



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

University of Wollongong  
Research Online

---

Faculty of Commerce - Papers (Archive)

Faculty of Business

---

2011

# Tariffs, subsidies, and profits: a re-assessment of structural change in Australia 1901–39

David Merrett  
*University of Melbourne*

Simon Ville  
*University of Wollongong, [sville@uow.edu.au](mailto:sville@uow.edu.au)*

---

## Publication Details

Merrett, D. & Ville, S. (2011). Tariffs, subsidies, and profits: a re-assessment of structural change in Australia 1901–39. *Australian Economic History Review: an Asia-Pacific journal of economic, business and social history*, 51 (1), 46-70.

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library:  
[research-pubs@uow.edu.au](mailto:research-pubs@uow.edu.au)

---

# Tariffs, subsidies, and profits: a re-assessment of structural change in Australia 1901–39

## **Abstract**

We re-interpret the drivers of structural change in Australia from Federation to World War II. Manufacturing increased its relative share of output and employment, the farm sector and mining contracted. Conventional wisdom contends these shifts largely resulted from government policy, particularly increases in trade barriers. We contend that the connection between tariffs and increased profitability is conceptually weak and not supported by extant evidence. We argue that exogenous shifts in consumer preferences, the adoption of new technologies, changing factor proportions, and greater specialisation in manufacturing and services were responsible for manufacturing increasing its share of the economy's resources and output.

## **Keywords**

australia, 39, change, tariffs, structural, assessment, re, profits, 1901, subsidies

## **Disciplines**

Business | Social and Behavioral Sciences

## **Publication Details**

Merrett, D. & Ville, S. (2011). Tariffs, subsidies, and profits: a re-assessment of structural change in Australia 1901–39. *Australian Economic History Review: an Asia-Pacific journal of economic, business and social history*, 51 (1), 46-70.

Tariffs, subsidies and profits: a re-assessment of structural  
change in Australia, 1901-39

David Merrett

University of Melbourne

and

Simon Ville

University of Wollongong

Running title: Tariffs, subsidies and profits

Corresponding author:

Simon Ville; School of Economics, Faculty of Commerce, University of Wollongong,  
Wollongong, NSW 2522. [sville@uow.edu.au](mailto:sville@uow.edu.au). 02-4221-3098

Acknowledgements: We gratefully acknowledge comments on an earlier version of the paper by the referees and participants at the Asia-Pacific Economic and Business History conference, University of Sydney 2007, also subsequent comments by Ian McLean, and econometric advice from Jeff Borland. This research was supported under Australian Research Council's *Discovery Projects* funding scheme (project number DP 0557412). Research assistance provided by Andrew Parnell and Dinuka Wijetunga is gratefully acknowledged.

# Tariffs, subsidies and profits: a re-assessment of structural change in Australia 1901-1939

## Abstract

We re-interpret the drivers of structural change in Australia from Federation to World War II. Manufacturing increased its relative share of output and employment, the farm sector and mining contracted. The conventional wisdom is that these shifts largely resulted from government policy, particularly increases in trade barriers that stimulated import substitution by manufacturers. We contend that the connection between tariffs and increased profitability is conceptually weak and not supported by extant evidence. We argue that a wide range of stimuli was responsible for manufacturing increasing its share of the economy's resources and output. These included exogenous shifts in consumer preferences, the adoption of new technologies, changing factor proportions, and greater specialization in manufacturing and services.

JEL categories: N17, N67, O24

Keywords: tariff policy, profitability, technology, consumption

## INTRODUCTION

In the first half of the twentieth century, the Australian economy took a substantial shift away from its reliance on resource-based industries. Manufacturing industry lifted its share of both output and employment. Nearly all of the growth in the share of manufacturing was accounted for by a reduction in that of the farm and mining sectors. A very large tertiary sector oscillated around its trend. The data sets of GDP, employment and capital formation generated by Butlin and others<sup>1</sup> provide the starting point for discussion. These data will be reviewed in the second section of the paper.

The conventional explanation of the relative rise of manufacturing rests largely on the role of the tariff. Rising levels of tariff protection enabled local producers to capture a larger share of the market from increasingly expensive imports. The literature on structural change will be discussed in the third section. The paper will then proceed by arguing that the previous explanations of sectoral change do not provide a convincing account of the rise of manufacturing relative to the primary sector let alone the rise and fall of industries within manufacturing. New data of profits at the industry level promises to provide a more accurate picture of the changing choice set facing people making strategic decisions about where to do business.<sup>2</sup> These data highlight the role of both changes in output prices, as captured in the discussion of tariffs and subsidies,

---

<sup>1</sup> Butlin, *Australian Domestic Product*; Keating, *Australian Workforce*; Butlin and Dowie, Estimates of Australian workforce, pp. 38-55.

<sup>2</sup> See Merrett and Ville, Returns to enterprise.

and developments on the supply side. Technological change, endogenous and exogenous, transformed the landscape of relative profitability. Much of the changing structure of the Australian economy was the result of the emergence of new industries founded on new production possibilities. There was a sequential dimension to this process with the developments up stream in the generation of new sources of energy, particularly electricity, being a precondition for changes down stream. We will deploy a wide range of primary and secondary sources to substantiate our alternative account.

### STRUCTURAL CHANGE, 1901-39

The structure of the Australian economy altered in many ways in the first half of the twentieth century. The big picture is a relative growth of manufacturing that is nearly offset by a contraction in rural and mining activity with the large service sector remaining at a roughly constant figure. National income account data of product indicate shifts in the relative importance at a sector level.<sup>3</sup> The broad shifts revealed by these indicators are mirrored by changes in the distribution of the workforce.<sup>4</sup> Research on particular sectors, industries or regions provides evidence of absolute expansion or decline that adds detail and nuance to the broad sweep of the aggregate data, including the shifting balance between the size of the public and private sector.<sup>5</sup>

---

<sup>3</sup> Butlin, *Australian Domestic Product*; Idem, *Australian economic development*; Dowie, *Service ensemble*.

<sup>4</sup> Butlin and Dowie, *Estimates of Australian workforce*.

<sup>5</sup> Forster, *Industrial Development*; Snooks, *Depression and Recovery*; Barnard, and Butlin, *Public and private capital formation*, pp.354-67; Sinclair, *Capital formation*, pp. 11-65; Mathews and Jay, *Federal Finance Tables 13 and 22*, pp. 102 and 169.

Together the GDP and employment series demonstrate the broad sweep of change in the structure of the economy from 1901 up to World War II. The data is shown in Tables 1 and 2 below. Manufacturing grew significantly both in terms of its share of employment, from 15 to 24 per cent, and its share of output, 12 to 19 per cent, from a low base. Its expansion was broadly matched by the contraction in the resource-based sector of farming and mining, a decline in share of employment from 33 to 23 per cent and a fall in share of output from 30 to 23 per cent. Services, to which the utilities of gas, electricity and water, and construction are added to become the tertiary sector, were the cornerstone of the economy with a largely unchanged contribution of around 53 to 58 per cent for employment and product respectively.

Table 1 about here

Table 2 about here

The data are widely recognized as robust indicators of trends. However, there are shortcomings in using them as measures of structural change. The two key references are Butlin (1962) and Keating (1973) who constructed the long term estimates of national accounts and workforce data respectively. These series have been subject to commentary and revisions.<sup>6</sup> There are a number of problems. These data rely heavily on the *Production Bulletins* covering farming, mining and manufacturing and the population *Census*. The very large service sector is practically invisible. Attempts to calculate its output are bedeviled by the intangible nature of the product. Valuations

---

<sup>6</sup> See references in note 1 above.

of its inputs are used instead. This places great reliance on the accuracy of the employment series in services, which rest heavily on inter-census interpolation that masks year to year fluctuations, and wage data that is less than comprehensive. Further conceptual and practical issues arise in drawing boundaries between the sectors. Some authors, such as Dowie, aggregate the nine industry classification used by Butlin to a threefold classification, viz, primary, secondary and tertiary.<sup>7</sup> This process involves making important decisions about boundaries, particularly about whether mining should be included with the rural sector or with manufacturing, and whether industries such as construction and utilities that have tangible product should be separated from 'services'. Similar problems arose when classifying workers amongst occupations. In his Report about the 1933 *Census*, the Statistician concluded that 'the taxonomic problem [of classifying occupations] is never completely solved. It is complicated by the development of new fields of industrial enterprise and by the splitting and overlapping of fields previously conventionally definable, by the emergence of new occupations, crafts and callings, [and] by the further specialization and division of labour...'<sup>8</sup>

## EXPLANATIONS OF STRUCTURAL CHANGE

---

<sup>7</sup> Maddock and McLean follow Boehm in using four: 'farming', 'mining', 'manufacturing' and 'other'. Maddock and McLean, 'Australian economy', Table 1.2, 19. A recent contribution continues with the three-sector approach (agriculture, industry, and services) but does disaggregate 'industry' in a subsequent table. Broadberry and Irwin, *Lost exceptionalism?*, pp. 269-70.

<sup>8</sup> *Statistician's Report, Census of the Commonwealth of Australia, 1933*, p. 214.

Describing the structural shift has, nonetheless, proven to be more straightforward than explaining what caused it to take place. The aggregate data captures the net outcome of hundreds of thousands of decisions taken by businesses and households in any year. The ‘shape’ of the economy<sup>9</sup> altered continuously as entrepreneurs, investors and workers readjusted their behaviours in the light of a set of price signals. The most relevant sets of information were the terms of trade between industries<sup>10</sup> and the relative profitability of firms between industries, the latter showing the return to investing in a bundle of resources to produce those goods and services.

The existing literature has focused most of its attention on one set of price signals, tariffs and subsidies. Tariffs rose from 1907 onwards driving a wedge between domestic and ‘free trade’ prices for manufactures.<sup>11</sup> There are two indices of the ‘height’ of the tariff. The first is a simple average of the revenue collected divided by the value of net imports, both dutiable and total, entering the country in the same

---

<sup>9</sup> Butlin, *Shape of the Australian economy*.

<sup>10</sup> ‘... the inter-sectoral terms of trade...governed resource allocation within the domestic economy.’ Thomas, *Manufacturing*, p. 269.

<sup>11</sup> For a discussion of the political economy of changes in the tariff see Reitsma, *Trade Protection in Australia*, ch. 2; Anderson and Garnaut, *Australian Protectionism*, chs. 2 & 4. The tariff was subject to broad revisions in 1908, 1911, 1914, 1921, 1926 and 1928 before the introduction of a host of emergency measures in the Scullin Tariff between August 1929 and July 1931. Tariff schedules were further affected in the 1930s as Australia offered increased preference to Britain and other trading partners through its participation in the Ottawa Agreement in 1932 and the ill-fated trade diversion policies of the late 1930s. The introduction of preferential tariffs from 1908 meant that the rate of duty differed according to the country from which the import was sourced. Furthermore, the Tariff Board, established in 1921, made numerous alterations to duties on individual items throughout the 1920s and 1930s. Linge, *Australian Tariff Board Reports*.

year.<sup>12</sup> Chart 1 shows that the average rate of duty paid on those imports on which duty was payable remained roughly constant from 1903 until the beginning of World War I when it fell until 1921 before rising above pre-war levels at the onset of the 1929 depression. Average rates rose sharply in the early 1930s and remained on a relatively high plateau, inflated by primage duty levied from 1931 to 1939, but with a declining trend due to rate adjustments and the preferential system under the Ottawa Agreement. The ratio of duty paid on all imports followed the same broad pattern although the percentage of imports admitted free of duty fluctuated by rising before the World War I, falling in the 1920s and rising again in the 1930s.<sup>13</sup> The simple average method has a downward bias in that, *ceteris paribus*, the higher the rate of duty the lower the value of imports and so the less duty collected. Another study has recalculated the data, using a sample of commodities for which corresponding import and production figures are available, using local production and imports as the denominator.<sup>14</sup> This series, an index, shows higher rates of increase in the ‘weight’ of the tariff than the simple average especially during the 1920s. Finally, Lloyd has constructed tariff series for all and dutiable clearances with adjustments for refunds and drawbacks of duties.<sup>15</sup>

Chart 1 about here

---

<sup>12</sup> Australia, *Overseas Trade Bulletin*, various.

<sup>13</sup> The impact of the revised tariff schedules was two-fold. Rates were increased and more goods were made dutiable. *Commonwealth Year Book of Australia* 1921, pp. 503-05.

<sup>14</sup> Carmody, Australian tariff, pp. 51-65.

<sup>15</sup> Lloyd, 100 years of tariff protection.

None of the series discussed in the last paragraph correlate closely with the structural change identified in the previous section. Chart 1 indicates very little concordance between trends in average tariff rates and manufacturing's share of GDP or employment. The only trend similarity between tariffs and the employment share was during World War One and, for tariffs and GDP share, during 1925-26 and 1928-29. More broadly, manufacturing's rising share of GDP from about 1904 to 1925-26 was not accounted for by trends in tariff rates, for which there was no distinct secular movement. While the Scullin tariff lifted average rates steeply between 1928-29 and 1931/2, the GDP and employment shares fell during the Slump. The subsequent rise in manufacturing's share on both measures is in contrast to declining average tariff rates in the 1930s. Nor are there any obvious lagged relationships. In addition to this broad picture, corresponding data on tariff levels and employment exist for a limited number of individual products in the interwar period, testing of which has provided no support for a causal relationship between the two.<sup>16</sup>

Governments also altered the ratio of domestic to 'free trade' prices through other means, primarily subsidies to domestic producers. Bounties and subsidies were paid to producers in many industries. However, the farming industries were the major recipients. The form of subsidy ranged from producers receiving cash grants through to being provided with transport services at less than cost and price support

---

<sup>16</sup> *Production Bulletins* and *Overseas Trade Bulletins* for 1918-19, 1928-29 and 1938-39 provided data for changes in employment and import duties. Scatter diagrams of the data proved inconclusive and problems of endogeneity among the variables cautions against seeking a causal relationship through regression analysis.

schemes.<sup>17</sup> A number of attempts were made in the late 1920s and 1930s to estimate the value of this assistance.<sup>18</sup> The authors of *The Australian Tariff* calculated that the subsidy equivalent of the tariff to manufacturing was £26 million in 1926-27 while primary industries were not far behind receiving £22 million. By 1932-33, the subsidy equivalent paid to primary industry had risen to £29 million with the amount going to manufacturing having fallen to £19 million.<sup>19</sup>

Contemporary economists decried the allocative effect of tariffs and subsidies.<sup>20</sup> They argued, in some memorable prose, that these policies distorted markets in ways that led to a loss of national welfare. Shann, for instance, wrote in 1929 of the creation of a system of ‘faked prices’ that ‘deranges and weakens [the] whole economy.’<sup>21</sup> Benham asserted that ‘there has been deliberate interference with the “price-mechanism,”’<sup>22</sup> likening this to the actions of a ‘Dictator’.<sup>23</sup> All agreed that Australia’s comparative advantage lay in its resource-based industries. The farm and mining industries were exporters who, of necessity, accepted the world price for their products. In contrast, manufacturing and services were sheltered from world markets, the former because of tariffs and the latter by its non-tradeable nature. The export sector could not pass on

---

<sup>17</sup> See Eggleston, *State Socialism*; Butlin, Barnard, and Pincus, *Government and Capitalism*.

<sup>18</sup> Giblin, *Marketing control*, pp. 148-54; Brigden, et.al., *Australian Tariff*, Part IV and Appendices N and O; and Nimmo, *Effect of the tariff*, pp. 118-19.

<sup>19</sup> Nimmo, *Effect of the tariff*, p. 121.

<sup>20</sup> Benham, *Prosperity of Australia*, chapter 5; Brigden, et.al., *Australian Tariff*; Giblin, *Marketing control*.

<sup>21</sup> Shann, *Economic History*, p.447.

<sup>22</sup> Benham, *Prosperity of Australia*, p. 139.

<sup>23</sup> Benham, *Prosperity of Australia*, p. 137.

higher costs to its customers whereas the sheltered industries could. Tariffs raised the input costs of the export sector so narrowing its margins. Moreover, increases in domestic prices feed back into higher wages through an indexation mechanism.<sup>24</sup> By the late 1920s there was serious concern that the process may have gone too far by threatening the viability of the export industries. The rapid increase in the level of assistance being given to the minor rural industries even before the onset of the 1930s depression served to reinforce the point. As Giblin so famously wrote:

The vision that comes is of Australia as one enormous sheep bestriding a bottomless pit, with statesman, lawyer, miner, landlord, farmer and factory hand all hanging on desperately to the locks of its abundant fleece. The limits to protection are set by what the sheep will carry, and there are definite limits to that, even if the threat of synthetic wool remains only a threat.<sup>25</sup>

The debate about the welfare loss associated with the tariff has continued to the present day. Anderson and Garnaut encapsulate the prevailing view with the statement that ‘one of the most robust conclusions from economic theory is that protection reduces per capita national income of a small economy.’<sup>26</sup> The analysis undertaken by Brigden and his co-authors of *The Australian Tariff* has been revised over the years by more formal and increasingly sophisticated modeling.<sup>27</sup> This literature, which draws heavily on international trade theory, largely passes over the issue of the mechanism

---

<sup>24</sup>Hancock, Australian wage policy, pp. 129-60.

<sup>25</sup> Giblin, Marketing control, p.154.

<sup>26</sup> Anderson and Garnaut, *Australian Protectionism*, p. 12.

<sup>27</sup> Coleman, Cornish and Hagger, *Giblin's Platoon*, pp. 56-73 & 80-83; Tyers and Coleman, Beyond Brigden; Athukorala and Chand, Tariff-growth nexus.

by which tariffs caused manufacturing to grow relative to the rest of the economy in terms of the resources it used and its share of product.

The link between tariffs and subsidies and the relative expansion of manufacturing in the economy is made most clearly by Benham. Tariffs result in higher domestic prices than would be the case under free trade and also permit the manufacturer to pay higher money wages. He argues that ““protected” industries are thus rendered more profitable, and more capital and labour therefore flows towards them, than would be the case under free trade.’<sup>28</sup> Moreover, ‘...labour and resources are deliberately diverted away from non-protected industries and towards protected industries, or, broadly speaking, away from Primary Production and towards Manufacturing.’<sup>29</sup>

The question is how much of the shift towards manufacturing was the result of such policies? Benham equivocates noting that the share of workers in the primary sector had fallen secularly in advanced economies as a result of technological change. He concludes that the tariff had really operated at the margin, as under free trade ‘Manufacturing would have expanded to a *somewhat* smaller extent, and in a somewhat different way.’<sup>30</sup> The structure of manufacturing was altered as ‘labour and resources were diverted to the more highly protected Manufacturing industries.’<sup>31</sup>

---

<sup>28</sup> Benham, *Prosperity of Australia*, p. 138.

<sup>29</sup> Benham, *Prosperity of Australia*, p. 139.

<sup>30</sup> Benham, *Prosperity of Australia*, p. 146. Emphasis in the original.

<sup>31</sup> Benham, *Prosperity of Australia*, p.162.

Benham and others have argued that the profits of manufacturers rose as tariffs rose. Local producers, it is alleged, will charge higher prices as tariffs rise because they can be 'passed on.'<sup>32</sup> Increased average revenues are assumed to result in higher profits. This is not necessarily the case. Let us suppose that imports and domestic products are perfect substitutes<sup>33</sup>, and that imports make up 20 per cent of the market. A new tariff of 10 per cent is imposed on imports that results in zero demand for those products. What is the appropriate response of the local firms if they are profit-maximizing? Let us also suppose that each firm was in an equilibrium position, with marginal cost and marginal revenues equal, before the onset of the tariff. How will they respond to the tariff? They can raise their price to the pre-tariff price plus duty. Demand will fall correspondingly. However, by taking this action their marginal revenues will rise above marginal costs. Profit maximizing behaviour will lead each firm to increase its supply back to the pre-tariff production level so reducing the price. If the new price, with 80 per cent of the pre-tariff demand being supplied, exceeds the pre-tariff price existing firms in the industry will have an incentive to increase supply and/or new entrants would start production as long as they can do so without marginal costs exceeding marginal revenues. Production would increase to the point where the 20 per cent of the market supplied by imports has been met locally. The price would fall back to the pre-tariff level as long as there is a competitive market.

Those making the argument in the 1920s that an increase in tariffs would increase profits had seen fit to qualify the case. By raising prices after a tariff increase, firms would trigger a subsequent increase in costs. Cost rises were of two sorts. The first

---

<sup>32</sup> Brigden, et.al., *Australian Tariff*, Part V, Passing on of excess cost.

<sup>33</sup> A questionable assumption. See Thomas, *Manufacturing*, pp. 249-51.

came from the centralized wage system that automatically adjusted the Basic Wage to movements in price indexes that measured the 'cost of living'. A combination of higher prices for imports and domestic goods would feed through into quarterly 'cost of living' adjustments. Secondly, insofar as firms relied on imported inputs their costs were increased.<sup>34</sup> In its Reports in the 1920s the Tariff Board lamented that firms were using the increased costs as a rationale for greater protection and expressed alarm at the growing divergence between money wages in Australia and overseas.<sup>35</sup> The impact on the margins earned by firms of these costs pressures would once again depend on industry and firm-specific factors. In general terms, though, Australian manufacturing was relatively labour intensive with a high degree of reliance upon imported inputs making it hard to escape the conclusion that the supposed positive stimuli to profits given by tariffs in the first instance were quickly moderated by these feedback loops. A recent study of US trade policy in the late nineteenth century has also highlighted the significance of tariff-induced increases in the price of non-tradeable goods with the effect that an average 30 per cent import tariff translated into only a 17 per cent implicit subsidy to import-competing producers.<sup>36</sup>

The impact of tariffs on profitability will also depend on the degree of industry competitiveness. First, the elasticity of supply of the domestic industry matters.<sup>37</sup>

---

<sup>34</sup> Roughly three-quarters of imports were producer goods. Thomas, *Manufacturing*, p. 266, notes 14, 15.

<sup>35</sup> Brigden, et.al., *Australian Tariff*, Appendix C.

<sup>36</sup> Irwin, 'Tariff incidence'.

<sup>37</sup> '...the capacity to increase prices differs greatly between ...industries. It depends upon the conditions of supply and demand for the goods produced. Where demand is fairly rigid, and the supply is responsive to market conditions, the necessary increase in prices may be almost automatic.

Competitive industries are more likely to increase their supply than more highly concentrated ones, so reducing price below the post-tariff import price. Local monopolies can set a price to maximize profits. Industries with binding cartel agreements could hold prices above competitive levels after the tariff was imposed. How competitive was Australian manufacturing in the first four decades of the twentieth century? A common view has been that many industries had high levels of seller concentration and/or engaged in collusive behaviour especially with respect to price agreements.<sup>38</sup> A recent study has found that the increase in seller concentration in many manufacturing industries before World War II was the result of the adoption of new technologies that allowed for significant economies of scale.<sup>39</sup> Barriers to entry rose quickly in those industries where firms could reap economies of scale or establish powerful brands.<sup>40</sup> Firms enjoying market power defended their above normal returns behind barriers to entry that became increasingly difficult for new entrants to breach. However, these barriers were breached if the rewards on offer were large enough. There was entry into even highly concentrated industries such as glass, rubber tyres and confectionery by both foreign and domestic firms.<sup>41</sup> In a related research project, the authors have recently shown that profitability and new capital issues, both in manufacturing and the economy as a whole, followed very similar

---

Differences in conditions of supply are probably the more important causes of differences in capacity to increase prices to cover the costs imposed.' Brigden, et.al., *Australian Tariff*, p.53

<sup>38</sup> Butlin, Barnard & Pincus, *Government and Capitalism*, ch. 4. See also Wilkinson, *Trust Movement*; Rawlings, *Who Owns Australia?*

<sup>39</sup> Fleming, Merrett and Ville, *Big End of Town*; Forster, *Economies of scale*.

<sup>40</sup> Bain, *Barriers to New Competition*.

<sup>41</sup> Fountain, *Technology acquisition*, pp. 89-108; Barker, Pilkington; Jones, *Multinational chocolate*; Stanton, *Protection, market structure*.

trajectories through the interwar period. Economy-wide, there was an 85 per cent correlation between the annual series for the return on equity and the number of new capital issues, 1920-38.<sup>42</sup> This would suggest that new investment, by incumbents and new entrants, flowed largely unimpeded into profitable industries and products.

Technological change and shifts in labour-capital ratios were commonplace in the economy. Often the two were associated as technology was embodied in new machinery that reduced the need for labour or substituted lower cost process workers for craftsmen. The importance of these developments has been underplayed in the literature, which has focused its attention on the gap between productivity levels in Australia and overseas.<sup>43</sup> Our concern is with the impact of such investments on relative profitability amongst firms within the domestic industry. In such circumstances, competitive advantage amongst firms within an industry could swing in favour of those undertaking most investment in new production methods. Firms with lower costs had an incentive to increase supply to the point where the new equilibrium price was lower than the pre-tariff price. Is there evidence to support this argument? Colin Forster concluded after a careful review of the data that 'although it is impossible to measure with precision the growth of manufacturing productivity in Australia during the 1920s, general considerations indicate that the increase was substantial.'<sup>44</sup> Even those authors who continue to focus on lower levels of manufacturing productivity than other nations acknowledge that such a divergence

---

<sup>42</sup> Both series are calculated from data in *Australian Investment Digest*, various years.

<sup>43</sup> This continues to be the case. Broadberry and Irwin, *Lost exceptionalism?*; Irwin, *Australian exceptionalism revisited*; McLean, *Why was Australia*; Huberman and Minns, *The times they are not changin*.

<sup>44</sup> Forster, *Industrial Development*, p.224.

existed prior to major tariff increases and applied equally to a non-traded sector like construction.<sup>45</sup> Mark Thomas argued that Australian manufacturing increased in competitiveness vis-a-vis imports in the 1930s, through a combination of ‘the increased efficiency of Australian industry and declining input prices.’<sup>46</sup> This resulted, in part, from the growth of the local market that permitted the realization of economies of scale in some industries but, Forster suggests, was insufficient to provide minimum efficient scale for those capital-intensive and science-based industries of the second industrial revolution.<sup>47</sup> However, new technologies were adopted in many industries that provided an opportunity for incumbents or entrants to reshape the nature of ‘rivalry’.<sup>48</sup> Moreover, there occurred the substitution of machinery for labour on a large scale across a wide range of industries. Once again, there were marked differences in the extent and timing of this process between industries that could explain the reconfiguration of industry structure.<sup>49</sup>

Thomas, more broadly, casts doubt on the link between changes in tariff rates and the expansion of manufacturing in his study of recovery from the 1930s depression.<sup>50</sup> His analysis of the role of import substitution as a contributor to output growth throughout the inter-war period demonstrates that there was no simple relationship between increases in tariffs, devaluation, and declining import penetration. The 1921 tariff, and

---

<sup>45</sup> Irwin, *Australian exceptionalism*, pp. 232-3.

<sup>46</sup> Thomas, *Manufacturing*, p. 267. See pp. 255-260.

<sup>47</sup> Forster, *Economies of scale*, pp. 167-8.

<sup>48</sup> Eyre, ed, *Technology in Australia*. See Porter, *Competitive Strategy*, pp. 17-23.

<sup>49</sup> Mauldon, *Mechanisation*, Tables XI, XII and XIII, pp. 40 (a) and (b), 57 and 62.

<sup>50</sup> Thomas, *Manufacturing*, pp. 246-71.

further revisions in 1926 and 1928, did not result in increased import substitution.<sup>51</sup> The decomposition of output growth shows that import substitution made a negative contribution to the growth of total expenditure between 1919-20 and 1928-29.<sup>52</sup> In marked contrast, there was a sharp increase in the contribution of import substitution between 1928-29 and 1931-32. However, he argues that this resulted more from the increased competitiveness of Australian manufacturing as domestic costs fell than from the impact of either the Scullin Tariff or devaluation. Moreover, import substitution played a negative role during the recovery phase after 1932 up to the outbreak of World War II. He concludes that ‘the contribution of massive import substitution to Australian recovery appears on such evidence to be a myth.’<sup>53</sup>

From a comparative perspective, recent research on manufacturing expansion in different periods of United States history provides some support for a more muted influence of tariff policy. Irwin has variously concluded that the cotton industry could have survived without tariffs by 1830, that the belated development of the tinsplate industry was due to high input costs not lack of protection, and that post-bellum industrial protection was moderated by the impact of import duties on the price of non-traded goods.<sup>54</sup> Focusing recently on the major structural shift of the United States economy towards manufacturing from the 1890s, Irwin rejects the McKinley tariff as the central explanation in favour of cost-reducing natural resource discoveries.<sup>55</sup>

---

<sup>51</sup> Thomas, *Manufacturing*, p. 252.

<sup>52</sup> Thomas, *Manufacturing*, Table 11.2, p. 255.

<sup>53</sup> Thomas, *Manufacturing*, p. 255.

<sup>54</sup> Irwin and Temin, *Ante-bellum tariff*; Irwin, *Did late nineteenth-century*; *ibid*, *Tariff incidence*.

<sup>55</sup> Irwin, *Explaining America’s surge*.

## AN ALTERNATIVE EXPLANATION OF STRUCTURAL CHANGE

An alternative perspective emphasizes previously neglected dynamic elements in the Australian economy as entrepreneurs and business people responded to the many opportunities presented to them. Our contention is that the nature of the Australian economy was markedly different in 1939 from what it had been in 1901. The range of goods and services on offer was far wider. Changes in consumption patterns provided opportunities for firms to develop new markets, Edith Penrose's interstices.<sup>56</sup> The technologies underpinning production and distribution were far more advanced. Cost functions were realigned by the adoption of new technology, much of which was labour saving. Changes in demand and supply schedules across the economy prompted firms to adjust their behaviours in an attempt to lift profitability or to ward off failure. Shifts in demand and supply factors were played out in thousands of micro-markets in which firms competed. Factors exogenous to the firms were responsible for some of the shifts in both the demand and supply schedules. However, firms increasingly built the capabilities to influence the demand for their products through branding and advertising, and to create superior production technologies. The resultant effect on changes in demand and supply factors over time was reflected in a shifting in relative profitability between industries down to very narrow product categories.

### **Modern Consumerism**

---

<sup>56</sup> Penrose, *Growth of the Firm*.

A number of powerful drivers of change can be identified on the demand side. There was a strong demonstration effect from the United States and the United Kingdom about what was on offer. Australians wanted to experience what was new and different. The 1920s in particular was a decade of experimentation. Expenditure patterns shifted under the weight of three forces: a growing demand for consumer durables; a growing preference for entertainment and leisure activities; and the emergence of a new category of expenditure, fast moving consumer goods.

Australian consumers and producers were aware of the new consumer products, particularly consumer durables, coming onto markets in North America and Europe after World War I. Immigrants brought this personal knowledge with them. Australian residents saw this 'new' world through the medium of letters from relatives living abroad, newspapers, magazines and cinema and in shop windows. They observed the purchases of their family and friends. What might have seemed unobtainable luxuries became necessities for more and more families under the siren call of advertising.<sup>57</sup> Household budgets were thus rearranged to reflect changes in the composition of demand in the light of an expanding set of products and services. In turn, this contributed to changes in the relative profitability of firms and the relative size of industries.

---

<sup>57</sup> For estimates of amounts spent on advertising through different medium see McNair, *Radio Advertising*. For an account of the growth of the advertising industry see Crawford, *But Wait, There's More*.

The decade of the 1920s has been identified as the beginning of Australia's progress to becoming 'a modern consumer society.'<sup>58</sup> A sufficient number of households possessed the discretionary income to purchase motor cars and a range of household durables particularly small kitchen appliances.<sup>59</sup> Hire purchase facilities allowed the cost to be spread over a number of years. Whitwell argues that these expenditures rose rapidly in the second half of the decade before falling away in the depression and war. The extraordinary growth of consumer spending after 1945 was the start of a new era rather than a continuation of a longer process.<sup>60</sup> However, there are a range of indicators to suggest that the demand for consumer durables continued strongly throughout the 1930s. Table 3 indicates the rapid growth in popularity of durables such as radios, telephones and motor vehicles.

Table 3 about here

The increased consumption of motor vehicles and household consumer durables such as radios, washing machines, refrigerators, vacuum cleaners and the like necessarily lagged behind investments in the construction of sealed roads and the provision of electricity and gas. State and local governments made those investments on a large

---

<sup>58</sup> Whitwell, *Making the Market*, p. 3.

<sup>59</sup> There may be an element of the Engel effect here as consumers shifted their relative expenditures from primary industry products such as food and clothing to manufactures with a higher income elasticity of demand. However, it should be remembered that this was a period of relatively slow income growth. Dennis and İřcan, Engel versus Baumol, use an accounting framework to identify an Engel effect for the USA over a longer period.

<sup>60</sup> Dingle, Electrifying the kitchen; Whitwell, *Making the Market*.

scale in the 1920s and 1930s.<sup>61</sup> Private providers had also entered the energy sector from the late nineteenth century. A hybrid system of state and private providers continued up to World War II but the government utilities absorbed many of the smaller private firms. The number and share of households connected to gas and electricity rose rapidly between the wars. 34 per cent of homes in Australia had electricity in 1923 a number that rose sharply later in the decade; by 1947 78 per cent of private dwellings had electricity; just two points shy of the figure for the United States of America in 1941.<sup>62</sup> The 1947 Census confirms an almost complete coverage of private houses in the metropolitan cities.<sup>63</sup> While data points are relatively few and far between, it appears that most of Sydney was already covered by 1939 thus locating most of the growth in the interwar period.<sup>64</sup>

There was a growing market for electrical appliances, which provided opportunities for local producers and distributors. A substantial electrical manufacturing industry had been established in the 1920s to fill the demand for electric lighting and small appliances such as irons and radiators.<sup>65</sup> It continued to expand in the 1930s as sales of washing machines, vacuum cleaners, refrigerators and gas cookers and heaters continued to grow. The market was served by a combination of local manufacturers, many of whom were foreign owned, and importers. The distribution channels ranged

---

<sup>61</sup> Butlin, *Australian Domestic Product*, Table 9, pp. 26-27; Sinclair, *Capital formation*. See also Linn, *ETSA*; Wilkenfeld and Spearitt, *Electrifying Sydney*.

<sup>62</sup> Schwartz, *More Work for Mother*, pp. 93-4; Whitwell, *Making the Market*, p. 14

<sup>63</sup> Census of Commonwealth of Australia, *Statistician's Report*, p. 289.

<sup>64</sup> Anderson, *Electricity Supply*, Appendix 1, p. 255.

<sup>65</sup> Forster, *Industrial Development*, ch. 5; Dingle, *Electrifying the kitchen*, p. 124.

from door to door salesmen, to specialist stores and department stores. Hire purchase or some form of vendor finance became common for the more expensive items.<sup>66</sup>

Consumption patterns altered in the face of new technologies, shorter working hours, longer life expectancy and rising incomes.<sup>67</sup> More was spent on entertainment and leisure pursuits. Two illustrations suffice to make the point. First, the popular entertainments of the nineteenth century, the circus, music hall and live theatre, were challenged by the arrival of the cinema in the 1920s. The speed with which it became a mass medium is astonishing.<sup>68</sup> By 1927 there were 1,250 theatres that had sold 110 million tickets that year. Gross receipts were £5.5 million. Investment in the theatres was estimated to be £25 million and 20,000 people worked in the industry.<sup>69</sup> Sport and recreation played an increasingly important part in Australian life. School children were dragooned into organised physical activity. Participation was fostered through school, church, neighbourhood and district competitions covering every sport from archery to volley ball. Their parents might choose fishing, sailing, bowls or golf. Recreational activity became institutionalized with state and national organizations taking charge in all of the major sporting codes. Sport became mass entertainment as

---

<sup>66</sup> Tariff Board Reports, Electric Household Clothes Washing Machines – Tariff Item 179 (D) (3) (d), 26 April 1938; Vacuum Cleaners, 29 June, 1938; Refrigerators and refrigerator Parts covered by Tariff Item 176 (F) (2), 9 February 1939; Gas Cooking and Heating Appliances – Tariff Item 180 (C), 6 September, 1938.

<sup>67</sup> The literature emphasizes the important of shorter working hours (leisure preference) and increased life expectancy as important changes in wellbeing in the first half of the twentieth century. McLean, Economic wellbeing.

<sup>68</sup> Tulloch, *Australian Cinema*.

<sup>69</sup> Royal Commission into the Moving Picture Industry, pp. 14 and 22.

attendances at football matches, test cricket and racing rose.<sup>70</sup> Much of the infrastructure was provided by local government and churches. However, there were plenty of opportunities left for business.<sup>71</sup> The demand for sporting equipment and specialized apparel including footwear grew.<sup>72</sup> Large crowds at cricket grounds, boxing stadiums, theatres, and race tracks required transport, food and drink, and at the latter, gambling facilities. Posters, tickets and programs gave additional work to printers, and newspapers' sports sections fed the public's demand for results and information.

Fast moving consumer goods became an important part of expenditure patterns after World War I. Until then, the category would have been confined to a small range of products — cigarettes, pipe tobacco, toiletries and confectionery. The list lengthened in the 1920s and 1930s to include cosmetics such as face creams, lipstick, nail polish,<sup>73</sup> toothpaste and over the counter drugs such as 'Aspro'.<sup>74</sup> Confectionery also became big business as the homemade or unbranded sweets of pre-World War I were replaced by branded chocolates and toffees, and chewing gum. The soft drink market

---

<sup>70</sup> See entries under type of sport in Chisholm, ed, *Australian Encyclopaedia*; Vamplew and Stoddart, eds, *Sport in Australia*; Adair and Vamplew, *Sport in Australian History*; Cashman, *Paradise of Sport*.

<sup>71</sup> Some boxing promoters, Hugh McIntosh, and SP bookies, John Wren, became millionaires. Van Straten, *Huge Deal*; Buggy, *John Wren*.

<sup>72</sup> Dunlop Australia first made a sandshoe in 1924. By 1930 half of its footwear production was for sports. It began production of the famous 'Volley' tennis shoe in 1939.

<http://www.dunlopfootwear.com.au/Volleys/default.asp>. [Accessed 14 November 2006]

<sup>73</sup>Woodhead, *War Paint*.

<sup>74</sup>Grenville Smith and Barrie, *Aspro*.

was transformed by the adoption of the crown seal and commercial refrigeration.<sup>75</sup> Children became important consumers in their own right, not only through their expenditures of pocket money but as a new segment in the food market. The first wave of convenience foods for breakfast, cereals, school lunches, vegemite and processed cheese, and after school and bed time snacks, ice cream, milk chocolate and cocoa came from the giant foreign food corporations of Kellogg's, Kraft, Nestle, Cadbury's and the local Peters.<sup>76</sup> These types of products, along with canned fruit and baked beans, came in new and improved forms of packaging.

### **Supply Side Shifts**

The economy was also experiencing a series of important changes on the supply side that would in turn disturb existing equilibrium positions. Four will be considered briefly: the sudden curtailment of imports occasioned by World War 1; the marked increase in specialization of function; a refashioning of distribution channels; and the growing importance of intellectual property as a firm resource and as a source of competitive advantage.

Australia entered the war against Germany on 5 August 1914. The conflict played havoc with Australia's trade. A shortage of shipping space meant that the bulk of commodity exports did not leave its shores for the duration of the war and imports were similarly affected. Supplies of imported manufactures, including capital goods, parts and components and finished goods were in short supply. The immediate impact

---

<sup>75</sup>Blainey, *Black Kettle*, pp. 381-6 and 369-72; Sharpe, *Remember that Heavenly Ginger Beer*; *Cottee's A Family Favourite*

<sup>76</sup>Symons, *One Continuous Picnic*, pp. 129-33.

on manufacturing industry was mixed. The number of workers employed remained constant around 385,000,<sup>77</sup> but the value of output shrank.<sup>78</sup> Could local firms compensate for the supply side shock? Their success was contingent on the capabilities of domestic firms, in an economy where military needs tightened factor markets, and the extent to which imported goods were critical to industry supply chains. Importantly, an expansion in the local metals industries, iron and steel, zinc and brass, permitted strong growth by downstream users. Some manufacturers entered markets for the first time,<sup>79</sup> while others found that an absence of import competition enabled them to achieve economies of scale and to reduce their costs.<sup>80</sup> Colin Forster argued that ‘the net result was a change in the pattern of production so that the war can be regarded as a definite transition period...’<sup>81</sup>

A more gradual and longer term impact of the expansion of the economy in the first half of the twentieth century was the opportunity for an increased specialization of function across the board. Butlin argues that the ‘gradual separation’ of the ‘institutional combination of manufacturing, trade and transport function, the confusion of rural production, construction, transport and selling activities’ was a ‘basic feature of pre-1914 and interwar growth.’ This might, *a priori*, ‘enlarge opportunities for increased efficiency.’<sup>82</sup> Specialization could reduce costs

---

<sup>77</sup> Keating, *Workforce*, Table 7.11, p.182.

<sup>78</sup> Butlin, *Australian Domestic Product*, Table 87, p. 169 and Table 267, pp. 455-56.

<sup>79</sup> Forster, *Australian manufacturing*, pp. 222-23.

<sup>80</sup> Geo. W. Kelly and Lewis in Pratt, ed., *Australian Tariff Handbook 1919*, pp. 139-48.

<sup>81</sup> Forster, *Australian manufacturing*, p. 211.

<sup>82</sup> Butlin, *Perspectives*, p. 315.

independent of scale as firms improve efficiency due to cumulative experience.<sup>83</sup> Evidence of the growth in specialization can be found in trade directories, where firms advertised their wares to buyers. A review of the 'Index to professions and trades Melbourne and suburbs' in the *Sands & McDougall's Directory of Victoria*<sup>84</sup> in 1920, 1930 and 1939 reveals significant change. There were 48 new categories in the 1930 edition compared with 1920, and another 218 categories in 1939 compared with 1930. Thus, the number of occupations increased by a third over the interwar period, although the actual number of new occupations was greater than this due to the disappearance from the directory of some more traditional trades. The new entrants were spread across services and manufacturing. The professions splintered into highly specialist groups, particularly amongst chemists and engineers. Specialist intermediaries and wholesalers abounded, including the valuers and auctioneers making a market in second hand machinery. The list of manufacturing trades shows the rapid emergence of a range of new industries and products such as air conditioning, Christmas cards, gramophone records, ice cream cones and wafers, hearing aids and spectacles.

This process of specialization was particularly evident in wholesale and retail distribution. The role of the importing wholesaler, once the most important conduit between Australian retailers and their foreign suppliers, was diminishing. The tariff played its part. However, many of the larger retailers, particularly the department stores, established their own buying offices abroad.<sup>85</sup> Increasingly, these large

---

<sup>83</sup> Porter, *Competitive Strategy*, pp.11-12.

<sup>84</sup> *Sands & McDougall's*, 1920, 1930 and 1939.

<sup>85</sup> Dalton, *Economic and Trade Conditions*, pp. 181-99.

metropolitan city-based stores either integrated backwards into production or formed close links with domestic producers in relationships that exhibited considerable countervailing power. Sidney Myer's store in Bourke Street, Melbourne, borrowing freely from models in the United States, became the pace setter for department stores in the 1920s and 1930s. New types of specialist retailer were emerging. Chain stores such as Moran and Cato in groceries, O. Gilpin's in drapery and ironmongery, and G. J. Coles in variety goods were well advanced before 1939.<sup>86</sup> The expanding use of the motor car brought dealerships, garages selling petrol and providing repairs, and used car lots in its wake. The general store was challenged by specialist retailers, such as grocers, Manchester, hardware and home wares.<sup>87</sup> The clothing stores segmented the market into women's and men's clothes, and youths and children. Moreover, hats, corsets, fur coats, gloves and shoes for women would be sold in different establishments. Purchases were driven by events such as parties and weddings, the changing season and fashions rather than need. New forms of food retailers started to trade in the 1930s, delicatessens, soda fountains and the soon to be ubiquitous milk bar.<sup>88</sup>

---

<sup>86</sup> Pratt, *Sidney Myer*; Blainey, *If God Prospers Me*; McLaughlin, *Nothing Over Half a Crown*; Penny, *Just a Pocket for the Money*.

<sup>87</sup> The Victorian government licensed all shops from 1915 onwards. The first return in 1916 divides shops into 28 categories. An 'electrical and radio' category was added in 1933. The number of shops rose from 25,635 in 1916 to 41,127 in 1938. *Annual Report of the Chief Inspector of Factories*.

<sup>88</sup> *Sands & McDougall's*, 1939.

Additions to capital stock have figured prominently in the explanations of output and productivity growth before World War II.<sup>89</sup> The growing importance of intellectual property to firms should also be recognised. Knowledge and know how was embedded in organizational routines.<sup>90</sup> Australian firms imported technology on a large scale, a process that often included the transfer of machinery, blue prints and skilled workers to assemble and train the local operatives. Examples can be drawn from steel, glass and fertilizer industries.<sup>91</sup> Businesses sought exclusive access to their own technology through patents and to imported technology and the products it could make through licensing agreements. Many new issues of this period were for the purpose of purchasing the rights to manufacture another company's goods, which often included the purchase of patents or licences.<sup>92</sup> Products were branded and heavily promoted where ever possible. Firms registered trade marks and paid fees to foreign firms to use their trade marks on products made under licence to protect their property rights. These intangible assets were a source of competitive advantage to firms and a factor contributing to differing rates of profits between and within industries.<sup>93</sup>

Changes in demand or supply conditions had widespread repercussions across the economy. The point is most simply made with reference to motor vehicles and

---

<sup>89</sup> Forster, *Industrial Development*; Idem, Economies of scale; Butlin, Perspectives; Sinclair, Capital formation.

<sup>90</sup> This point appeals to the literature of the resource-based view of the firm.

<sup>91</sup> Hughes, *Australian Iron and Steel*; Hutchinson, Australian manufacturing; Fountain, Technology acquisition.

<sup>92</sup> Merrett, Parnell and Ville, Capital formation.

<sup>93</sup> Porter, Structure within industries, pp. 214-27.

electricity, two general purpose technologies that were diffusing rapidly through the interwar economy.<sup>94</sup> The pervasive impact of the motor car is captured by Womack, Jones and Roos in their claim that ‘twice this century [the motor car] has changed our most fundamental ideas of how we make things. And how we make things dictates not only how we work, but what we buy, how we think, and the way we live.’<sup>95</sup> The growing demand for motor cars affected a number of up stream industries, such as oil companies, road construction contractors, suppliers of aggregate and asphalt, and manufacturers and installers of traffic signals. Consumption of motor cars generated a new class of insurance risk, signaling increased competition within the insurance industry, and spurred the development of the hire purchase industry. Down stream garages sprang up to provide fuel, service and repair cars, with panel beaters and spray painters emerging as separate entities. Used car yards, wreckers and scrap metal merchants dealt with the older models. Motorists formed associations that vigorously promoted their interests against competing users of road space.<sup>96</sup> Commercial users of motor trucks, buses and cars arose apace. The truck became a major source of transport in the 1930s, while bus and taxi fleets also expanded.<sup>97</sup> Electricity generation had a pervasive impact on the economy. It reached back to the domestic coal mining industry as a source of energy and spawned hydroelectric schemes. Heavy engineering met its needs for both generation and transmission. Power was essential for the expansion of the telephone network, which had its own feedback loop

---

<sup>94</sup> Jovanovic and Rousseau, *General purpose technologies*, pp. 1182-1224

<sup>95</sup> Womack, Jones and Roos, *Machine that Changed the World*, p. 11. On the impact of electricity on economic and social life see Jakle, *City Lights*.

<sup>96</sup> Davison and Yelland, *Car Wars*.

<sup>97</sup> A fleet of 101 Yellow Cabs began operating in Melbourne in 1923, joining the 800 independent taxis already in business. Kelly, *Achieving a Vision*, pp. 91-99. See also Maddock, *People Movers*.

to business productivity by reducing communication costs. Power to factories greatly increased their productivity. In the 1930s many small tools such as drills and grinders, once hand tools, were fixed to a bench and power driven. The capacity of pumps and compressors also increased.<sup>98</sup> Electricity transformed offices by being used for lighting, lifts, hot water systems, air conditioning, refrigeration, and to power office equipment such as calculating machines. The retail trade, in particular, used electricity for illuminating shop windows, powering cash registers and running lifts and escalators in the larger department stores. By the late 1930s electrical appliances had invaded every room in the house. The State Electricity Commission of Victoria, for instance, boasted that there were 21 types of equipment other than lighting available.<sup>99</sup>

Our alternative story of structural change is a broad and contextualised one, which reflects a series of changes occurring across the economy in both the conditions of supply and of demand. There is no single dataset or model that can of itself capture these changes. We have provided a range of quantitative and qualitative data to support our thesis. However, if firms are expanding in response to a range of new opportunities brought on by demand and supply side changes, we would expect to find some degree of correlation between rates of capital formation and profitability between industries. The direction of causality between profitability and capital formation is not easy to specify – firms were responding to the profit signal in making investment decisions but, equally, investing in cost-reducing new technology boosted profits.

---

<sup>98</sup> *McPherson's Catalogue of Tools and Machinery*.

<sup>99</sup> *Ramsay's Architectural and Engineering Catalogue*, section 38-3, pp. 1-24.

We have extracted information from the *Production Bulletins* on operating surplus, output, capital investment, numbers of employees and establishments, the latter four as proxies for structural change, for a large range of manufacturing industries during the interwar period. Surplus, a crude measure of profitability, is the value of output, at wholesale prices, less the cost of inputs used such as raw materials and intermediate goods, tools, power and utilities charges, and labor costs.<sup>100</sup> We have split the exercise into two sub-periods, 1919-29 and 1931-39, to reflect definitional changes that preclude constructing a single unbroken series.

The results indicate a high degree of correlation between changes in surplus and the four measures of structural change – capital, output, employees, and establishments - suggesting that investment was flowing into those industries benefiting from the positive impact of the various factors identified above.<sup>101</sup> In particular, we find that some of the best performers in terms of profits and structural change are highly pertinent including electrical apparatus, lamps and fittings, and rubber goods. This exercise adds further weight to our argument, in earlier sections of the paper, that structural change was far more than simply a function of tariff protection for industries lacking a competitive structure.

Table 4 about here

---

<sup>100</sup> Costs such as interest payments, insurance, advertising and so on are not captured in this measure.

<sup>101</sup> We have reported a Spearman rank correlation. While we use interval data, the interest is in the relative ranking of industries and there is potential for a large margin of error in using the interval data. See discussion in Feinstein and Thomas, *Making History Count*, pp. 86-7. We have also calculated Pearson correlations and obtained high and statistically significant results. Results are available from the authors.

## CONCLUSION

From Federation to the eve of World War II the Australian economy added to its stock of labour, capital and technology. The allocation of these resources within the economy, however, altered significantly - manufacturing grew, the rural sector shrank by the same amount, and the tertiary sector remained roughly constant. The question is what motivated this reallocation. Consistent with recent revisionism on the American economy, we contend that the conventional story of tariffs and subsidies interfering with relative prices is at best a partial explanation. The thesis connecting tariffs and increased profitability has not been clearly established in the literature and does not provide a convincing explanation of how profits in manufacturing would rise both absolutely and relatively after an increase in the tariff. Taking an industrial organization perspective, the link is contingent on the competitive positioning of firms after the tariff rise. We acknowledge that in some industries structural conditions would allow tariffs to result in higher prices. However, we argue that a wide range of stimuli was also responsible for manufacturing increasing its share of the economy's resources and output. Nor does the data, while problematic in some respects, lend support to the conventional account. If we shift our attention away from the issues that have dominated much of the literature, notably Australia's comparative advantage and its costs and productivity relative to those of its trading partners, a different picture emerges.

Our contention is that new opportunities for profitable investment were becoming available in many parts of the economy because of changes on both the demand and supply sides. Many of these changes were exogenous to Australia. The demonstration effect was strong for both households and businesses. Information about new products and services, and the technology required to produce them, flowed freely into the country. Households shifted their preferences towards consumer durables, entertainment and leisure and fast moving consumer goods. These decisions were at the heart of Graeme Snooks' discussion of the changing boundaries between household and total economy.<sup>102</sup> Up to World War II, households were increasingly 'buying' goods and services that were previously produced and consumed within the family unit. Large scale investment in public infrastructure was a precondition that had been largely met by the mid-1920s. Increased profits awaited those firms first to market or who could develop a sustainable competitive advantage. Changes on the supply side such as the efficiency gains associated with specialisation, new distribution channels to satisfy customer demands, and a growing reliance on inimitable proprietary assets provide additional or complementary paths to profitable investments. Finally, we argue that the outcomes of these shifts in both demand and supply had large scale linkage effects across the economy.

Ian McLean and Jonathan Pincus have offered the tantalizing comment that 'there is the possibility that the nature of economic growth [between 1890 and 1940] was different from that in the preceding and subsequent periods of much faster

---

<sup>102</sup> Snooks, *Portrait of the Family*.

growth...<sup>103</sup> We believe this paper has helped to reassess and demystify the process of growth during much of this period.

---

<sup>103</sup> McLean and Pincus, Australian living standards, p. 196.

## REFERENCES

- Adair, D., and Vamplew, W. (1997) *Sport in Australian History* (Oxford: Oxford University Press).
- Anderson, G. F. (1955) *Fifty Years of Electricity Supply: the Story of Sydney's Electricity Undertaking* (Sydney: The Sydney County Council).
- Anderson, K., and Garnaut, R. (1987) *Australian Protectionism: Extent, Causes and Effects* (Sydney: Allen & Unwin).
- Athukorala, P., and Chand, S. (2005) Tariff-growth nexus in the Australian economy, 1870-2002: Is there a paradox? Presented at conference on: Globalisation in Asia and the Pacific before the Modern Era, Australian National University.
- Australian Investment Digest* (Sydney: Alex Jobson).
- Bain, J. S. (1956) *Barriers to New Competition* (Boston, MA: Harvard University Press).
- Barker, T. (1986) Pilkington: the reluctant multinational. In: G. Jones, ed. *British Multinationals: Origins, Management and Performance*, (Aldershot: Gower), pp. 184-201.
- Barnard, A., and Butlin, N. G. (1981) Australian public and private capital formation, 1901-75. *Economic Record*, 57: 354-67.
- Benham, F. C. (1930) *The Prosperity of Australia: an Economic Analysis* (London: P.S. King & Son).
- Blainey, A. (1990) *If God Prospers Me: a Portrait of Frederick John Cato* (Burwood, Vic: Chandos Publishing Company).

- Blainey, G. (2003) *Black Kettle and Full Moon: Daily Life in a Vanished Australia* (Camberwell, VIC: Viking).
- Broadberry, S., and Irwin, D. (2007) Lost exceptionalism? comparative income and productivity in Australia and the UK, 1861-1948. *Economic Record*, 83: 262-74.
- Buggy, H. (1977) *The Real John Wren* (Camberwell, VIC: Widescope).
- Butlin, N. G. (1958) The shape of the Australian economy 1861-1900. *Economic Record*, 34: 10-29.
- Butlin, N. G. (1962) *Australian Domestic Product, Investment and Foreign Borrowing 1861-1939* (Cambridge: Cambridge University Press).
- Butlin, N. G., and Dowie, J. A. (1969) Estimates of Australian workforce and employment 1861-1961. *Australian Economic History Review*, 9: 38-55.
- Butlin, N. G. (1970) Some perspectives of Australian economic development, 1890-1965. In: C. Forster, ed. *Australian Economic Development in the Twentieth Century* (Sydney: Allen & Unwin and Australasian Publishing Company), pp. 266-327.
- Butlin, N. G., Barnard, A., and Pincus, J. J. (1982) *Government and Capitalism: Public and Private Choice in Twentieth Century Australia* (Sydney: Allen & Unwin).
- Carmody, A. T. (1952) The level of the Australian tariff: a study in method. *Yorkshire Bulletin of Economic and Social Research*, 4: 51-65.
- Cashman, R. (1995) *Paradise of Sport: the Rise of Organized Sport in Australia* (Melbourne: Oxford University Press).
- Chief Inspector of Factories and Shops *Annual Report*. (various years) *Victoria Papers Presented to Parliament*, (Melbourne).

- Chisholm, A. H. (1958) ed, *The Australian Encyclopaedia* (Sydney: Angus and Roberston), 10 volumes.
- Coleman, W., Cornish, S., and Hagger, A. (2006) *Giblin's Platoon: the Trials and Triumph of the Economist in Australian Public Life* (Canberra: ANU E Press).
- Commonwealth Bureau of Census and Statistics, (various years) *Production Bulletin*, (Canberra).
- Commonwealth Year Book of Australia* (Canberra: Government Printer).
- Cottee's A Family Favourite – Celebrating 75 Years* (2002), (Sydney: Focus Publishing).
- Crawford, R. (2008) *But Wait, There's More: a History of Australian Advertising, 1900-2000* (Melbourne: Melbourne University Press).
- Dalton, R. W. (1929) *Economic and Trade Conditions in Australia to August 1929* (London: His Majesty's Stationery Office).
- Davison, G., and Yelland, S. (2004) *Car Wars: How the Car Won our Hearts and Conquered our Cities*, (Crow's Nest, NSW: Allen & Unwin).
- Dennis, B. N., and İşcan, T. B. (2009) Engel versus Baumol: accounting for structural change using two centuries of U.S. data. *Explorations in Economic History*, 46: 186-202.
- Dingle, T. (1998) Electrifying the kitchen in Interwar Victoria. *Journal of Australian Studies*, 22: 119-27.
- Dowie, J. A. (1970) The service ensemble. In: C. Forster, ed. *Australian Economic Development in the Twentieth Century*, (Sydney: Allen & Unwin and Australasian Publishing Company), pp. 208-65.
- Eggleston, F. W. (1932) *State Socialism in Victoria* (London: P. S. King & Son).

- Eyre, F. ed. (1988) *Technology in Australia 1788-1988* (Parkville, VIC: Academy of Technological Sciences and Engineering).
- Feinstein, C., and Thomas, M. (2002) *Making History Count. A Primer in Quantitative Methods for Historians* (Cambridge: Cambridge University Press).
- Fleming, G., Merrett D., and Ville, S. (2004) *The Big End of Town: Big Business and Corporate Leadership in Twentieth-Century Australia* (Melbourne: Cambridge University Press).
- Forster, C. (1953) Australian manufacturing and the War of 1914-18. *Economic Record*, 29: 211-230.
- Forster, C. (1970) *Industrial development in Australia 1920-1930* (Canberra: ANU Press).
- Fountain, H. (2000) Technology acquisition, firm capability and sustainable competitive advantage: a study of Australian Glass Manufacturers Ltd, 1915-39. In: D. Merrett, ed. *Business Institutions and Behaviour in Australia*, (London: Frank Cass), pp. 89-108
- Giblin, L. F. (1928) Some costs of marketing control. *Economic Record*, 4: 148-54.
- Brigden, J. B., Giblin, L. F., Copland, D. B., Dyason, E. C., and Wickens, C. H. (1929) *The Australian Tariff: an Economic Enquiry* (Melbourne: Melbourne University Press in association with Macmillan & Co).
- Grenville Smith, R., and Barrie, A. (1976) *Aspro: How a Family Business Grew Up* (Melbourne: Nicholas International).
- Hancock, K. (1979) The first half century of Australian wage policy – Part 2. *Journal of Industrial Relations*, 21: 129-60.

- Huberman, M., and Minns, C. (2007) The times they are not changin': days and hours of work in Old and New Worlds, 1870–2000. *Explorations in Economic History*, 44: 538-67.
- Hughes, H. (1962) *Australian Iron and Steel Industry 1842-1962* (Melbourne: Melbourne University Press).
- Hutchinson, D. (2002) Australian manufacturing business: entrepreneurship or missed opportunities. *Australian Economic History Review*, 41: 103-34.
- Irwin, D. A. (2000) Did late nineteenth-century US tariffs promote infant industries? Evidence from the tinplate industry. *Journal of Economic History*, 60: 335-60.
- Irwin, D. A., and Temin, P. (2001) The ante-bellum tariff on cotton textiles revisited. *Journal of Economic History*, 61: 777-98.
- Irwin, D. A. (2003) Explaining America's surge in manufactured exports, 1880-1913. *Review of Economics and Statistics*, 85: 364-76.
- Irwin, D. A. (2007) Tariff incidence in America's gilded age. *Journal of Economic History*, 67: 582-607.
- Irwin, D. A. (2007) The Third Noel Butlin Lecture: Australian exceptionalism revisited. *Australian Economic History Review*, 47: 217-37.
- Jakle, J. A. (2001) *City Lights: Illuminating the American Night* (Baltimore: Johns Hopkins University Press).
- Jones, G. (1984) Multinational chocolate: Cadbury overseas. *Business History*, 26: 59-76.
- Jovanovic, B., and Rousseau, P. L. (2005) General purpose technologies. In: P. Aghion, and S. N. Durlauf, eds. *Handbook of Economic Growth, Volume 1B* (Elsevier B.V.).

- Keating, M. (1973) *The Australian Workforce 1910-11 to 1960-61* (Canberra: ANU Press).
- Kelly, V. (1950) *Achieving a Vision: the Life Story of P. W. Tewksbury Australian Industrial Pioneer* (Sydney: George M. Dash).
- Linge, G. J. R. (1964) *Index of Australian Tariff Board Reports 1901-1961* (Canberra: ANU Press).
- Linn, R. (1996) *ETSA: The Story of Electricity in South Australia* (Adelaide: ETSA Corporation).
- Lloyd, P. (2008) 100 years of tariff protection in Australia. *Australian Economic History Review*, 48: 99-145.
- Maddock, J. (1992) *The People Movers: a History of Victoria's Private Bus Industry* (Kenthurst, NSW: Kangaroo Press).
- Maddock, R., and McLean, I. W. (1987) The Australian economy in the very long run. In: R. Maddock and I. W. McLean, eds. *The Australian Economy in the Long Run*, (Cambridge: Cambridge University Press), pp. 5-29.
- Mathews, R. L., and Jay, W. R. C. (1972) *Federal Finance: Intergovernmental Financial Relations in Australia since Federation* (Melbourne: Thomas Nelson (Australia) Limited).
- Mauldon, F. R. E. (1938) *Mechanisation in Australian Industries* (Hobart: University of Tasmania Press).
- McLaughlin, J. (1991) *Nothing Over Half a Crown: a Personal History of the Founder of the G. J. Coles Stores* (Main Ridge, VIC: Loch Haven Books).
- McLean, I. (1987) Economic wellbeing. In: R. Maddock and I. W. McLean ed. *The Australian Economy in the Long Run* (Melbourne: Cambridge University Press), pp. 319-43.

- McLean, I. W. (2007) Why was Australia so rich? *Explorations in Economic History* 44; 635-56.
- McLean, I. W., and Pincus, J. (1983) Did Australian living standards stagnate between 1890 and 1940? *Journal of Economic History*, 43: 193-202
- McNair, W. A. (1937) *Radio Advertising in Australia* (Sydney: Angus & Robertson).
- McPherson's *Catalogue of Tools and Machinery* (1929 and 1937), (Melbourne, McPherson).
- Merrett, D., and S. Ville (2010) Returns to enterprise: profits in Australia 1901 – 1938. In Y. Cassis ed. *Profitability in Historical Perspective*, (Cambridge: Cambridge University Press), forthcoming.
- Merrett, D. Parnell, A., and Ville, S. (2008) Capital formation and structural change in interwar Australia, draft paper.
- Nimmo, J. F. (1939) The effect of the tariff on the Australian consumption standard. In: F. W. Eggleston, et.al., *Australian Standards of Living*, (Melbourne: Melbourne University Press in association with Oxford University Press), pp. 118-121.
- Overseas Trade Bulletin* (various years), (Canberra: Government Printer).
- Penny, M. (1955) *Just a Pocket for the Money: the History of Oliver Gilpin and his Stores* (published privately).
- Penrose, E. (1959) *Theory of the Growth of the Firm* (Oxford: Basil Blackwell).
- Porter, M. E. (1979) The structure within industries and companies' performance. *Review of Economics and Statistics*, 61: 214-27.
- Porter, M. E. (1980) *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (New York: The Free Press).

- Pratt, A. (1919) ed., *Australian Tariff Handbook 1919* (Melbourne: The Australian Industrial and Mining Standard).
- Pratt, A. (1978) *Sidney Myer: a Biography* (South Yarra, VIC: Quartet Books).
- Production Bulletin* (Canberra: Australian Government Publishing Service).
- Ramsay Standard Catalogue Service Pty. Ltd (annually from 1931) *Ramsay's Architectural and Engineering Catalogue* (North Melbourne: Ramsay Standard Catalogue Service Pty. Ltd).
- Rawlings, J. N. (1937) *Who Owns Australia?* (Sydney: Modern Publishers).
- Reitsma, A. J. (1960) *Trade Protection in Australia* (St Lucia: University of Queensland Press).
- Report of Royal Commission into the Moving Picture Industry, Volume 4,* (Commonwealth P. P. 1926-27-28).
- Sands & McDougall's Directory of Victoria* (annually from 1912), (Melbourne: Sands & McDougall).
- Schwartz, R. S. (1983) *More Work for Mother: the Ironies of Household Technology from the Open Hearth to the Microwave* (New York: Basic Books).
- Shann, E. (1948) *An Economic History of Australia* (Cambridge: Cambridge University Press).
- Sharpe, David (1992) *Remember That Heavenly Ginger Beer: A History of Sharpe Bros* (Melbourne: D. Sharpe).
- Sinclair, W. A. (1970) Capital formation. In: C. Forster, ed. *Australian Economic Development in the Twentieth Century*, (Sydney: Allen & Unwin and Australasian Publishing Company), pp. 11-65.

- Snooks, G. D. (1974) *Depression and Recovery in Western Australia, 1928/29-1938/39: a Study in Cyclical and Structural Change* (Nedlands, WA: University of Western Australia Press).
- Snooks, G. D. (1994) *Portrait of the Family within the Total Economy: a Study in Longrun Dynamics, Australia 1788-1990* (Cambridge: Cambridge University Press).
- Stanton, J. (1984) Protection, market structure and firm behaviour: inefficiency in the early Australia tyre industry. *Australian Economic History Review*, 42: 91-114.
- Statistician's Report, Census of the Commonwealth of Australia, 1933, 1947* (Canberra: Government Printer).
- Symons, M. (1982) *One Continuous Picnic: a History of Eating in Australia* (Adelaide: Duck Press).
- Tariff Board Reports (various years) (Canberra: Government Printer).
- Thomas, M. (1988) Manufacturing and economic recovery in Australia, 1932-1937. In: R. G. Gregory and N. G. Butlin, eds. *Recovery from the Depression: Australia and the World Economy in the 1930s*, (Cambridge: Cambridge University Press), pp. 255-67.
- Tulloch, J. (1982) *Australian Cinema: Industry, Narrative and Meaning* (Sydney: Allen & Unwin).
- Twentieth Annual Report of State Electricity Commission of Victoria for year ended 30 June 1939 (Victorian P. P. 1939, appendix 9).
- Tyers, R., and Colman, W. (2008) Beyond Brigden: Australia's pre-war manufacturing tariffs, real wages and economic size. *Economic Record*, 84, 264: 50-67.

- Vamplew, W. (1987) ed. *Australians: Historical Statistics* (Broadway, NSW: Fairfax, Syme & Weldon Associates).
- Vamplew, W., and Stoddart, B. (1994) eds. *Sport in Australia: a Social History*, (Cambridge: Cambridge University Press).
- Van Straten, F. (2004) *Huge Deal: the Fortunes and Follies of Hugh D. McIntosh* (South Melbourne: Lothian).
- Victorian Year Book* (Melbourne: Government Printer).
- Whitwell, G. (1989) *Making the Market: the Rise of Consumer Society* (Fitzroy, VIC: McPhee Gribble Publishers).
- Wilkenfeld, G., and Spearitt, P. (2004) *Electrifying Sydney: One Hundred Years of Energy Australia* (Sydney: Energy Australia).
- Wilkinson, H. L. (1914) *The Trust Movement in Australia* (Melbourne: Critchley Parker).
- Womack, J. P., Jones, D. T., and Roos, D. (1990) *The Machine that Changed the World* (New York: Rawson Associates).
- Woodhead, L. (2003) *War Paint: Miss Elizabeth Arden and Madam Helena Rubinstein: Their Lives, Their Times, Their Rivalry* (London: Virago).

*Table 1. Sectoral shares of employment, 1900-01 to 1938-39, per cent*

	Resource-based	Manufacturing	Tertiary
1900-01	33.0	14.6	52.4
1910-11	30.5	18.8	50.7
1920-21	26.3	19.9	53.8
1930-31	28.3	18.4	53.3
1938-39	22.7	23.9	53.4

Source: Butlin and Dowie, Estimates, Table 6, 153.

Table 2. Sectoral shares of GDP, 1900-01 to 1938-39, per cent

	Resource-based	Manufacturing	Tertiary
1900-01	29.7	12.2	58.1
1910-11	32.1	13.2	54.7
1920-21	30.8	12.5	56.7
1930-31	22.6	15.9	61.5
1938-39	23.1	18.7	58.2

Source: Butlin, *Australian Domestic Product*, Table 3, 12-13.

Table 3. Consumption of new durables goods, 1919-40 (count of population per unit of product)

	1919-21	1925	1929-30	1939-40
Motor Vehicles	44		12	8.5
Vehicle licences	43		8	6
Radio licences		97	20	6
Telephones	24		12	10

Sources: Population data from Australian Bureau of Statistics, <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3105.0.65.001>. All other data from Vamplew, ed, *Australians*. Radio licences (for 1925, 1929, 1939) SR 121-122, p. 390; Telephone subscribers (for 1920, 1930, 1940), TC 160-66, p. 178; Vehicles and licensed drivers (for 1921, 1929, 1939 and 1919, 1929, 1939 respectively) TC 51-54, p. 171.

*Table 4. Rank Correlations of Surplus with Output, Capital, Employees and Establishments*

		% Change in Surplus 19/20 - 28/29	% Change in Surplus 19/20 - 28/29
% Change in Output 19/20 - 28/29	Correlation Coefficient	.888**	.889**
	Sig. (2-tailed)	.000	.000
	N	74	39
% Change in capital 19/20 - 28/29	Correlation Coefficient	.803**	.803**
	Sig. (2-tailed)	.000	.000
	N	39	39
% Change in number of employees 19/20 - 28/29	Correlation Coefficient	.808**	.840**
	Sig. (2-tailed)	.000	.000
	N	74	39
% Change in number establishments 19/20 - 28/29	Correlation Coefficient	.680**	.750**
	Sig. (2-tailed)	.000	.000
	N	74	39

\*\* . Correlation is significant at the 0.01 level (2-tailed).

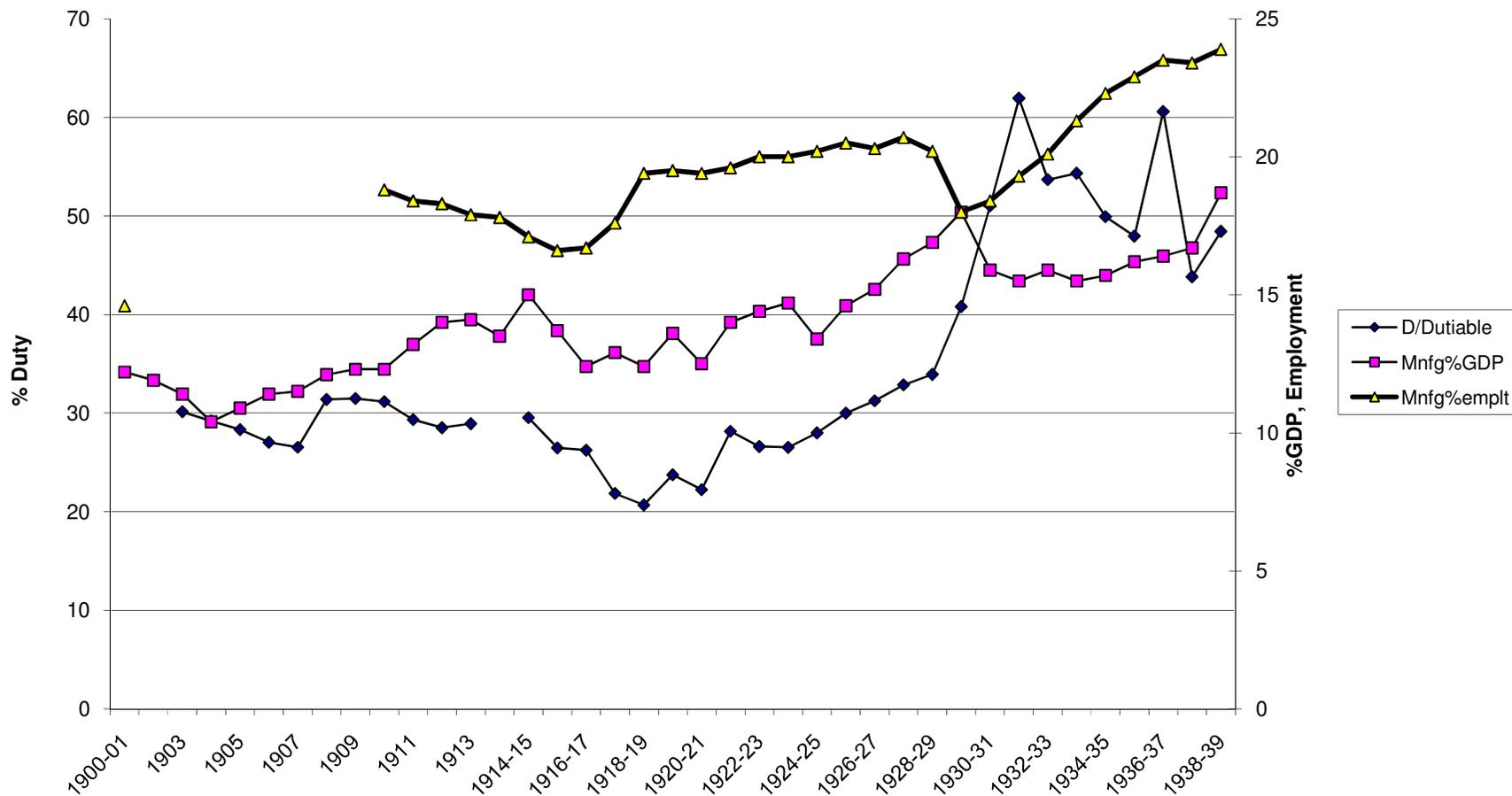
		% Change in Surplus 31/32 to 38/39	% Change in Surplus 31/32 to 38/39
% Change in Output 31/32 to 38/39	Correlation Coefficient	.916**	.915**
	Sig. (2-tailed)	.000	.000
	N	152	150
% Change in capital 31/32 to 38/39	Correlation Coefficient	.631**	.616**
	Sig. (2-tailed)	.000	.000
	N	152	150
% Change in number of employees 31/32 to 38/39	Correlation Coefficient	.850**	.850**
	Sig. (2-tailed)	.000	.000
	N	150	150
% Change in number establishments 31/32 to 38/39	Correlation Coefficient	.537**	.537**
	Sig. (2-tailed)	.000	.000
	N	150	150

\*\* . Correlation significant at the 0.01 level (2-tailed).

Source: *Production Bulletin*, various years.

Note: Final column includes only those industries common to all variables.

Chart 1. Tariff rates and manufacturing's share of GDP, Employment



Sources: Overseas trade bulletins; Butlin, Australian Domestic Product Table 3, 12-13; Butlin & Dowie, Estimates table 6.