent in 1986. The GATT rounds of tariff reductions in 1947 (Geneva), 1949 (Annecy), 1951 (Torquay), 1956 (Geneva), 1960-61 (Dillon), 1964-67 (Kennedy), and 1973-79 (Tokyo), 1986-1990 (Uruguay), are primarily responsible for these reductions (see Bhagwhati, 1988).

[16] The Internal Revenue Act was passed on July 1, 1862 imposing widespread taxes on goods and income.

Figure 4 - A

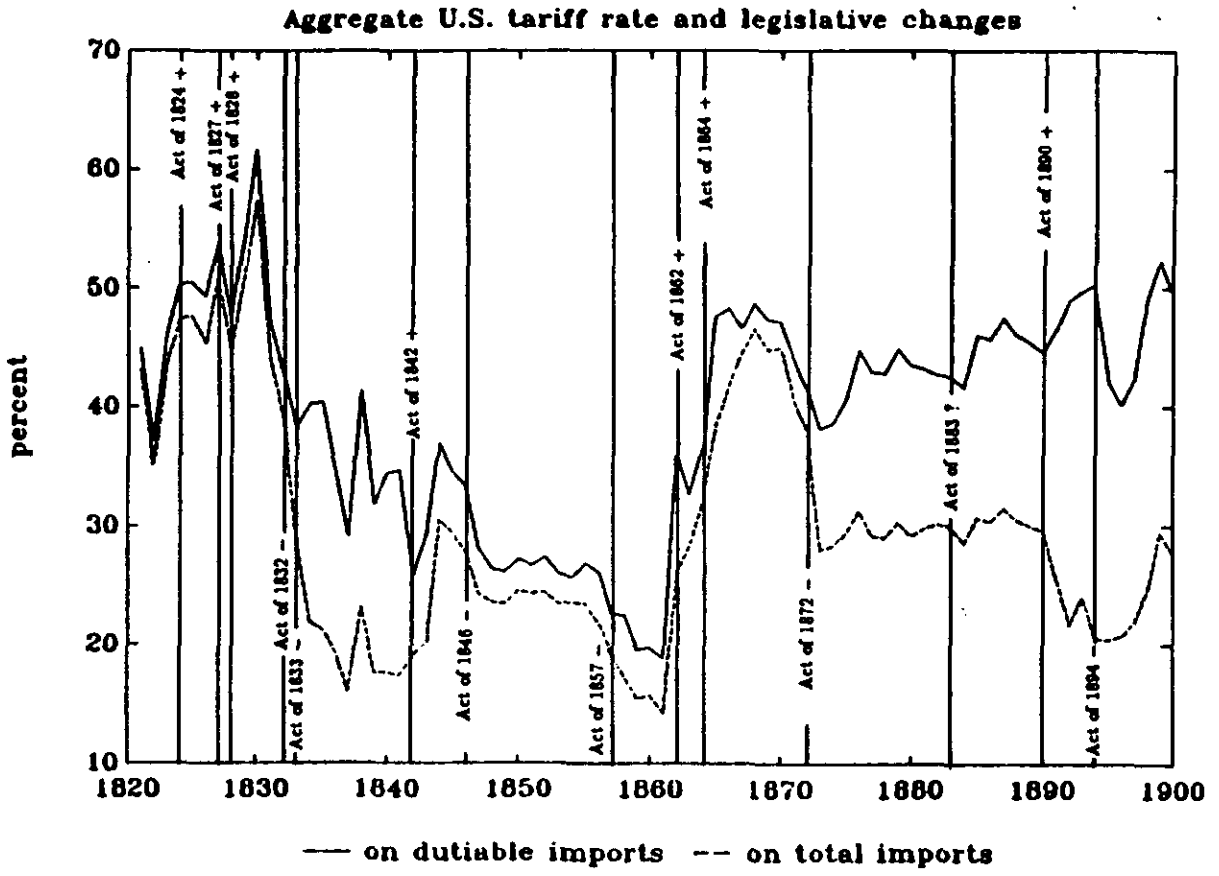
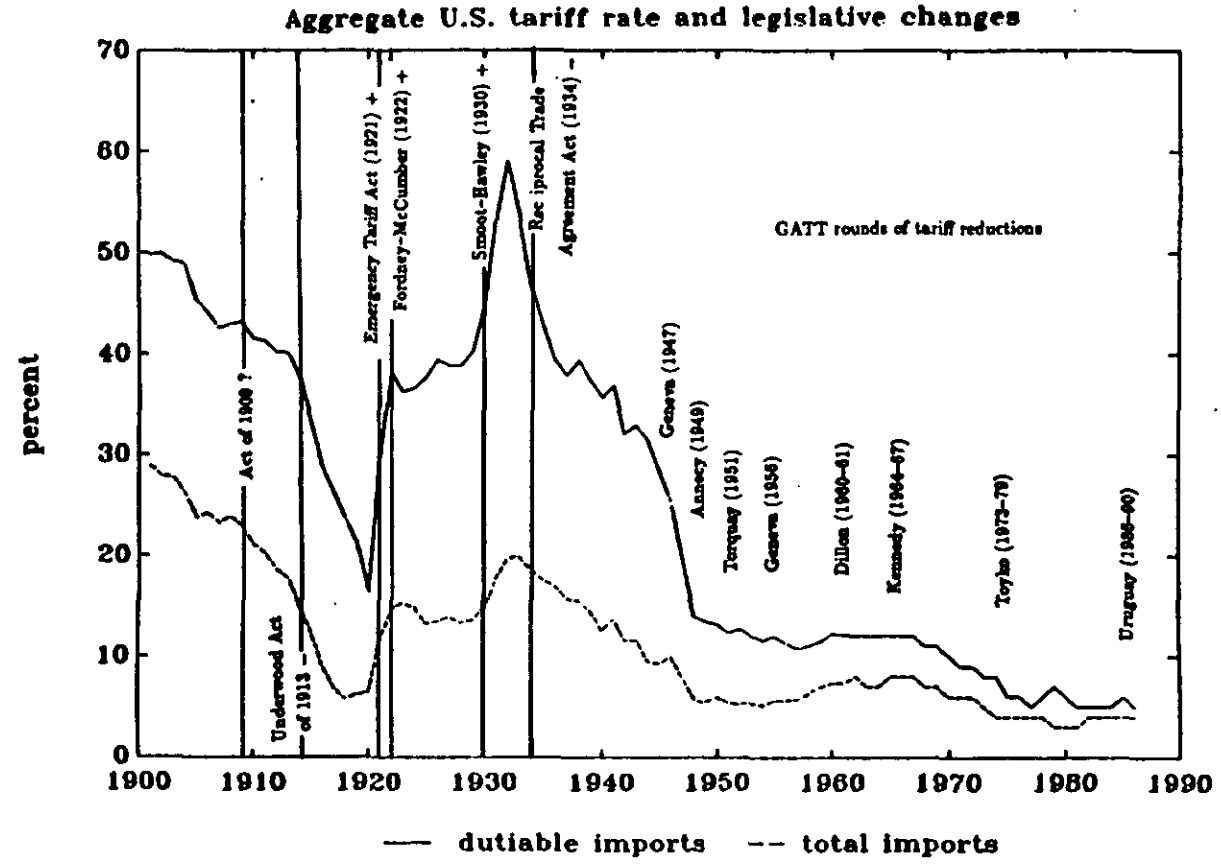



Figure 4 - B



## References


[1] **Baxter, M. and M. J. Crucini,** "Explaining Savings–Investment Correlations," *Rochester Center for Economic Research,* Working paper no. 224, March 1990.

[2] **Berglund A.,** "The Tariff Act of 1930," *American Economic Review,* September 1930, pp. 467 - 479.

[3] **Balassa, B.,** *Trade Liberalization among Industrialized Countries,* Atlantic Policy Studies on Foreign Relations, McGraw–Hill, New York : 1967.

[4] **Bhagwati, J.,** *Protectionism,* The MIT press, Cambridge, 1988.

[5] **Cole, A.,** "The Textile Schedules in the Tariff Act of 1922," *Quarterly Journal of Economics,* November 1922, pp. 29-41.

[6] **Crucini, M. J. and J. Kahn,** "Tariffs and Economic Activity : A Dynamic Equilibrium Analysis," *University of Rochester,* 1990, mimeo.

[7] **Dornbusch, R. and S. Fischer,** "The Open Economy : Implications for Monetary and Fiscal Policy," *National Bureau of Economic Research,* August 1984, Working paper no. 1422.

[8] **Eichengreen, B.,** "The Political Economy of the Smoot–Hawley Tariff," *Research in Economic History,* 1989, 12, pp. 1 - 43.

[9] **Foreign Trade and Navigation of the United States,** *U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce,* selected years.

[10] **Gardner, G. W. and K. P. Kimborough,** "Tariffs Revenues and Tax Regimes," *Duke University,* manuscript, 1988.

[11] **Haberler, G.,** *The World Economy, Money and the Great Depression 1919 - 1939,* American Enterprise Institute : Washington, D.C., 1976.

[12] **Kindleberger, C. P.,** *The World Depression : 1929 - 1939,* Univeristy of California Press, 1986.

[13] **Meltzer, A.,** "Monetary and Other Explanations of the Start of the Great Depression," *Journal of Monetary Economics,* 2, 1976, pp. 458-471.

[14] **Ostry, J. D., and A. K. Rose,** "Tariffs and the Macroeconomy : Some Empirical Evidence," *IMF working paper,* September 8, 1989.

[15] **Ramsey, F.,** "A Contribution to the Theory of Taxation," *Economic Journal,* 37, (1927), pp. 47-61. Reprinted in 1978.

[16] **The Statistical History of the United States : Colonial Times to the Present,** *Fairfield Publishers : Stanford,* 1965.

[17] **Statistical Abstract of the United States,** *U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce,* selected years.

[18] **Taussig, F. W.,** *The Tariff History of the United States,* G.P. Putnam's Sons : New York, 1931, ed. 8.

[19] **United States Tariff Commission,** *Comparison of Rates of Duty in the Tariff Act of 1930 and in the Tariff Act of 1922,* U.S. Printing Office, 1930.

[20] **Viner, J.,** "Taxation and Changes in Price Levels," *Journal of Political Economy,* August 1923, 31, 4, pp. 495-520.