Protection and the British rayon industry during the 1920s

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Abstract

The Finance Act of 1925 imposed upon rayon yarn an excise duty of 1s. per lb. and an import duty of 2s. per lb. This article argues that the difference between the excise and import duties was not intended as classic protection. Rather, the difference was intended only to indemnify British producers for the excise-wrought decline in domestic consumption by means of an offsetting reduction of imports. This article then estimates that, had the rayon duties been removed in 1926, the share of imports in Britain's growing consumption of rayon yarn would have increased from one-tenth to at least one-quarter. Trade policy had secured the domestic market for British rayon firms prior to the formation of an international cartel in 1927. More broadly, this article instantiates that trade policy was considerably distorting the British market for manufactured goods well before the landmark Import Duties Act of 1932.

Introduction

Rayon, one of the classic industries of the Second Industrial Revolution, rose to a position of economic prominence in Britain in the 1920s. Despite the phenomenal growth of the British rayon industry during this decade, there were unmistakable signs of vulnerability in the industry, particularly during the early 1920s.[1] From 1922-5, Britain was a net importer of rayon yarn (*Trade of the United Kingdom*). By the middle of the decade, imports amounted to more than one-third of domestic consumption of rayon yarn (calculated from Harrop, 1968, p. 82; *Trade of the United*

[1] Britain's output of rayon yarn increased eightfold from 1920-9 (Harrop, 1968, p. 82).

Kingdom). Britain's longstanding specialization in textile production hardly ensured a leading position in the emerging (artificial) textile industry of rayon.

Rayon was unique insofar as it numbered among a small selection of British manufacturing industries receiving 'protection'—the applicability of this term to the rayon industry is addressed shortly—prior to the Import Duties Act of 1932.[2] The Customs Duties Act of 1915, the Safeguarding of Industries Acts of 1921 and 1925, and the annual Finance Acts of the late 1920s extended protection to various industries, to the extent that 9 percent of British manufacturing occurred in a protected industry by 1930 (Varian, 2019). Among the pre-1932 protected industries, the largest was motorcars. The effect of protection on this industry has been assessed by Foreman-Peck (1979), who estimated that the McKenna duty on motorcars raised domestic production by at least 40 percent. This article considers the second largest of the pre-1932 protected industries, the rayon industry.[3] (For the purposes of this article, the rayon industry should be taken as synonymous with the rayon yarn industry.[4])

The Finance Act of 1925 imposed an excise duty of 1s. per lb. on domestically produced rayon yarn and an import duty of 2s. per lb. on imported rayon yarn, thereby affording the domestic rayon yarn industry a margin of protection of 1s. per lb. (*Finance Act, 1925*). This article considers both the intent and the effect of Britain's import duty on rayon, which has gone largely unexamined in previous literature. Specifically, the article poses two questions. First, why did the rayon duties

[2] Lloyd George referred to manufacturing protection in the 1920s as a 'kind of kangaroo protection, jumping from here and there, making little advances here and there' (quoted in Hicks, 1938, p. 241).

[3] According to net output in 1930, the largest of the pre-1932 protected manufacturing industries was motorcars and motor cycles (£53.5 million), followed by silk and rayon (£9.2 million) and musical instruments (£6.0 million) (Varian, 2019, p. 706).

[4] As for the production of cloth, rayon yarn was oftentimes interwoven with cotton yarn to produce a mixed cloth. This practice was especially widespread in the 1920s (Harrop, 1979, p. 282). As late as 1930, Britain's output of piece goods of rayon mixed with other materials exceeded its output of piece goods wholly of rayon (*Fourth Census of Production, 1930: Part 1*, 1933).

involve a margin of protection for domestic industry? Second, to what extent did the domestic share of the British rayon market depend upon the margin of protection after 1925?

Any analysis of the British rayon industry in the 1920s is necessarily complicated by the domestic and international market structure of the industry. Until 1925, the British rayon industry effectively consisted of two firms: Courtaulds and British Celanese.[5] Courtaulds, which produced viscose rayon yarn, accounted for 78 percent of domestic production in 1924 (calculated from Coleman, 1969, p. 274). Courtaulds' main domestic competitor in the early 1920s was British Celanese, which produced acetate rayon yarn, a more expensive (but close) substitute for viscose yarn.[6] Internationally, the rayon industry of the 1920s was increasingly characterized by cartels and foreign direct investment, which have been examined in recent work by Cerretano. A watershed moment in the cartelization of the international rayon industry came in 1927 when Courtaulds and the German rayon firm, Vereinigte Glanzstoff Fabriken (VGF), together acquired a controlling stake in the Italian rayon firm, Snia Viscosa, which possessed a distinct cost advantage owing to the lower wages in Italy (Cerretano, 2012, p. 615). In assessing the tariff dependence of the British rayon industry after 1925, proper attention must be given to such international commercial arrangements.

Further complicating the analysis in this article are deficiencies in the data, arising partly from the newness of the rayon industry in the 1920s.[7] Britain's economic statistics often included

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[5] There was a third firm, Brysilka, which was established in 1920 and produced a fine rayon yarn using the cupra-ammonium process. However, compared to Courtaulds and British Celanese, production occurred on a very small scale. In 1929, Brysilka had a nominal capitalization of £0.4 million, whereas Courtaulds and British Celanese had nominal capitalizations of £20 million and £6 million, respectively. Avram (1929, pp. 68-77).

[6] By means of bold advertisements, British Celanese attempted quite successfully to differentiate its acetate rayon yarn from the viscose rayon yarn produced by Courtaulds (Harrop, 1979, p. 289).

[7] Another deficiency in the data arises from the inaccessibility of the historical records of Courtaulds, which Coleman relied upon when writing his magisterial three-volume history of the firm.

rayon, then referred to as 'artificial silk', within the silk industry. The *Annual Statements of the Trade of the United Kingdom* report import and export data for rayon at an annual frequency throughout the decade, but the Board of Trade's monthly statistics combine rayon and natural-fiber silk commodities until the late 1920s. The lack of high-frequency output and trade data precludes econometric approaches to estimating the extent to which the British share of the domestic rayon market depended upon protection after 1925. Rather, in this article, the extent of dependence is ascertained within a two-variety (domestic and imported) Armington framework in which the assumed elasticity of substitution between imported and domestic varieties of rayon yarn is informed by literature in economic history and economics.

The next section of this article surveys several of the most notable historical studies of the protection of textile industries. All of these studies relate to the cotton textile industry, consistent with the emphasis placed upon this industry in the historical literature on textile protection. Indeed, one of the contributions of this article is to widen the scope of the literature to include textile industries other than cotton. The following section covers the domestic and international market structure of the industry, drawing upon both older research and more recent research by Cerretano. The following section investigates whether the import duty on rayon yarn imposed by the Finance Act of 1925 was intended as protection. In this section, new archival evidence is brought to the fore. The penultimate section presents counterfactual scenarios in which the excise and import duties on rayon yarn were removed in 1926. Inspired by Keynes's argument that sterling was overvalued by 10 percent when Britain returned to the gold standard at the pre-war parity, this section presents further counterfactual scenarios in which sterling was devalued by 10 percent, both with and without the removal of the excise and import duties. The final section offers

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Presently, the historical records of Courtaulds are held by AKZO Nobel, and access by scholars is prohibited.

concluding remarks regarding this pre-1930s episode of trade policy distorting the British market for manufactured goods.

The historical protection of textiles

Textiles have long been the object of economic policy, including trade policy, as should be expected given the unrivalled importance of textiles in the early stages of industrialization in many countries (Hoffman, 1958, pp. 111-5). Even despite the emergence of newer industries in the nineteenth and twentieth centuries, textiles continued to account for an immense, albeit declining, share of world manufacturing output and trade. As late as 1929, textiles accounted for roughly one-quarter of world manufactured exports (Tyszynski, 1951, p. 283). History is replete with examples of the imposition (or increase) and the removal (or reduction) of tariffs upon textiles. This section surveys three well-studied episodes of trade policy toward textiles and then relates these episodes to the case of Britain's protection of rayon in the 1920s.

As Britain dismantled its tariffs on manufactured imports in the middle of the nineteenth century, it is necessary to look far back in British history to locate an episode of textile protection preceding the rayon duties of 1925.[8] In the eighteenth century, the British cotton textile industry received the most extreme form of protection under the Calico Acts of 1701 and 1722, which banned the importation of printed calicos (1701) and, subsequently, all calicos (1722), which came mostly from India. Broadberry and Gupta (2009, pp. 293-5) argued that the British cotton textile industry, with its much higher wages and raw cotton costs than in the Indian cotton textile industry, was dependent upon the import prohibition until its repeal in 1774.[9] Moreover, they claimed that

[8] Even before the tariffs on textiles were removed, the tariffs were greatly reduced in the 1820s (Imlah, 1958, p. 119, fn. 6).

[9] In 1770, the British wage and raw cotton price were, respectively, 460% and 320% of the Indian.

the opening of the British market to imports accelerated a process of labor-saving innovation in the high-wage British cotton textile industry during the closing decades of the eighteenth century (Broadberry & Gupta, 2009, p. 298). Ultimately, by the 1820s, productivity in the British cotton industry had increased to a level that more than offset India's cost advantage of extremely lower wages, thereby permitting the British industry to reclaim the domestic market (Broadberry & Gupta, 2009, p. 295).

The French cotton textile industry underwent a similar transition following the removal of its prohibition on cotton textile imports under the Anglo-French Treaty of Commerce of 1860, known less formally as the Cobden-Chevalier Treaty.[10] The prohibition was succeeded by modest duties on cotton yarn and cloth. According to Dunham's study of the French cotton industry, the lifting of the import prohibition and the ensuing competition from Britain were instrumental in bringing about the modernization of the French industry, including the use of improved spinning machines and, to a great extent, the replacement of handlooms by power looms (Dunham, 1928, p. 304). Though France already had a cost advantage vis-à-vis Britain in wages, its cotton industry had lagged behind Britain's technologically. However, the liberalization of trade under the Cobden-Chevalier Treaty assisted the French industry in narrowing the technological gap and maintaining a firm hold of the French market.

The question of whether the early nineteenth-century American cotton textile industry, specifically cloth production, depended upon protection has also attracted the attention of historians. Bils (1984) argued that, in 1833, the American cotton textile industry was heavily tariff-dependent. Since the factor proportion of labor increased with the thread-count of the cloth, the United States, where wages were higher than in Britain, possessed a competitive advantage (in the

[10] Although, the prohibition of certain grades of cotton yarn was lifted in 1836 (Ashley, 1920, p. 285).

domestic, American market) in lower thread-count cotton cloth. Above a threshold thread-count, the competitive advantage shifted to Britain, where wages were lower than in the United States.[11] However, the tariff functioned to raise the threshold thread-count beneath which American firms were competitive, thereby allowing domestic production to displace imports in the intermediate range of thread-counts. Bils (1984, p. 1043) estimated that, had the import duty on cotton cloth been removed, value-added in the American cotton textile industry would have contracted by at least one-half. Harley (1992) claimed that the antebellum American cotton industry relied entirely upon the tariff for its survival.[12] Focusing on the most plain, low thread-count cloth, he found that the American price exceeded the pre-tariff British price (plus shipping) through the 1850s (Harley, 1992, p. 568).

What insights might these episodes of textile protection offer for a study of Britain's protection of the rayon industry in the 1920s? First, there is a close relationship between protection and productivity, with the elimination or reduction of protection typically spurring technological improvements in domestic industry so that it can better compete against imports. Conversely, the imposition or increase of protection could retard productivity growth. It might be reasoned that Britain's protection of its rayon industry hindered its *long-term* productivity growth and, consequently, its ability to compete against imports.[13] However, the potential effect of the Finance Act of 1925 on the productivity of the British rayon industry extends beyond the scope of the present article, which focuses on the tariff dependence of the British rayon market in the years

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[11] It might be questioned why lower-wage Britain did not also possess a competitive advantage in the American market for lower thread-count cotton cloth. However, it should be noted that the United States possessed a cost advantage in raw cotton, which accounted for a higher proportion of the factor content of lower thread-count cotton cloth.

[12] This article provoked debate. See Irwin and Temin (2001) and Harley (2001).

[13] For those manufacturing industries that received protection prior to 1932, Broadberry and Crafts (2011, p. 272) found a statistically significant decline in the growth rate of labor productivity between 1924-35 and 1935-48.

immediately following the Act, although it may incidentally be noted that there was a marked decline from 1925-9 in Courtaulds' labor productivity in rayon yarn (Coleman, 1969, p. 429).[14]

The second, more salient insight for the analysis in this article is that protection, taking the form of either an import prohibition or a tariff, has often been used to counteract a foreign cost advantage of lower wages. Surely, this is one of the most recurring themes in the history of international trade in textiles. In the eighteenth century, the British cotton textile industry depended upon protection against imports from lower-wage India. In the early nineteenth century, the American cotton textile industry depended, to at least a considerable extent, upon protection against imports from lower-wage Britain. Analogously, in the early 1920s, the British rayon industry contended with rising imports from lower-wage Italy, which, as this article addresses, may have been abated through the trade policy adopted in 1925.

The British and international market for rayon in the 1920s

In one of the earliest economic studies of the British rayon industry, Jones (1941, p. 95) referred to the British market for viscose rayon yarn in the 1920s as 'quasi-monopolistic'.[15] The monopolistic character of the market obviously derives from the dominant share held by Courtaulds. Yet, in describing the market, the greater emphasis ought to be placed upon the 'quasi'. Indeed, the British market for rayon yarn was never an unfettered monopoly. This section identifies those three economic forces that acted to maintain a competitive domestic price.

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[14] From 1925-9, the output of rayon yarn per worker at Courtaulds declined from 2,200 to 1,800 lbs. p.a.

[15] Also see Harrop (1979, p. 284).

First, Courtaulds faced domestic competition from British Celanese, which was formed as a public company in 1920.[16] Although British Celanese produced a technically different commodity, acetate rayon yarn, it was nevertheless a reasonably close substitute for viscose rayon yarn.[17] In price, acetate yarn commanded a modest premium of 21 percent over viscose yarn in 1926, the earliest year for which the price of acetate yarn is known (calculated from *Economist*, 11 November 1933). It might be argued that the prospect of consumer substitution from viscose to acetate imposed a ceiling upon the price that Courtaulds could command for viscose. When Courtaulds began to produce acetate rayon yarn on a small scale in 1926—acetate never amounted to more than a tiny fraction of Courtaulds' yarn output—Samuel Courtauld, the firm's Chairman, explained the decision: 'We were, however, faced with the fact that if we did not produce acetate yarn we might have to reduce viscose prices considerably in order to retain the custom of those to whom acetate would be preferable unless viscose gave a very substantial price advantage' (quoted in Coleman, 1969, p. 270).

Second, the British market was supplied by imports that were admitted free of duty until 1925. Figure 1 illustrates the quantity of rayon yarn imports and the share of rayon yarn imports in domestic consumption. Domestic consumption is calculated as domestic production plus imports and minus exports.[18] Italy accounted for most of the growth in rayon yarn imports, the

[16] British Celanese originated as the British Cellulose and Chemical Manufacturing Co. during the First World War. Investment in the company by the Ministry of Munitions was rolled over into a relatively small equity stake in the reconstructed public company in 1920. The Treasury transferred this £500,000 equity stake to the Securities Trust, which was administered by the Bank of England. Cerretano (2009, p. 93).

[17] Compared to viscose, acetate has a higher wet tensile strength and superior draping qualities (Silverman, 1946, p. 319).

[18] A portion of Britain's output of rayon yarn was, in fact, exported. The simultaneous existence of imports and exports is partly explained by the destination of the exports, with the British Empire taking the majority of Courtaulds' rayon yarn exports in 1924 (Coleman, 1969, p. 276). The British Empire was marked by well-developed commercial networks. Moreover, since the Edwardian era, the Dominions had applied preferential tariffs to British-made imports (Russell, 1947, p. 17).

quantity of bilateral imports having risen from 0.2 million lbs. (9 percent of imports) in 1922 to 5.1 million lbs. (45 percent) in 1925 (calculated from *Trade of the United Kingdom*). Sizable quantities were also imported from the Netherlands and Switzerland. Table 1 reports the volumes of Britain's bilateral imports.

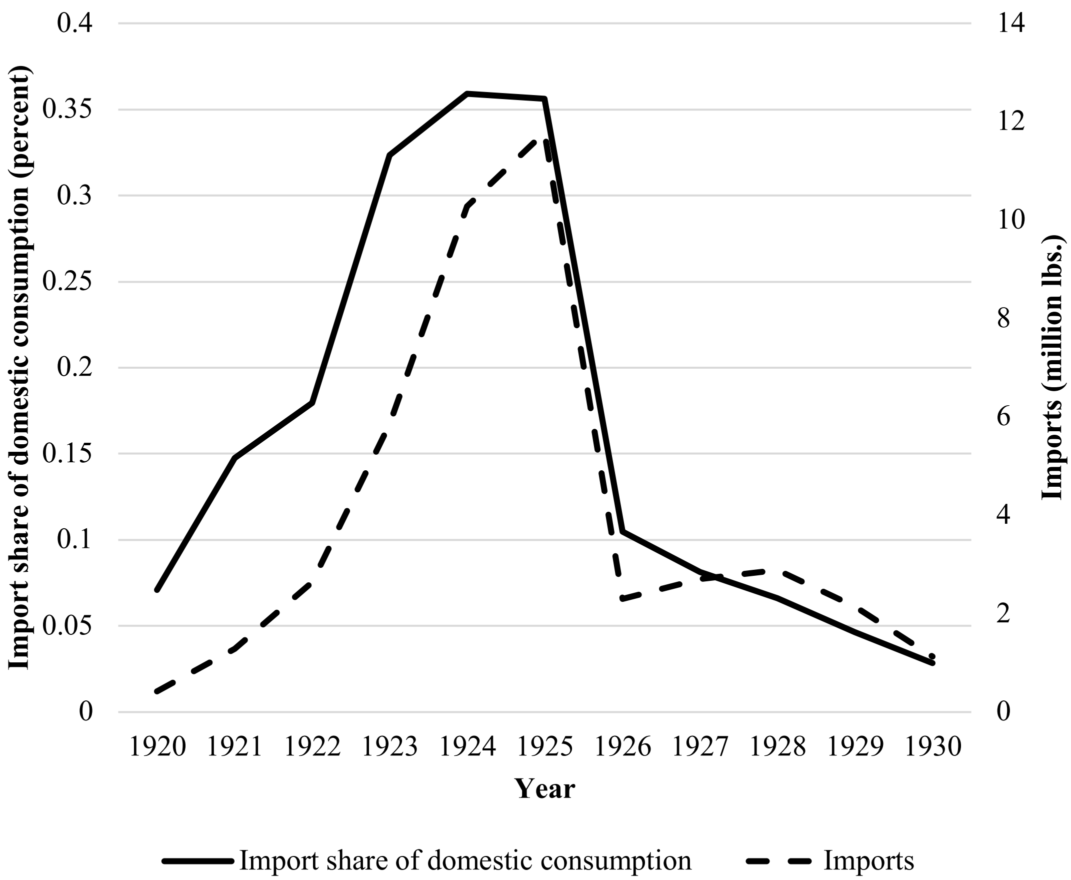

Figure 1. Share of imports in Britain's consumption of rayon yarn, 1920-30 (Sources: Import share of domestic consumption: calculated from Harrop (1968, p. 82) and *Trade of the United Kingdom*; Imports: *Trade of the United Kingdom*.)

Third, natural-fiber yarns, mainly cotton and silk, represented additional substitutes for rayon yarn in the 1920s. As Jones (1941, p. 83) observed, with the declining price of rayon, there was an increasing substitution from cotton to this slightly more expensive, artificial yarn, which so effectively and appealingly imitated the luster of real silk. From 1922-5, the price ratio of lower-grade rayon yarn to higher-grade cotton yarn had declined from 4.9:1 to 2.1:1 (calculated from

Harrop, 1979, p. 285). This rapid fall in the relative price of rayon yarn provoked disagreement among policymakers when the rayon duties were being debated in 1925. Some regarded artificial silk as a variant of silk and, thus, a luxury good that could be taxed without injuring the average consumer (United Kingdom House of Commons, 10 June 1925). Others regarded artificial silk as a slightly more expensive substitute for cotton, within the reach of the working class (United Kingdom House of Commons, 10 June 1925).[19] Although the former opinion won out in Parliament, the economic reality was that rayon increasingly competed against cotton.[20] The availability of high-quality cotton yarn, including mercerized yarn, militated against the emergence of a monopoly market for British rayon yarn (United Kingdom House of Commons, 10 June 1925).

Table 1.
Britain's bilateral imports of rayon yarn, 1922-9 (million lbs.)

Year	*Italy*	*Netherlands*	*Switzerland*	*Other*	*Total*
1922	0.2	0.3	1.1	1.0	2.6
1923	2.5	0.5	2.1	0.8	5.9
1924	4.5	1.3	2.7	1.8	10.3
1925	5.1	1.6	2.2	2.9	11.8
1926	0.7	1.0	0.2	0.4	2.3
1927	0.8	0.5	0.3	1.1	2.7
1928	0.9	0.4	0.2	1.4	2.9
1929	0.5	0.1	0.2	1.4	2.1

Source: *Trade of the United Kingdom.*

[19] On this point, Frederick Pethick-Lawrence, MP stated:

> I took the trouble to make inquiries in my own constituency, and I found there it was a very common thing for the factory girls to purchase artificial silk for the purpose of knitting themselves jumpers, in order to look neat and tidy when they went out, and for that purpose they purchased about a pound of artificial silk, and were able to make these up for themselves at anything from 8s. to 12s. or 13s. Surely, taking into account all the multitudinous things which the poorer people make out of silk, whether natural or artificial, the idea that silk is a luxury which is only used by the well-to-do is finally exploded.

[20] In his study of the international silk industry, Federico (1997, p. 43) claimed that rayon was not a substitute for silk, but rather for cotton.

It must recognized that, even by the end of the 1920s, the domestic market for rayon yarn remained rather minor compared to the markets for most natural-fiber yarns, especially cotton, against which rayon closely competed. Table 2 presents Britain's production and consumption of the different textile fiber yarns in the census years 1924 and 1930. In this context, the consumers of yarn, an intermediate good, are those British firms engaged in weaving cloth, i.e. not the ultimate consumers.[21] Nonetheless, the table unambiguously supports the assertion that Lancashire still reigned supreme in the production and consumption of yarn in Britain.

Table 2.
Britain's production and consumption of textile yarns, 1924 and 1930 (million lbs.)

	Production		Consumption	
	1924	*1930*	*1924*	*1930*
Cotton	1,395	1,047	1,240	922
Woollen and worsted	526	363	492	344
Linen	97	75	105	80
Natural silk	2	1	2	1
Artificial silk (rayon)	22	50	26	45

Consumption is calculated as production plus imports and minus exports.
Source: *Fourth Census of Production, 1930: Part 1* (1933).

Internationally, the market for rayon was coming further under the influence of cartels and foreign direct investment in the 1920s. Even before the First World War, Courtaulds had established a subsidiary corporation, the American Viscose Company, in the United States in 1910.[22] After the First World War, Courtaulds began forging links with the Continental rayon industry. In 1925, Courtaulds agreed to a joint venture with VGF to form Glanzstoff-Courtaulds, for the purpose of establishing operations in Cologne (Coleman, 1969, p. 278). Moreover, this

[21] British cloth can be exported, just as foreign cloth can be imported. Hence, Britain's consumption of yarn should not be equated to the consumption of yarn by the ultimate consumer, the latter being determined by the export and import of cloth. Moreover, the existence of (traded) mixed cloth incorporating different fiber yarns greatly impedes any estimation of Britain's consumption of yarn by the ultimate consumer.

[22] One of the main reasons for Courtaulds' creation of the subsidiary was to situate production behind the high American tariff wall (Coleman, 1969, pp. 104-8).

agreement occasioned a division of national markets, whereby yarn produced by Glanzstoff-Courtaulds or VGF could only be sold in Britain through Courtaulds (Coleman, 1969, p. 279).

Courtaulds and VGF heightened their cooperation when, in 1927, these firms together acquired a controlling stake in the mammoth Italian rayon manufacturer, Snia Viscosa (Coleman, 1969, p. 281). As Cerretano (2004, p. 256) has argued, Snia Viscosa's rapid growth in the early 1920s was enabled by Italy's inflationary monetary policy. However, as Cerretano (2018, p. 553) has also argued, Snia Viscosa, faced with rising interest rates and deteriorating access to credit beginning in 1925, resorted to raising capital through the sale of equity to Courtaulds and VGF in 1927. Of course, Courtaulds' (and VGF's) investment in Snia Viscosa was not made on benevolent grounds. Courtaulds sought control of Snia Viscosa because rayon yarn exports from low-wage Italy were undermining the competitiveness of Courtaulds in its markets, which included the United States by virtue of its subsidiary American Viscose Company (Cerretano, 2018, p. 554). Still, there remains the question: was the competitiveness of Courtaulds in the domestic British market challenged by Snia Viscosa in 1926?[23] Or had tariffs effectively sheltered the British rayon industry against imports? Before answering these questions, the origins of Britain's rayon duties are considered.

The Finance Act of 1925 and the rayon duties

The return of a Conservative government in October 1924 and a planned increase in fiscal expenditure, mainly to fund an expansion of the state pension system, gave impetus to the silk and

[23] Cerretano (2012, p. 615) stated, 'The implication was that Snia Viscosa could invade the home market of Courtaulds at any time, while the latter could not reciprocate the threat, hence the intrinsic instability of the agreements [between Courtaulds and VGF] and Courtaulds' decision to buy a large stake in the Italian firm'. However, it is unclear whether 'home market' refers to Britain, the United States, or both. If 'home market' refers to Britain, then this article serves as an evaluation of Cerretano's statement.

rayon duties (McGuire, 1939, pp. 238-9). Fiscal orthodoxy was the prevailing doctrine of the day. In an attempt to avoid a shortfall in the budget, the Chancellor of the Exchequer, Winston Churchill, vigorously supported import duties on natural and artificial silk.

In the 1920s, Britain's natural silk industry was in a dire condition. By 1924, the real output of silk manufactures had fallen to the level of the 1820s (Hoffman, 1955, table 54). While most of Britain's consumption of silk manufactures was satisfied through imports, a domestic silk industry had limped along since the nineteenth century in Macclesfield and some nearby mill towns. Courtaulds itself continued a vestigial production of silk manufactures in Essex (Coleman, 1969, p. 249). In 1925, proposed (and later enacted) import duties on raw silk and silk yarn threatened to raise the production costs of silk spinners and silk weavers, respectively. An import duty on silk cloth, also enacted in 1925, had the potential to offset the higher material-input prices confronting the British silk-weaving industry as it competed against imports.[24] Yet, the British silk industry also competed, at least somewhat, against the British rayon industry. Thus, it was necessary that the duties on silk be accompanied by duties on rayon, 'to avoid handicapping the silk industry in the competition with its powerful rival', according to a February 1925 draft proposal for duties on silk and artificial silk prepared by the Board of Customs and Excise (National Archives, CUST 143/100, p. 147).

While initial proposals for duties on rayon yarn included equal import and excise duties, the Finance Act of 1925 ultimately included a higher import duty (2s. per lb.) than excise duty (1s. per lb.). Was the higher import duty intended as a form of protection, as might be assumed? The intention behind the higher import duty can be discerned from the records of the Board of Customs

[24] By the early 1920s, the British silk-weaving industry was so diminished that, in 1924, the import share of Britain's consumption was 95% for 'piece goods, wholly of silk' and 79% for 'piece goods of silk mixed with other materials, if known as silks' (*Fourth Census of Production, 1930: Part 1*, 1933).

and Excise. Draft proposals for duties on rayon began to include a higher import than excise duty only after a letter dated 16 March 1925 from the Permanent Secretary to the Board of Trade, Sir Stanley Chapmen, to the Chairman of the Board of Customs and Excise, Sir Horace Hamilton. An excerpt from the letter is as follows:

> …the British industry would be heavily hit and might be seriously damaged if (in the calculation of equivalents) the charge on the imported yarns and fabrics were not made definitely higher than the corresponding charge imposed on the British silk producer and manufacturer (through the tax on his raw material).
>
> The reason, of course, is that a tax on silk goods would diminish their consumption. If the indirect charge on the home product were exactly the same as the direct charge on the imported product, this percentage contraction would, other things being equal, be the same in the case of home production as in the case of imports, and loss and unemployment would be caused in the British silk industry.
>
> A way out of the difficulty would be to impose such as charge on imports, in relation to the charge on home production, *that the check on imports would be sufficiently great to counteract any tendency for the home industry to contract*…
>
> This would not be protection in the ordinary sense and it would not have the effect of creating any vested interests, because, if the balance of charges on imports and home production were so successfully adjusted as to keep the British industry of approximately the same size, the removal of the duty any time thereafter would leave the British industry unchanged. In the circumstances, it seems not unreasonable, when imposing a tax of this kind, to design it in such a form that the British Industry is not damaged.
>
> *In the case of artificial silk, the circumstances relating to the industry and foreign competition are different of course, but the same general argument applies* (National Archives, CUST 143/100, pp. 249-51, emphases added).

The rationale for the higher import duty reflected a sophisticated understanding of economics for the 1920s. An excise duty would reduce domestic consumption of rayon yarn, which was satisfied partly through domestic production and partly (and increasingly) through imports. A higher import duty would cause a greater reduction of imports, transferring a share of the British market from foreign producers to domestic producers. This share of the British market transferred from foreign to domestic producers might offset, in terms of volume, the decline in domestically supplied consumption wrought by the excise tax. In summary, the higher import duty was intended to shift the burden of reduced consumption entirely to foreign producers. In this context, the difference between the excise duty and the import duty might well be described as indemnifying protection.

Through April 1925, the proposed duties on rayon yarn were 3s. per lb. for imports and 2s.6d. per lb. for domestic production (National Archives, CUST 143/100, pp. 365-7). However, following protests by both Courtaulds and British Celanese, the duties were lowered to 2s. per lb. for imports and 1s. per lb. for domestic production (*Times*, 15 May 1925; *Times*, 22 May 1925). British Celanese expressed satisfaction with the concessions secured from the Chancellor, referring specifically to 'the widening of that [protective] margin from 6d. per lb. to 1s. per lb.' (*Times*, 22 May 1925).[25] In theory, there would have been two implications of the revised duties. First, the reduced excise duty would have lessened the severity of the decline, *ceteris paribus*, in the domestic consumption of British rayon yarn. Second, the augmented margin of protection would have further reduced imports. In 1925, when the import price of rayon yarn was 5.3s. per lb., a margin of protection of 1s. per lb. was not inconsiderable (*Trade of the United Kingdom*).

So as not to hamper the competitiveness of Britain's rayon yarn exports, the Finance Act of 1925 provided for a drawback equal to the amount of the excise duty (*Finance Act, 1925*). If the excise-liable yarn was woven into cloth that was exported, then the cloth manufacturer could claim a drawback 'equal to the amount payable as drawback in respect of such a quantity of silk or artificial silk as, in the opinion of the Commissioners, has been used in the manufacture of the article' (*Finance Act, 1925*). The administration of the silk and rayon duties was not especially easy for the Customs and Excise Department.

[25] Although British Celanese was satisfied with the revised duties, the Lancashire cotton textile industry, which used rayon yarn as weft, remained vehemently opposed to the duties. On 20 July 1925, the Manchester Chamber of Commerce passed a resolution opposing 'the taxation of a raw material which was becoming so important to the Cotton Trade' (National Archives, CUST 118/169, p. 56).

Courtaulds and British Celanese responded to the imposition of the excise duty on rayon yarn by reducing their prices commensurately, in order to maintain a constant final selling price (Silverman, 1946, p. 330). Figure 2 depicts the domestic price inclusive of the excise duty, as well as the import price both exclusive and inclusive of the import duty. The absorption of the excise duty by Britain's rayon-spinning firms led to a greater shift in the relative price of domestic and imported rayon yarn than would have occurred otherwise. This article now considers the effect of changing relative prices on the British market for rayon yarn.

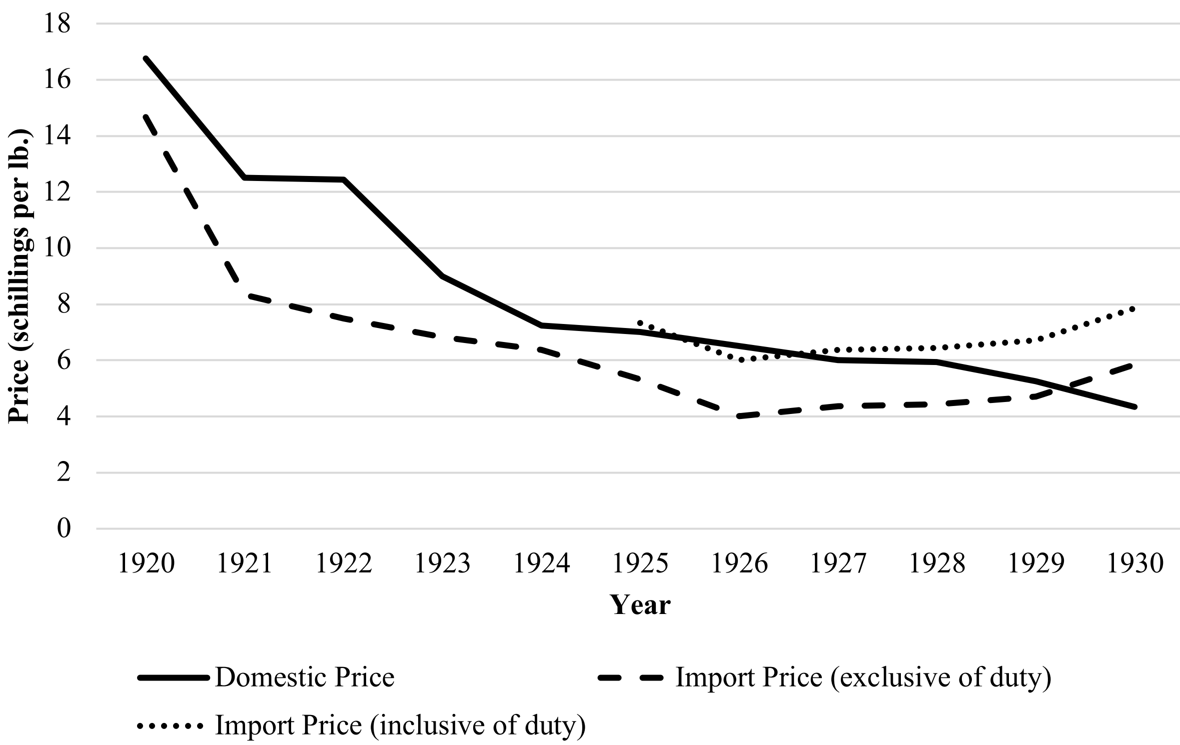

Figure 2. Domestic and import prices of rayon yarn, 1920-30 (Sources: Domestic price: Harrop (1979, p. 285); Import price: calculated from *Trade of the United Kingdom*.)

The tariff dependence of the British rayon market

There was considerable debate over whether the rayon duties were protective. Yet, even those like John Remer MP, who argued that the duties were luxury taxes, could not wholly discount an element of protection: 'It is true that possibly they have a flavour of Protection about them, but they are mainly revenue-producing' (United Kingdom House of Commons, 10 June 1925). Ultimately, the Finance Act of 1925 offered the British rayon industry more than just a mere flavor of protection. The Act, which imposed a duty of 2s. per lb. on rayon yarn imports from 1 July 1925 onward, was instrumental in conferring upon domestic producers a substantially increased share of a growing domestic market.

In order to determine the extent to which the British rayon industry's domestic market share depended upon the Finance Act of 1925, this article considers counterfactual scenarios in which the excise and import duties on rayon yarn were removed in 1926, prior to Courtaulds' acquisition (with VGF) of its main foreign competitor in the British market, Snia Viscosa. In doing so, this article makes the standard Armington assumption that commodities are differentiated by country of origin and that these country-varieties are imperfect substitutes for each other (Armington, 1969). This assumption is consistent with the literature on the interwar rayon industry that has identified cross-country variation in rayon yarn. As Cerretano (2018, p. 546) observed, Italian rayon yarn was of poor quality 'with irregular size, dying properties, and tensile strength'.[26]

In a two-variety (domestic and imported) Armington framework, the ratio of Britain's consumption of imported rayon yarn (M) to its consumption of domestic rayon yarn (D) is related to the relative price of domestic rayon yarn (p_D) and imported rayon yarn (p_M) according to the following conventional equation:

$$ln\left(\frac{M}{D}\right) = C + \sigma ln\left(\frac{p_D}{p_M}\right) \qquad (1)$$

[26] However, the average bilateral import prices of rayon yarn from other countries were even lower than average import price of Italian rayon yarn, suggesting that Italian rayon yarn was not so inferior. In 1924, the last year before the imposition of the import duty, the average bilateral import prices were as follows: 6.8s. per lb. for Italy; 5.8s. per lb. for the Netherlands; 6.2s. per lb. for Switzerland (calculated from *Trade of the United Kingdom*).

In this equation, C is a constant, and σ is the elasticity of substitution between the imported and domestic varieties of rayon yarn—the 'Armington elasticity'. In the Armington framework, any policy intervention, such as the counterfactual removal of the rayon duties, that alters the relative price of the domestic and imported varieties (p_D/p_M) would alter the ratio of Britain's consumption of imported rayon yarn to its consumption of domestic rayon yarn (M/D). If equation 1 is taken to represent the actual market for rayon yarn in 1926, the counterfactual market for rayon yarn can be expressed as follows, with * denoting counterfactual consumption and prices:

$$ln\left(\frac{M^*}{D^*}\right) = C + \sigma ln\left(\frac{p_D^*}{p_M^*}\right) \quad (2)$$

Subtracting equation 2 from equation 1 yields:

$$\ln\left(\frac{M}{D}\right) - \ln\left(\frac{M^*}{D^*}\right) = \sigma ln\left(\frac{p_D}{p_M}\right) - \sigma ln\left(\frac{p_D^*}{p_M^*}\right) \quad (3)$$

Equation 3 can be rearranged as:

$$\ln\left(\frac{M^*}{D^*}\right) = \ln\left(\frac{M}{D}\right) + \sigma(lnP_M + lnP_D^* - lnP_D - lnP_M^*) \quad (4)$$

In order to estimate the effect of the removal of the duties on the ratio of Britain's consumption of imported to domestic rayon yarn, it is necessary to assume an historical Armington elasticity (σ) for rayon yarn. In this regard, the literature in economic history offers a precedent, if not guidance. In their computational general equilibrium (CGE) models of the British Industrial Revolution, Crafts and Harley (2000, p. 829) and later Clark et al. (2014, p. 112) assumed that the elasticity of substitution between domestic and imported varieties of cotton textiles was 5.0. Further (non-historical) evidence of an appropriate Armington elasticity for rayon yarn comes from Donnelly et al. (2004, p. 44), who estimated an elasticity for 'yarn and thread mills' of 2.5, using contemporary data for the United States. However, the appropriate Armington elasticity for, specifically, rayon yarn is likely to be greater than 2.5, due to the existence of a heterogeneity bias in trade elasticities, whereby the elasticity tends to increase as the commodity is defined at a more disaggregated level (Imbs and Mejean, 2015). Still, $\sigma = 2.5$ might be taken as a conservative Armington elasticity that would yield a lower-bound estimate of the share of imports in domestic consumption following the counterfactual removal of the rayon duties.[27] For an upper-bound estimate, it is assumed that $\sigma = 5.0$.

The data used in equation 4 are as follows. P_D is the price of 150-denier rayon yarn, a standard grade, as obtained from Harrop (1979, p. 285), and is inclusive of the excise duty (1s. per lb.).[28] P_M is average price of imported rayon yarn, which is calculated from the *Annual Statement of the Trade of the United Kingdom*, and is inclusive of the import duty (2s. per lb.).[29] M is the quantity consumed of imported rayon yarn, as reported in the latter source. D is the quantity consumed of domestically produced rayon yarn. This value is calculated as the difference between the volume of domestic production, obtained from Harrop (1968, p. 82), and the volume of exports, obtained from the *Annual Statement of the Trade of the United Kingdom*.

Table 3 presents the shares of imports in domestic consumption under various counterfactual scenarios in which the excise and import duties were removed in 1926, when the actual share of imports in domestic consumption was 10 percent. In *Scenario 1*, the baseline counterfactual scenario, P_D^* equals P_D. Just as the British rayon-spinning firms absorbed the excise duty when it was imposed, so too could the firms raise (pre-excise) prices following the removal

[27] An *historical* Armington elasticity, albeit for pig iron, was actually estimated econometrically by Irwin (2000, p. 287) for the United States in the late nineteenth century. He estimated the elasticity to have been 2.6. If rayon yarn and pig iron are taken to be similarly homogenous commodities, then the limited historical evidence would not undermine the assumption of $\sigma \geq 2.5$ for rayon yarn.

[28] Silverman (1946, p. 308, fn. 1) described 150-denier as 'normal viscose yarn'. For a discussion of the range of British rayon yarn production according to denier, see this source. Here, it may briefly be noted that a higher-number denier corresponds to a coarser yarn.

[29] To calculate P_M, it is necessary to add the import duty to the average import price calculated from the *Annual Statement of the Trade of the United Kingdom*.

of the excise. In this scenario, P_M^* is 2s. less than $P_{M,}$ consistent with the removal of the import duty. Under *Scenario 1*, the share of imports in Britain's consumption of rayon yarn ranges from 24-47 percent, depending upon the assumed value of σ. In *Scenario 2*, in which the British rayon-spinning firms do not raise (pre-excise) prices following the removal of the excise, the counterfactual share of imports in domestic consumption is lower than in *Scenario 1* but still substantially higher than 10 percent.

Table 3.

Share of imports in Britain's consumption of rayon yarn under counterfactual scenarios, 1926

	σ = 2.5	σ = 5.0
Actual	*0.10*	*0.10*
Scenario 1: $P_D^* = P_D$; $P_M^* = P_M - 2$ schillings	0.24	0.47
Scenario 2: $P_D^* = P_D - 1$ schilling; $P_M^* = P_M - 2$ schillings	0.17	0.28
Scenario 3: $P_D^* = P_D$; $P_M^* = 1.11(P_M - 2$ schillings)	0.20	0.34
Scenario 4: $P_D^* = P_D$; $P_M^* = 1.11(P_M - 2$ schillings) + 2 schillings	0.09	0.08

This table presents the share of imports in Britain's consumption of rayon yarn (*M/(M+D)*), which should not be confused with the ratio of Britain's consumption of imported to domestic rayon yarn (*M/D*).

When, in 1927, Courtaulds and VGF jointly acquired a controlling stake in Snia Viscosa, the British rayon market had already been sheltered against imports to a great extent, as the counterfactual scenarios for 1926 reveal. Trade policy, rather than market division, reversed the foreign incursion into Courtaulds' domestic market. However, it was a market that Courtaulds would have to share with new domestic firms, in addition to its perennial rival, British Celanese. As Silverman (1946, p. 330) has suggested, the margin of protection contributed to a spate of new rayon-spinning firms in the late 1920s. None of these firms operated on any great scale, and a good portion of the firms existed only on paper. A typical firm would have been Harbens of Golborne, which commenced production in 1926 (Avram, 1929, p. 73). By 1928, it was producing 1.1 million lbs., while Courtaulds was producing 26.5 million lbs. (Avram, 1929, pp. 70 and 73). The scholarly consensus is that most of the firms formed in the late 1920s were undercapitalized and did not reach the minimum efficient scale of production for the industry (Jones, 1941, p. 86; Harrop, 1968,

p. 73). Unsurprisingly, therefore, most of the firms did not survive the depression of the early 1930s.[30] Nevertheless, the emergence of these firms in the late 1920s confirms the existence of competition within the British market. Courtaulds still maintained a dominant position, to be sure, but the presence of new competitors served to prevent Courtaulds from setting too high of a price. Altogether, it may be asserted that the Finance Act of 1925 shifted the theater of competition from the international market to the domestic market.

In 1924, the last year before the imposition of the rayon duties, the share of imports in domestic consumption of rayon yarn peaked at 36 percent (calculated from Harrop, 1968, p. 82; *Trade of the United Kingdom*). This statistic underscores the disadvantaged position of the rayon industry in Britain vis-à-vis the industry in other countries, particularly Italy. What were the economic causes for the relative weakness of the British rayon industry? Certainly, the rayon industry in Britain was disadvantaged by higher wages. Moreover, it has been alleged that the domestic rayon industry suffered from the overvaluation of sterling in the 1920s (Harrop, 1968, p. 78).

In the early 1920s, the Bank of England conducted monetary policy with the aim of returning to the gold standard at the pre-war parity of £1 = $4.86, per the recommendation of the Cunliffe Committee of 1918. However, since sterling was trading at less than this parity in the foreign exchange market, the Bank of England had to pursue a deflationary monetary policy in order to effect a return at the pre-war parity.[31] Having appreciated sterling sufficiently, Britain

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[30] For the numbers of rayon plant closures during the years of the depression, see Coleman (1969, p. 334).

[31] For a general discussion of Britain's monetary policy during this period, see Moggridge (1972, pp. 37-97).

officially returned to the gold standard in April 1925, coincidentally just a couple of months before the imposition of the silk and rayon duties.[32]

Both the imposition of the rayon duties and the return to the gold standard in 1925 were 'consequences' of Churchill, but it was the latter policy that incurred the criticism of Keynes. In *The Economic Consequences of Mr. Churchill*, Keynes (1925) argued that, in 1925, the pre-war parity overvalued sterling by 10 percent. Economic historians have tended to confirm that sterling was overvalued to at least some extent.[33] The overvaluation of the currency was injurious to the competitiveness of Britain's exports, but it was also conducive to the competitiveness of its imports, which included rayon yarn.

The Finance Act of 1925 reduced the share of imports in domestic consumption, and a devaluation of sterling would have exerted the same directional effect.[34] What would have been the share of imports in domestic consumption if sterling had been devalued by 10 percent in 1926 (or if Britain had returned to the gold standard at 10 percent beneath the pre-war parity)? This article considers two more counterfactual scenarios informed by the economic discourse of the 1920s. *Scenario 3* is the same as *Scenario 1*, except that in *Scenario 3* sterling is devalued by 10 percent, resulting in the price of rayon yarn imports increasing by 11 percent. In this counterfactual scenario, the share of imports ranges from 20-34 percent (*Scenario 3*), compared to 24-47 percent *(Scenario 1*). Thus, had Britain not imposed the rayon duties but instead pursued a 10-percent devaluation, the share of imports in domestic consumption of rayon yarn would not have been

[32] The election of the Conservative Party in October 1924 explains the coincidence of these events, as the Conservative Party espoused both monetary and fiscal orthodoxy, i.e. a return to the gold standard and a balanced budget.

[33] See Moggridge (1972, p. 105); Dimsdale (1981, p. 343); Redmond (1984, p. 528).

[34] In the interwar era, there was a substitutability between trade policy and monetary policy among countries; countries that persisted in their adherence to the gold standard tended to resort more greatly to tariff increases (Eichengreen and Irwin, 2010). In the rayon industry of the 1920s, it can be conceptualized that, at a microeconomic level, protection was substituting for the lack of a devaluation.

much reduced. In other words, with respect to the British rayon yarn market, the Finance Act of 1925 was more consequential than would have been a devaluation of 10 percent. *Scenario 4* involves the maintenance of the (protective) Finance Act of 1925 *and* a devaluation of 10 percent; thus, the only counterfactual element of this scenario is the devaluation. In this scenario, the share of imports ranges from 8-9 percent, slightly less than the actual share of imports in Britain's consumption of rayon yarn in 1926.

Scenario 3 and *Scenario 4* make the simplifying assumption that a sterling devaluation affects P_M^* but not P_D^*. In the long term, a sterling devaluation would raise factor input prices and consequently tend to raise P_D^*. For example, a sterling devaluation would have the effect of raising the price of imported wood pulp, the main material input in the production of rayon.[35] Thus, a devaluation would have shifted the relative price of domestic and imported rayon yarn less than was assumed in the counterfactual scenarios. The import shares reported for *Scenario 3* and *Scenario 4* should therefore be regarded as an upper-bound estimate of the effect, via shifting relative prices, of a 10-percent devaluation—in line with Keynes's stance. Even still, such a devaluation would not have been as potent as was the Finance Act of 1925.

Conclusion

The margin of protection extended to rayon yarn by the Finance Act of 1925 was intended only to indemnify the British rayon industry for a decline in domestic consumption resulting from the imposition of an excise duty. The effect of the margin of protection on the British market for rayon yarn was considerable. Had the rayon duties been removed in 1926, then the share of imports in Britain's consumption of rayon yarn would have increased from one-tenth to one-quarter or more,

[35] Britain imported, mainly from Scandinavia and Canada, nearly all of the wood pulp used in its production of rayon (Silverman, 1946, p. 316).

depending upon the assumed Armington elasticity. The margin of protection afforded by the Finance Act of 1925 transferred a greater share of the rayon market to domestic firms than would have been achieved through a 10-percent devaluation of sterling, as was then advocated by Keynes.

In the chronology of the interwar British rayon industry, the rayon duties preceded Courtaulds' acquisition of Snia Viscosa in 1927. The margin of protection enabled the British rayon industry to reclaim almost all of the domestic market share lost in the early 1920s, before Courtaulds' and VGF's acquisition of Snia Viscosa *might* have afforded a partial mechanism for limiting rayon yarn imports. While cartels and foreign direct investment proliferated in the international rayon industry during the interwar era, the Finance Act of 1925 was an equally seminal contribution to the development of the British rayon industry.

Although focused on the British rayon industry, this article offers a broader insight relating to British history. It serves to underscore the extent of government intervention in the manufacturing sector of 1920s Britain. This intervention distorted the free-trade industrial composition of the British economy. Foreman-Peck (1979) has already documented the substantial degree to which the British motorcar industry depended upon the McKenna duties. This article has argued that the British rayon industry, threatened by rising imports, was protected by the Finance Act of 1925. While historians of the interwar British economy have largely focused on the government interventions of the 1930s, notably the Import Duties Act of 1932, this article beckons for a reconsideration of the 1920s as the decade during which government economic intervention commenced in earnest.

Acknowledgements

I gratefully acknowledge funding from the Pasold Research Fund for a project titled 'The Finance Act of 1925 and the origins of the artificial silk duties'. I thank Andy Seltzer and two anonymous referees for their helpful comments. I am also thankful for comments received at the session on 'The Anglosphere in the 1920s' at the World Economic History Congress at MIT, the Frontier Research in Economic and Social History Conference at the University of Groningen, and the 4th LSE Interwar Economic History Workshop. All errors are mine.

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