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I Introduction

In 1901 Australia abolished six internal, state-based tariff walls, and replaced them with a common external tariff. What was the impact of this establishment of a custom union (CU) of the six newly federated states? The presumption then, and today, is that it would have fostered intra-Australian trade, while inhibiting Australian international trade. The paper seeks to scrutinise this presumption through using previously unutilised quantitative evidence, deployed in the form of various analytical measures of the strength of trade relationships. In doing so the paper contributes to a topic that has been left relatively unexamined. Although there exists a literature that draws near the question of the impact of the Federation customs union on Australia's trade relations (Patterson 1968; Lloyd 2008, 2015, 2016), with one prominent exception (Irwin 2006), the topic itself has not been directly addressed.

In some respects the results of the present paper's investigation are mildly corroborative of the presumption that Federation customs union 'nationalised' trade: in the decade subsequent to the formation of the Australian customs union in 1901 the export ties of the larger states with the rest of Australia strengthened, while their trade with the rest of the world tended to stagnate. In the same vein, the export relations of the rest of the world to Australia also tended to falter. But, pointing to a conclusion of a very different character, the export orientation of the three smaller states to the rest of the world actually increased in the wake of Federation, and the exports of most of the smaller states to the larger states actually waned. The impacts of the Federation Customs union, then, seem to present a fractured picture rather than a simple one.

II The event

During the latter part of the 19th c the governments of New South Wales, Victoria, Queensland, South Australia, Western Australia and Tasmania came to impose tariffs on imports, *including imports from one another* (Patterson 1968, p.10). Table 1 supplies some measures of the significance of these barriers on the eve of Federation.

Table 1: Measures of Australian Trade Barriers, 1900

(per cent)

	NSW	Vic	Qld	SA	WA	Tas
Average Rate of duty (Lloyd 2016)	6.2	11.8	20.4	8.1	16.0	22.6
Proportion of imports tariff free (Coghlan)	87.6	53.4	36.0	35.7	37.1	9.0
Average rate of duty on dutiable imports (Coghlan)	10.3	36.2	21.5	20.8	14.8	24.2

To encapsulate Table 1: NSW was free trade; the four smallest states pursued 'revenue tariffs' – a combination of a low rate but broad base designed to maximise revenue; while Victoria pursued a more classically protectionist strategy.[1] The various barriers that Table 1 measures inevitably provoked

[1] The figures for average rate of duty in Table 1 may underestimate the typical rate in high tariff state. The figures are the ratio of duty collected to the value of imports. As is well-known, such a ratio amounts to a weighted average of tariff rates, where the weight on a given tariff correspond to the value of imports of the tariffed good. This has perverse result: tariffs rates that are prohibitive have

resentment, engendered distrust of the ambitions of the other states, and offended the nationalist ethos of the day. The elimination of internal barriers to trade was an important motive for the federation of the states into the Commonwealth of Australia, which came into existence on January 1 1901.

In accordance with the remit of the new Commonwealth's constitution, at 4pm October 8 1901 tariffs on the imports of the five eastern Australian states from the six Australian states ceased.[2] At the same moment a uniform tariff schedule on imports from the rest of the world into the six states was imposed under the first customs tariff act of the new Commonwealth Parliament. Thus a Customs Union was established in Australia. Table 2 provides some measures of the new external barrier.[3]

zero weight; and tariffs that are very nearly prohibitive have very nearly zero weight. And Victoria did have some prohibitive tariffs. The much mooted example was Soda Crystals, the tariff on which allegedly yielded in 1896 a grand total of one pound and four shillings.

[2] Section 95 of the Constitution gave leave to Western Australia to phase out its tariffs on imports from the other five states over a period of five years, the rates reducing by 20 per cent each year. Thus Western Australia was not completely integrated into the Customs Union until 8 October 1906.

[3] In the decade following Federation there were essentially two tariff Acts, that of 1902 (retrospective from 1901) and that of 1908. The second act is judged by almost all observers to amount to a heightening of the external barrier, but Table 2 provides no support for this.

Table 2: Measures of Australian Trade Barriers post-Federation

(percent)

	1903-4	1908-9
Average duty (Lloyd 2008)	21.1	18.2
Proportion duty free (Lloyd 2008)	28.8	40.4
Average duty on dutiable imports (Lloyd 2008)	29.7	30.6

In terms of the *breadth* of the wall, the Federation CU was evidently somewhere between the narrow wall of NSW and that broad wall of the smaller states. In terms of *height,* the common external barrier of Federation was somewhat less than Victoria's old barrier, but in excess of the height of the old barriers of the other states. In summary terms, Federation amounted to the old Victorian system of significant tariffs on fairly specific sectors being extended, but in somewhat weakened form, to all states.

But trade between the states was from October 1901 'absolutely free'.

Thus one might expect that Federation would have fostered trade between the Australian states, and discouraged trade of Australia with the rest of the world.

What does economic theory predict?

III Some theory

The widely shared theoretical presumption is that a Customs Union would foster trade among the Union members, and inhibit their trade with the rest of the world: this is how a custom union works. Certainly, a very simple model of a CU may align with that presumption. But even modest elaborations will present a more complex picture.

Consider a maximally simple model: two states (Industria and Agraria), that produce and consume two goods (Wheat and Iron), which are both supplied by the rest of the world to Industria and Agraria at a given price that comprehends some transport cost. Suppose also both states would import Iron under free trade, but Industria would import less than Agraria; in other worlds, the autarky tariff of Industria would be lower than in Agraria. Finally, suppose that each has imposed some tariff on Iron, with the rate in Industria such that it is in autarky. This scenario seems to capture, in simplified terms, the division of Australia into an industrial and protectionist Victoria, and the agrarian and free-trade (or 'revenue tariff') remainder of Australia.[4] The CU would abolish tariffs on trade between Agraria and Industria, and establish a common tariff on Iron, at a rate somewhere between the higher rate and the lower rates before the CU. After the CU is established *either* the new (common) tariff rate on Iron will spell a price greater than the autarky price in Industria, *or* it will spell a price less than the autarky price in Industria. If the new common tariff rate spelt a price *below* Industria's autarky price then the CU simply reduces the price of Industria's iron producers receive, and so induces Industria to begin exporting wheat to the rest of world, while still not trading with Agraria. Here the establishment is CU

[4] On the eve of Federation one 'Federation Father', John Quick, saw Australia divided very much in these terms. 'Those who visited the International Exhibition and went through the Australian courts had no doubt been struck with the extraordinary contrast between the courts of protection and free trade, New South Wales, South Australia and Tasmania. In the Victorian court they saw articles of manufacture, plant and machinery; articles that required skilled labor; articles that required population, the very backbone of any nation, a mechanical and industrial population. (Cheers.) The New South Wales court teemed with natural, products. In one court they saw the bounty of nature, in the other they saw what man had done. (Cheers.)' (*Bendigo Advertiser*, 7 September 1888)

equivalent to Industria engaging in a unilateral tariff reduction, and so doesn't seem to capture the character of the CU.

Assuming the new common tariff rate spells a price above Industria's autarky price, then, thanks to the CU, Industria now has privileged access to a new market – Agraria - to which it can sell at above autarky prices. Thus Industria exports Iron to Agaria in exchange for Agraria's Wheat.[5] At least part (and possibly all) of Agararia's former exports to the rest of the world are now deflected to Industria, and at least part (and possibly all) of its imports of Iron are now sourced from Industria rather than the rest of the world. Trade between the two states emerges where it was previously non-existent (Figure 1). But what of trade with the rest of the world? If the new common tariff rate is above Agraria's former rate, then in the face of a higher iron price, Agraria's iron production will rise and her demand will fall: Agraria's total imports - from Industria *plus* from the ROW – will fall. And given that Industria's iron exports have risen (from zero), then, as a matter of arithmetic, Agraria's iron imports from the ROW must have fallen. And correspondingly, in a two good model such as this, Agraria's wheat exports to the ROW must have fallen. To summarise: If the new common tariff rate is above Agraria's former rate then the maximally simple model is entirely in accord with the presumption that a CU 'nationalises' trade.

[5] We assume zero transport costs between Agraria and Industria. An upshot of this is that Industria under the Customs Union will not source any of its Wheat imports from the rest of the world. To do so would mean Industria paying a price for wheat equal to the world price plus transportation cost from overseas; which (trivially) exceeds the world price less transportation cost to overseas, which is what Agraria is paid for its exports, and which is, in consequence, the supply price of Agraria's wheat to Industria. Thus equilibrium requires that Industria source all its Wheat imports from Agraria, at a price equal to the world price less transportation cost.

But if the new common rate on Iron is below Agraria's former rate, then Agraria's trade with the ROW may actually rise. In the face of a reduced price of iron, Agraria's production will fall and demand will rise: Agraria's total imports - from Industria *plus* from the ROW – will rise.(Figure 2). Evidently, it is possible that if the supply elasticity in Industria is not large, the increase in Industria's Iron exports will not match Agraria's increase in total Iron imports, and Agraria's Irion imports from the rest of the world will *rise* (See Figures 3 and 4 for an illustration).

It may be objected that the circumstance that makes an increase in imports from the ROW a possibility - the CU reducing the price of Iron in Agraria - hardly captures the circumstances that the Federation customs union presented the less industrialised states. But, even without such an assumption, there exist modest elaborations of the maximally simple that make it possible that *Imports of Industria from the rest of the world increase* in the wake of a CU. Suppose there is a second importable, which is only produced in the rest of the world (Tea), and on which Industria (not Agraria) spends an exogenous fraction of income. Then assuming Industria had prior to the CU a tariff that had driven Iron imports down to zero, it must still, nevertheless, have been exporting; it must have been exporting Wheat in order to import Tea. On joining the CU the price it receives for Iron would rise as before, and Industria would begin to export Iron to Agraria, as before. But this increase in relative price of Iron increases Industria's income, and so *increases Industria's Tea imports.* Thus Industria's imports from the rest of the world rise, despite Industria's exports of wheat to rest of the world falling - perhaps to zero.[6]

[6] On the formation of the CU Industria will be producing less wheat, but consuming more. Thus its wheat exports to the rest of the world fall, perhaps to zero. It now pays for its tea imports by running a trade surplus with Agraria; as

Our conclusion is that even in the simplest models a CU need not be inhibiting of all states' trade relations with the rest of the world; and that a CU may stimulates some states' imports from the rest of the world, and some states' exports. Theory allows for these possibilities. What does empirical inquiry suggest?

not all (and perhaps none) of its Iron exports to Agraria will be spent on buying Agararia's wheat. Agraria, in turn, finances its balance of trade deficit with Industria through a balance of trade surplus with the rest of the world; a surplus that reflects the fact that Industria does not use all of its iron export revenues to buy wheat from Agraria.

Figure 1: The CU tariff above Agraria's former tariff

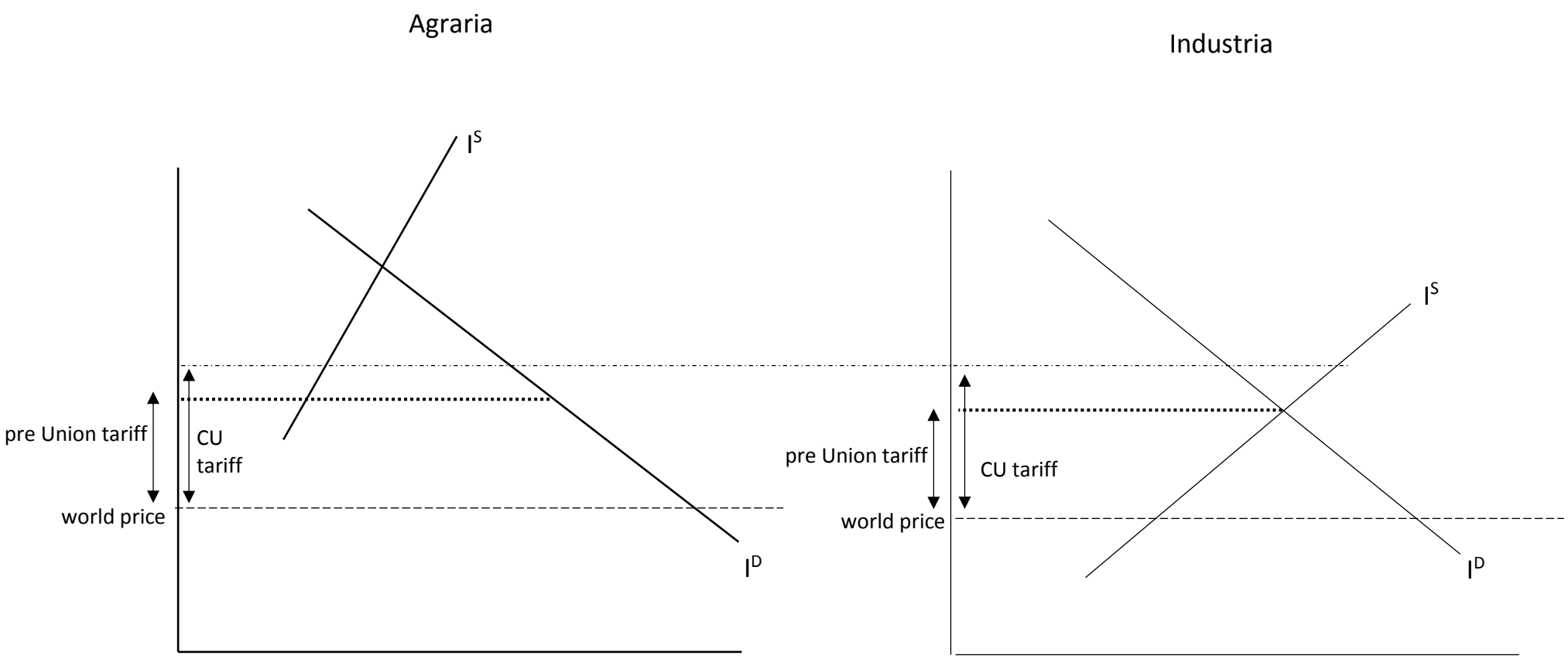


Figure 2: The CU tariff below Agraria's former tariff

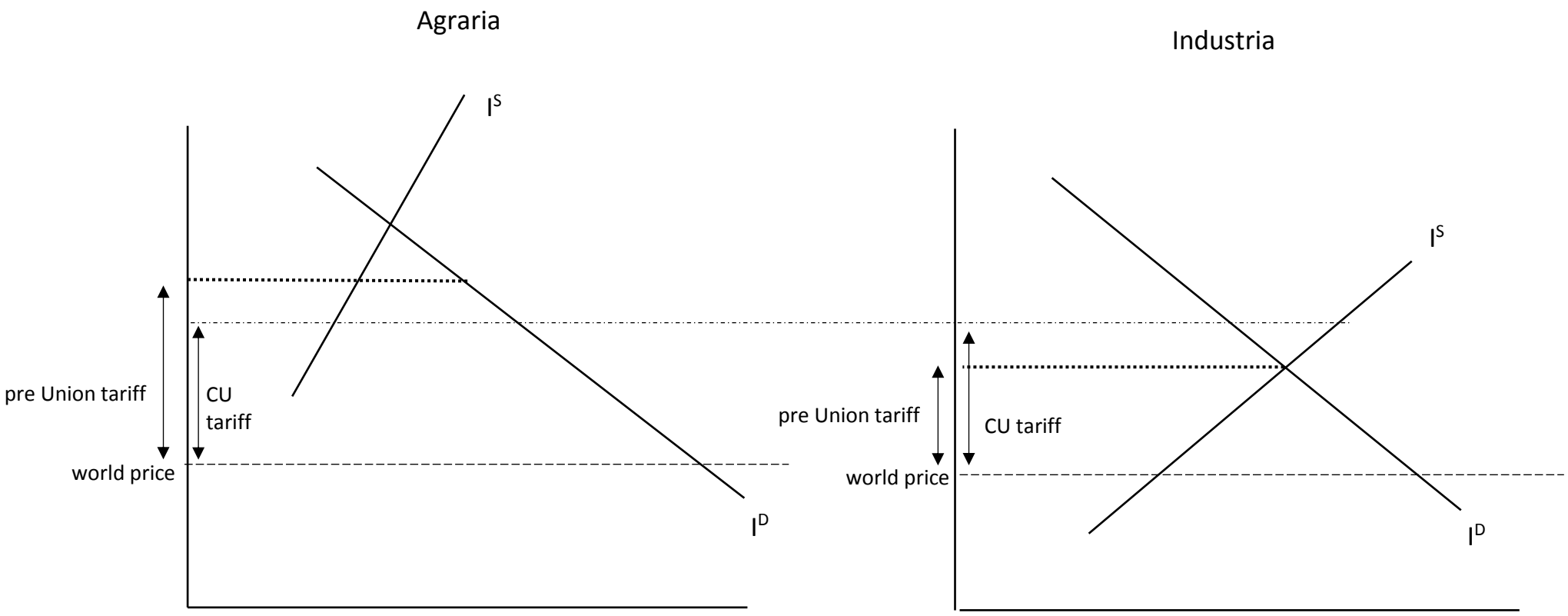
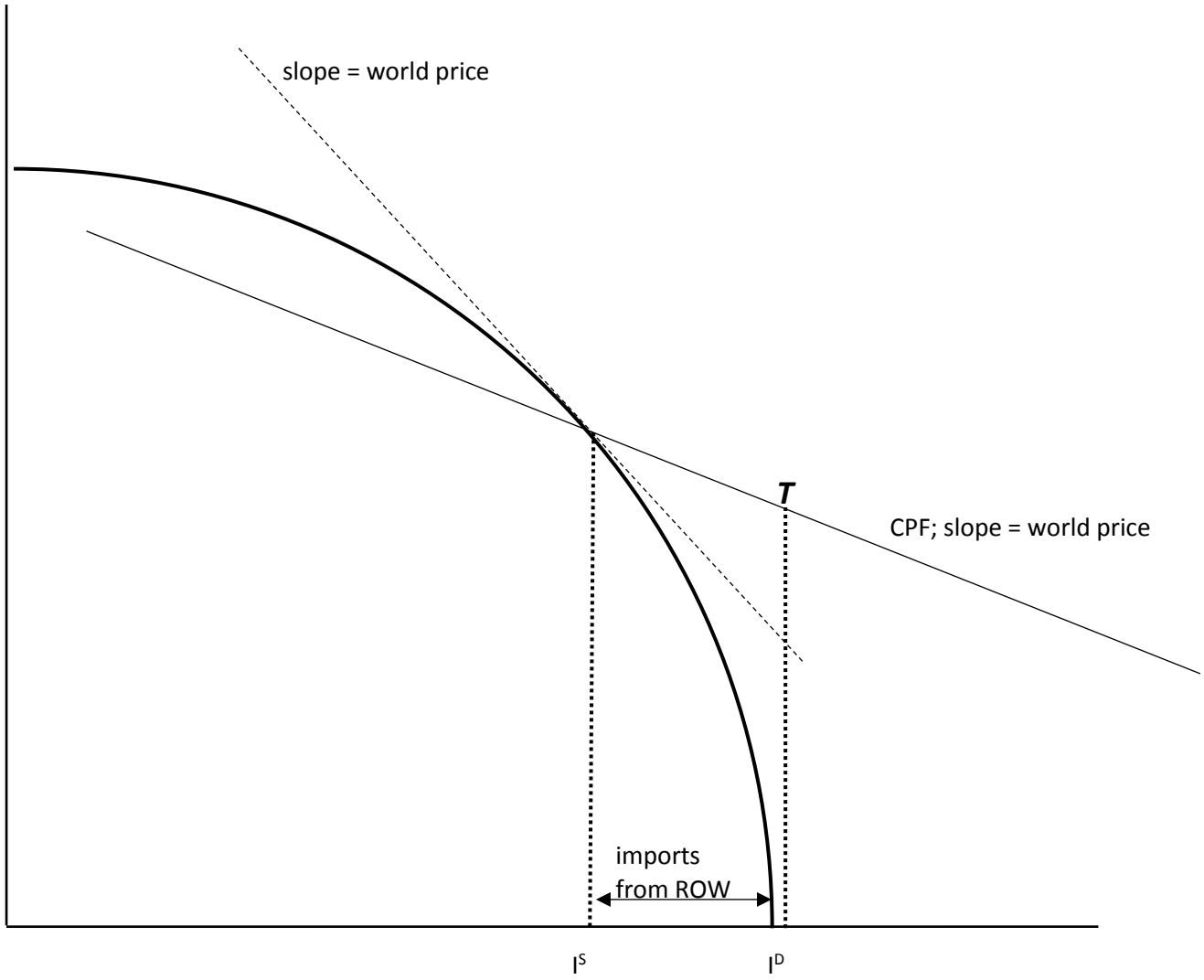
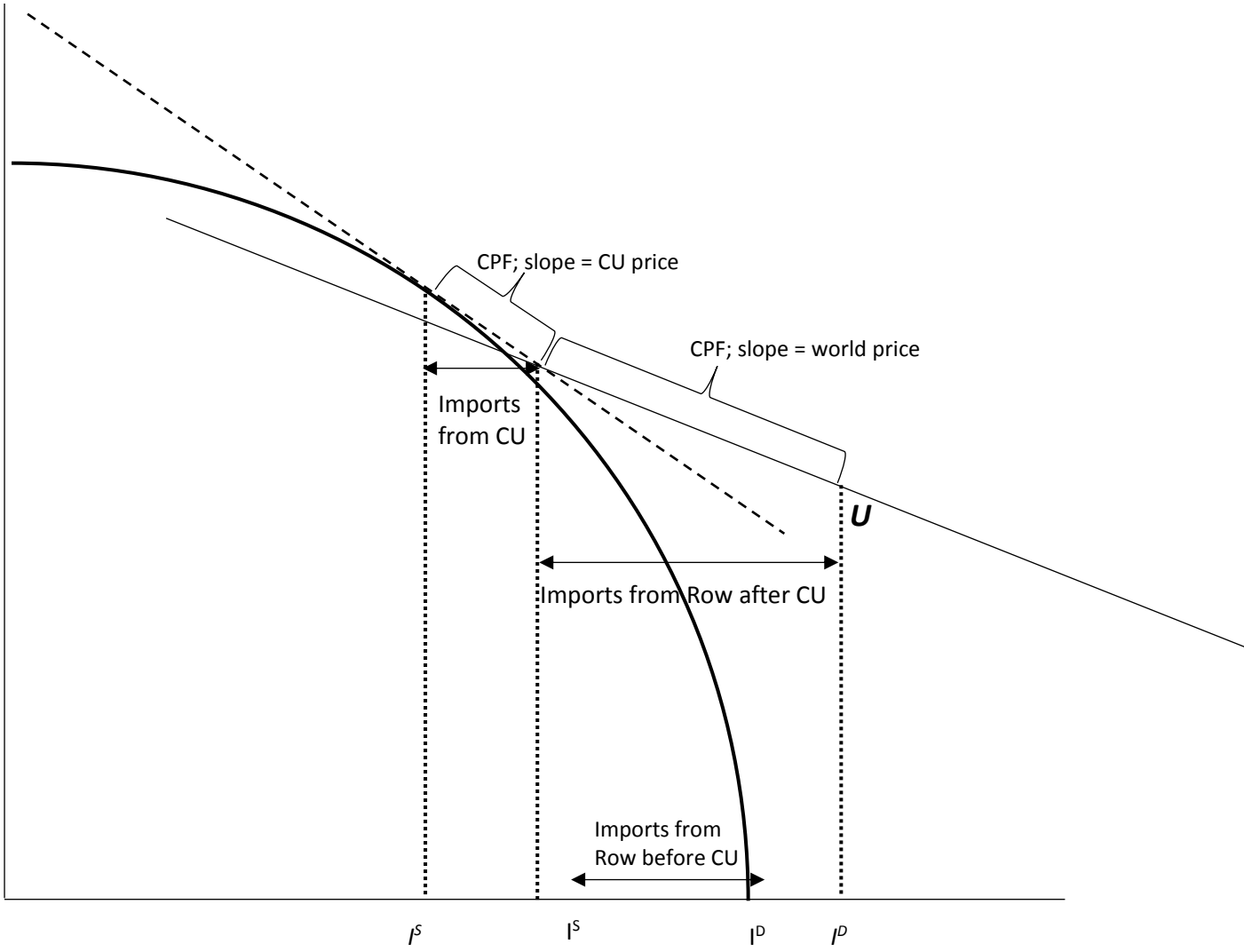


Figure 3: Agraria's Imports before the CU



T = consumption point

Figure 4: Agraria's Imports Increase after CU



U = consumption

IV The data

The question would seem to be well suited to empirical investigation since Australia at the turn of the 19th into the 20th c enjoyed an apparent abundance of data on intra-Australian trade. The *Statistical Registers, Gazettes* and *Year Books* of the States provide copious enumerations of 'exports' and 'imports' of the six states to and from each other, and the rest of the world. From Federation, the *Registers* and state *Year Books* continue to appear, and were supplemented by *Oversea Trade*.

This apparent abundance of data on inter-state trade invites the estimation 'gravity equation' type import and export regressions for the six states, for both before and after Federation, and to test for any shift towards, or away from, international and intra-Australian trade. This has been by Irwin (2006), who concluded 'that federation itself produced little change in Australia's trade patterns, but that the border effect increased substantially between 1906 and 1909' (2006, p315).[7]

Regrettably, the data of inter-state is of arguable reliability. Indeed, in 1905 the New South Wales statistician judged the data on interstate trade to be 'worth very little' (*State of New South Wales* 1905, p100).[8] The key problem lay in the data not distinguishing 're-exports' from genuine exports. Thus silver from Broken Hill was railed in large amounts into South Australia, in order to be shipped from Port Augusta to the UK. This is plainly an export from NSW to UK.

[7] See Magee (2008) for a summary account of the methods deployed to assess the impact of preferential trading agreements.

[8] One critic of 1898 observed that according to Victorian authorities 'in 1896 Victoria imported from New South Wales 491,741 tons coal … whilst, according to New South Wales returns … the mother colony exported 714,666 tons … Clearly something is wrong' (Pulsford 1898).

But in both SA and NSW publications this was recorded as an export of NSW to SA, an import of SA from NSW, and export from SA to UK. Or consider copper from Mt Lyell in Tasmania, shipped to Melbourne and there 'transhipped' - loaded onto another ship - bound for the UK. It would be nonsensical for its value to be recorded as an export of Tasmania to Victoria, but that is how Tasmania's statistical register records it. A parallel difficulty loomed for imports: British goods landed in Melbourne to be railed to the Riverina might be classed as imports into Victoria, especially if they were not tariffed in either Victoria or NSW.

The statistical authorities before Federation were well aware of the problem of 'nominal' exports and 'nominal imports', but had not much to offer by way of systematic rectification. Both NSW and Victoria supplied data on exports to other states that was the produce of their state rather than the re-export of another state's produce; but the receiving state might not be their ultimate destination, and might re-export them in turn.

The whole problem of 're-exports' was examined with minute care by Boehm (1965), who rightly calls the matter 'perplexing'. But the simple upshot is that 'exports' aren't exports; and 'imports' aren't imports, either.

The advent of the Commonwealth in 1901, and it assuming the task of trade data collection, seems to have made measures even worse. Firstly, the Custom House now had no opportunity to gauge overland trade. Secondly, inter-State trade by sea might not be measured: while the importer of any Australian-produced goods by sea into another state would need to demonstrate that the goods were of Australian origin in order to be customs exempt, the Custom officials – at least for the purpose of exemptions from duty - would require no information on the specific State the goods came from. Thirdly, there seems to

have been a lack of interest of the Commonwealth in the state-dimension of international trade. Copper departing Melbourne for the UK was an 'Australian export', regardless of what state it was mined, and that was that.

On the other hand, for 10 years after Federation the Commonwealth needed to know which state actually consumed a given import (regardless of where they were landed in Australia) in order to acquit the stipulations of Section 93[9]; and that knowledge provided data on the genuine imports from overseas of each state. Further from 1905 until the latter months of 1910 - the *Oversea Trade* bulletin published data that treated all goods produced in one Australian state and sent by sea to another Australian state, and thence shipped abroad, as an export abroad of the Australian state which produced them, and to not constitute a (spurious) 'export' or 'import' between the two states. Regrettably, this treatment was not possible for goods of one Australian state sent *by land* to another Australian state, and thence shipped abroad. And overland trade remained a closed book. Finally, the series of the *Oversea Trade* was not extended to prior to Federation.

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[9] Section 93 of the Constitution was designed to enable the return of tariff revenue to each state in accordance with how much they tariff duties each state's consumers had paid.

93. Payment to States for five years after uniform tariffs

During the first five years after the imposition of uniform duties of customs, and thereafter until the Parliament otherwise provides:

*(i) the duties of customs chargeable on goods imported into a State and afterwards passing into another State for consumption, and the duties of excise paid on goods produced or manufactured in a State and afterwards **p**assing into another State for consumption, shall be taken to have been collected not in the former but in the latter State;*

See La Nauze (1972, p212)

In the light of these difficulties, this paper makes use of a previously unutilised data series that spans the pre - and post-Federation periods. It appears in the *Official Year Book* (*Commonwealth of Australia* 1911, pp 666-667), and provides, annually for 1905 through 1909, and the quinquennium 1896-1900, for each state its exports to, and imports from, the other five states treated as a single unit. This data, too, needs to be treated with caution. It is prefaced by the statement, 'Owing to the many differences existing between the statement of trade hitherto published by the various states and commonwealth, and to the frequent alteration of the figures in exceeding editions of several publications, it is not possible to furnish an exact statement of trade of several states. The figures here given, therefore, should be regarded as merely approximate' (*Commonwealth of Australia* 1911, p.664). For all that, the *Year Book* series constitutes 'the last word' of Australia's statisticians of the day on interstate trade – as the collection of all interstate data on trade ceased in September 1910, and the whole problem became defunct. The *Year Book* data might be deemed the best there is.

Regrettably, the number of periods in the panel is just six. This suggests that regression analysis is not the best way to make use of this data. Instead, this paper uses the *Year Book* data to obtain several analytical measures of the strength of the trade relationship of the states, and compares the magnitude of these measures before and after Federation to get a gauge on whether these relations strengthened or weakened.

V Measures of the strength of a trade relationship

Table 3 presents estimates of nominal value of trade between the six Australian states and the rest of the world in 1903.

Table 3: Trade Values of the Six States and non-Australia, 1903

(000 Pounds)

	NSW	Vic	Qld	SA	WA	Tas	Rest of World
NSW	0	2656	983	1988	232	170	18665
Vic	3016	0	574	460	1015	591	13830
Qld	4748	415	0	247	15	87	9087
SA	1278	741	203	0	542	26	5157
WA	577	189	0	44	0	0	10193
Tas	848	531	60	17	49	0	2804
Rest of World	15374	13008	4337	3809	4602	1829	0

Each cell reports the value of exports *from* the region pertaining to the row *to* the region pertaining to the column. Thus exports can be read by row ('across'), and imports by column ('down'). To illustrate: NSW exports 170,000 to Tasmania, and, obviously, Tasmania imported 170,000 from New South Wales.[10] As already noted, the presumption is that a CU would weaken the trade relationship of each Australian state with the rest of the world, and strengthen the relationship of each state with each other. Thus the magnitude of the interior cells would rise, while the magnitude of the littoral cells would fall. In terms of changes, the interior would record positives, and the littoral negatives (Table 4).

[10] Evidently, Table 3 assumes some convention regarding the allocation of freight and insurance costs. The custom house practise of the day was to value imports inclusive of freight charges, and to value exports exclusive of such charges, leaving the recorded value of exports from NSW to Tasmania less than the recorded value of imports of Tasmania from NSW. To secure these values are equal, either freight charges etc need to be excluded from the value of imports, or included in the value of exports.

Table 4: Presumed Impact of CU on Trade Values

	NSW	Vic	Qld	SA	WA	Tas	Rest of World
NSW	0	+	+	+	+	+	-
Vic	+	0	+	+	+	+	-
Qld	+	+	0	+	+	+	-
SA	+	+	+	0	+	+	-
WA	+	+	+	+	0	+	-
Tas	+	+	+	+	+	0	-
Rest of World	-	-	-	-	-	-	0

Clearly, such a prediction can at best be a *ceteris paribus* proposition, that assume all else is unchanged in both the Australia and the world economy. In reality, Australian incomes were growing in the wake of recovery of the bust of the early 1890s. And the rest of the world was growing: real GDP of the developed world was 26 percent higher in the five years to 1908 than in the five years to 1900.[11] To take some account of these changes one might normalises the matrix entries in various ways

The Propensity to Import

A cell may be divided by the GDP of the region pertaining to the column in which cells appear (eg divide 170,000 by Tasmania's GDP), and so obtain a propensity to import region pertaining to the column in which the cell appears (ie Tasmania). Propensities to import, in brief, may be read 'down'. These will

[11] And significant structural change was taking place. Wheat, gold and timber were undergoing booms in WA during the Federation era. Tasmania was experiencing a mining boom. See Crowley (1960) and Blainey (1978).

provide a rough measure of the 'importance' of the trade relation to the import region.

The Propensity to Export

Alternatively, one could divide a cell by the GDP of the region pertaining to the *row* in which cells appear (eg divide 170,000 by NSW's GDP), and obtain a propensity to export of that region (NSW). These is a rough measure of the 'importance' of the trade relation to the export country.

The Propensity to Export/Import

Any export is simultaneously an import. To treat the flow between two regions as either the manifestation of a 'propensity to export' of one, or the 'propensity to import' of the other, seems arbitrary. The double-sided nature of any flow may to some degree be allowed for by computing a geometric mean of the propensity to import of the country that is the importer, and the propensity to export of the country that is the exporter. We will call this the *Propensity to Export/Import.* To illustrate,

$$\text{Propensity to Export/Import for NSW/Tasmania} \equiv$$

$$(\text{NSW propensity to export to Tasmania})^{0.5}(\text{Tasmania propensity to import from NSW})^{0.5} \qquad (1)$$

'propensities to trade'

The measures above are measures of the strength of unilateral trade relation (say, NSW exports to Tasmania), one can easily conceive of measures of the strength of a bilateral trade. To illustrate with NSW and Tasmania.

$$\text{geometric mean measure of two trade flows between NSW and Tasmania} \equiv$$

$$(\text{NSW propensity to export to Tasmania})^{0.5}(\text{Tasmania propensity to export to NSW})^{0.5} \qquad (2)$$

which is equivalent to.

$$\text{geometric mean measure of two trade flows between NSW and Tasmania} \equiv$$

$$(\text{NSW propensity to import from Tas})^{0.5}\,(\text{Tas propensity to import from NSW})^{0.5} \qquad (3)$$

[12]

intensities

The simplest notion of an 'intensity' measure of a trade relationship between country X and country Y is the share of the total exports of country X that goes to country Y; say, the share of NSW exports that are destined for Tasmania. These might be called 'absolute export intensities'. It is commonly thought that a better measure of the strength of a trade flow would be (to illustrate) share of NSW exports that are destined for Tasmania *relative* to the share of the world's exports destined for Tasmania. We will call these 'relative export intensities.'[13]

Adapting measures to the Year Book data

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[12] Variants of such 'propensities to trade' include,

$$(\text{NSW propensity to export to Tasmania})^{0.5}(\text{NSW propensity to import from Tas})^{0.5}$$

and

$$(\text{Tas propensity to export to NSW})^{0.5}(\text{Tas propensity to import from NSW})^{0.5}$$

[13] See Bandara and Smith (2002) for an example of intensities analysis. Clearly 'import intensities' could be defined in parallel.

This paper reports the propensity to export/import, the absolute export intensity and the relative export intensity for the states of Australia.

But these concepts require some adaptation to the available data. The *Year Book* does not report the exports of one state to another state. Rather, it reports the exports of NSW to Victoria, Queensland, South Australia, Western Australia and Tasmania *combined*; in other words, 'Australia ex NSW', which we might symbolise VQSWT. Similarly, it reports Victoria's exports to New South Wales, Queensland, South Australia, Western Australia and Tasmania combined; 'Australia ex-Victoria', or NQSWT. And so on. Thus the *Year Book* allows the construction of trade matrices of the type of Table 5.

Table 5: An example of the *Year Books* report of trade flows

(1908, 000 pounds)

	N	*VQSWT*	*Rest of World*
N		14089	23721
VQSWT	14638		40590
Rest of World	19829	29770	

N= New South Wales,VQSWT = Victoria, Queensland, South Australia and West Australia and Tasmania combined.

From these matrices the normalised transformations articulated above can be computed. On the face of it, this data does bring with a presentational problem; capturing the strength of Australian state trade relations seems to require six tables rather than one. But the data can be put in to one table, at the tolerable price of many empty entries

VI The Implications of the data on propensities to export/import

Table 6's reports the propensity to export/import (measured as a percentage) for the quinquennium 1896-1900 for each Australian state, and for six 'remainder of Australia' regions, each defined as Australia excluding a given a state. The most important message of Table 6 is that the propensity to export/import of each state with respect the remainder of Australia was five or more times the propensity of each regarding the rest of the world. The familiar distance effect is, evidently, manifesting itself powerfully.

Table 6: Propensity to Export/Import: 1896-1900

N= New South Wales, V = Victoria, Q = Queensland, S = South Australia, W = Western Australia, T = Tasmania

(percent)	N	V	Q	S	W	T	VQSWT	NQSWT	NVSWT	NVQWT	NVQST	NVQSW	RoW A
N							10						2.0
V								6.3					1.5
Q									9.6				0.8
S										6.9			1.0
W											3.6		0.7
T												3.4	0.3
VQSWT	11												2.0
NQSWT		8.1											2.4
NVSWT			4.4										2.7
NVQWT				7.5									2.7
NVQST					5.8								2.7
NVQSW						2.8							2.8
RoW	1.6	1.5	0.7	0.8	0.6	0.4	1.7	1.9	2.2	2.3	2.3	2.3	

Table 7's reports of the difference between the mean of the propensity to export/import of 1905-1909 from 1896-1900.

Table 7: Propensity to Export/Import 1905-1909: Change over 1896-1900

	N	V	Q	S	W	T	VQSWT	NQSWT	NVSWT	NVQWT	NVQST	NVQSW	Non A
N							1.9						-0.1
V								3.1					-0.1
Q									-1.2				0
S										-0.9			0.5
W											-2.1		0.6
T												0	0.2
VQSWT	-0.2												0.4
NQSWT		0.1											0.3
NVSWT			1.0										0.2
NVQWT				1.7									0.1
NVQST					-1.8								0.1
NVQSW						1.8							0.2
Non A	-0.2	0.1	-0.1	0	-0.1	0	0	-0.2	-0.1	-0.1	-0.1	-0.1	

Table 7's data provides a mix of support and disconfirmation of the thesis that the Federation CU fostered intra-Australian trade at the cost of international trade. The data is supportive in that largest numbers occur in the interior of the panel. 9 out the 12 interior entries are larger in absolute value than *all* of the 24 'littoral' entries, on the edge of the panel. We conclude the action was taking place intra Australian trade, rather than international trade.

The data is also supportive in that export relations of the rest of the world to Australia (bottom row) stagnated in the wake of Federation; 8 of the 12 entries in the bottom row are negative, and only 1 is positive one (Victoria).[14]

But the data of Table 7 appears to have two different contrary stories regarding exports to the rest of the world. Export relations of the three largest states to the rest of the world stagnated (side column); the relevant entries are negative or zero. However, export relations of three smaller states to the rest of the world *strengthened*. Clearly, the response of the smaller states cannot be characterised as them as switching their exports of primary products towards Victoria and NSW, in order to pay for their switching towards Victoria and NSW for manufactured imports.

The data has two, perhaps three, distinct stories with respect to intra-Australian trade. Victoria's export relation to the rest of Australia evidently strengthened. The relevant cell entry, of 3.1, is easily the largest entry anywhere in Table 7. And the export relation of NSW to the rest of Australia strengthened; 1.9, the second largest cell entry. At the same time the export relation of the rest of Australia to NSW weakened (-0.2). In brief, NSW was exporting more to the rest of Australia; and the rest of Australia was exporting less to NSW.

But Queensland is the opposite to NSW; the strength of its export relation to the rest of Australia weakened (-1.2), while the export relation of the rest of Australia to Queensland strengthened (1.0). In brief, Queensland was exporting less to, and importing more from, the rest of Australia. South Australia was the same as Queensland; exporting less to the rest of Australia (-0.9), while the rest of Australia was exporting more to it (1.7). Tasmania was similar; it was

[14] Table 7 rounds to zero any entry smaller in absolute value less than 0.05, or one twentieth of one percent.

exporting no more to the rest of Australia, but the rest of Australia was exporting much more to it (1.8).

WA is distinct; yes, its export relation to the rest of Australia weakened (-2.1) as with the other smaller states, but the rest of Australia was also exporting less to it (-1.8). A rationale for this last result is not difficult; the dispersion of resources from the gold fields following their peak early in the 20th c surely contributed to import replacing industry in WA, including the replacement of imports from the rest of Australia.

VII The implications of the data on export intensities

Table 8 reports absolute export intensities over 1896-1900.

Table 8: Absolute export intensities, 1896-1900

	N	V	Q	S	W	T	VQSWT	NQSWT	NVSWT	NVQWT	NVQST	NVQSW	Non A
N							33						67
V								32					68
Q									38				42
S										46			54
W											39		61
T												62	38
VQSWT	30												70
NQSWT		19											81
NVSWT			7										93
NVQWT				9									91
NVQST					7								93
NVQSW						3							97
Non A	0.8	0.6	0.2	0.2	0.2	0.03	1.1	1.4	1.7	1.7	1.8	1.9	

Evidently, despite the operation of the distance effect, exports to the rest of the world constituted the greater part of the exports of four of six states (side column). Indeed, 81 percent of the exports of Australia exclusive of Victoria were destined for the rest of the world, and only 19 percent to Victoria.

Table 9 reports of the difference in the mean absolute export intensity of 1905-1909 from 1896-1900.

Table 9: Change in absolute export intensities, 1905-1909 over 1896-1900

(percent)

	N	V	Q	S	W	T	VQS WT	NQS WT	NVS WT	NVQ WT	NVQST	NVQSW	RoW
N							4.0						-4.0
V								9.6					-9.6
Q									-5.0				5.0
S										-13.5			13.5
W													26.7
T													18.3
VQSWT	-4.5												4.5
NQSWT		-2.7											2.7
NVSWT			0.5										-0.5
NVQWT				0.2									-0.2
NVQST													2.4
NVQSW													-0.9
R of W	-0.1	0	-0.05	-0.03	-0.03	0	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	

Table 9's data is consonant with the message of Table 7. The export relation of NSW and Victoria with the rest of the world weakened, while their export relation with the other states strengthened. The export relations of the four smaller states with the rest of the world strengthened, and correspondingly their export relations with the two larger states weakened. The export relations of the rest of the world to components of Australia weakened.

Table 10 reports relative export intensities over the period 1896-1900; the share of exports of state i to Australian region j relative to the share of world exports to Australian region j. [15] Evidently, these relative export intensities range from 20s to over 80; another manifestation of the distance effect in trade.

[15] Thus Table 10 reports the ratio of a given interior entry in Table 8 to the corresponding entry in the bottom row in Table 8. (Table 10 does not report the share of exports of state i to the rest of the world relative to the share of world exports to the rest of the world).

Table 10: Relative Export Intensities: 1896-1900

	N	V	Q	S	W	T	VQSWT	NQSWT	NVSWT	NVQWT	NVQST	NVQSW
N							28.7					
V								23.2				
Q									33.6			
S										26.5		
W											21.8	
T												32.5
VQSWT	38											
NQSWT		33										
NVSWT			33.9									
NVQWT				49.4								
NVQST					47.5							
NVQSW						81.4						

Table 11 reports of the difference in the relative export intensity of 1905-1909 from 1896-1900.

Table 11: Change in Relative Export Intensities: 1905-09 over 1896-1900

	N	V	Q	S	W	T	VQSWT	NQSWT	NVSWT	NVQWT	NVQST	NVQSW
N							6.7					
V								12.8				
Q									0.5			
S										-5.5		
W											-14.2	
T												-6.4
VQSWT	0											
NQSWT		-4.8										
NVSWT			15.4									
NVQWT				11.3								
NVQST					-8.9							
NVQSW						43						

Table 11's data is also consonant with the message of Table 7. By Table 11's measure, the export relationship of both New South Wales and Victoria to the rest of Australia strengthened, while the export relations of the smaller states to the rest of Australia weakened. At the same time, we see from the 'southwest' portion of Table 11 that the import relation of New South Wales and Victoria with the remainder of Australia was stagnant or languishing, while the import relation of the smaller states from remainder of Australia was strengthening.

VIII Some statistical tests

The hypothesis that a given measure of trade strength had a different population value in 1905-1909 than in 1896-1900 is a statistically testable one, in principle. Regrettably, the data set has only five observations for each of the 36 trade relations. This low degree of freedom (four) spells a low power of any tests, and suggests classical hypothesis testing is not the way to make the most of the data set. Nevertheless, the tests can be performed. Table 12 reports, for the three measures, those cells where the null hypothesis that the mean of 1905-09 was no different from the magnitude measured for 1896-1900 is rejected at 5% in a one tailed test.

Table 12 Significant at the 5 % level

*= propensity to export/import; § = absolute export intensity; † = relative export intensity

	N	V	Q	S	W	T	VQSWT	NQSWT	NVSWT	NVQWT	NVQST	NVQSW	RoW
N							*† (+)						§ (-)
V								*§ † (+)					§ (-)
Q									*§ (-)				§ (+)
S										§† (-)			*§ (+)
W											*† (-)		*§ (+)
T												† (-)	*§ (+)
VQSWT													*§ (+)
NQSWT		† (-)											*§ (+)
NVSWT			*† (+)										§ (-)
NVQWT				*† (+)									
NVQST					*† (-)								§ (+)
NVQSW						*† (+)							§ (-)
RoW	* (-)	* (+)	* (-)		* (-)			* (-)		* (-)		* (-)	

Inspection of Table 12 reveals that, in spite of the low degrees of freedom, many of the 36 measured trade strengths experienced statistically significant changes. 29 of the 36 cells obtain a statistically significant result.

IX Some reflections

The conclusion that Victorian and News South Wales trade relations' with the rest of Australia strengthened, while that of the rest of Australia with Victoria and NSW generally weakened, is the occasion of some reflection.

Motives for Federation

A fairly common and frankly expressed argument for Federation was that Victorian manufacturing had met the limits of its market, and the 'uniform tariff' of Federation would permit it to expand into an Australian-wide market.

> *Federation [is] necessary to provide new markets for Victorian goods*.
>
> Alfred Shrapnell Bailes, the M.P. for Bendigo 1886-1904, (in Cave-Browne 1891)

> *When uniform tariff is established Victoria will be benefitted by being called upon to meet the demand in the other colonies which have not developed industries under protection.*
>
> William Trenwith, Victorian delegate to the Constitutional Convention (in Cave-Browne 1891, p 79)

No colony was as aggressively self-confident of the enormous profits from intercolonial free trade as Victoria.

Ronald Norris (1975, p 79)

The data examined above provide some moderate substantiation of those motivated hopes. Of the 36 trade relations measured the mean of propensity to import and export, the one which experienced the greatest increase in 1905-8 over 1896-1900 was Victoria's exports to the rest of Australia.

However, the data suggests the story may be more involved than 'protectionist Victoria winning the Federationist prize'. This is because the second strongest measured increase of the 36 propensities top export/import was that concerned with the exports of NSW to the rest of Australia. It maybe that NSW – in the midst of industrialising at the opening of the 20th c - responded to the Federation CU in a similar way to Victoria. To sharpen this notion, go back to the model of Industria and Agraria, and suppose there is a third state which at free trade also imports Iron, more than Industria, but less than Agraria. If it had no tariff to begin then in joining the CU it will certainly experience an increase in the price of Iron, an increase which may be larger enough to turn it, too, into an exporter of Iron to Agaria.

Effects

The likely impacts on the Federation CU on trade flows have been explored above. What has not been touched upon is the impact of the CU on the welfare of the states. Perhaps most renowned result of CU theory is that a country joining a CU may suffer a loss in welfare potential. But by the tenets of standard theory it is not possible all countries who join a CU to suffer a welfare loss. In

the scenario of Agararia and Industria, Agraria may lose welfare, on account of it now exporting Wheat at price less favourable than the world price. But Industria must benefit. We are left with the thought that the two largest states, NSW and Victoria surely experienced a welfare gain. Such a benefit might explain a result that has not so far received emphasis in this paper: that Victoria's import relation from the rest of the world *strengthened* in Federation; the propensity to export/import between the rest of the world and Victoria is in the only positive co-efficient in the bottom row of Table 7, and the result is statistically significant. One might seek to rationalise this as a price effect; however, the average rate duty of the Federation tariff was higher than the Victorian tariff of 1900 (Table 2). One could alternatively rationalise it as an income effect: an increase in Victorian imports of goods were not producible in Australia, on account of higher Victorian incomes. This rationalisation can be deepened and expanded. As noted in the theoretical section, the CU spells a negative income effect for 'Agraria', as it receives less than world values for whatever it exports to 'Industria'. Thus the CU may be construed as spelling a negative income effect for the smaller states, and curbing their consumption. Their consequent surplus goods might be sold to the larger states. But if, additionally, the demand of the larger states for the products of the smaller states was weak, the response of the smaller states to the Federation CU would have been to sell more abroad. [16]

In 1981 Geoffrey Blainey ventured,

> *In my view they [NSW and Victoria] have been the great beneficiaries of the new Commonwealth … If there had been no Federation in the era*

[16] The Premier of Western Australia, John Forrest to the Federation Convention of 1897: 'We have few products, I am sorry to say, to export to these colonies at the present time'.

1901-1960 NSW and Victoria would not have grown so rapidly. Likewise several states – especially WA and Queensland – would probably have grown more rapidly in the years 1901-1960 if there had been no Federation.

(Blainey 1981, p.6)

These remarks touch on a question that this paper has not addressed, but the conclusions of the present analysis are in sympathy with Blainey's contention.

X Conclusions

The measures of the strength of trading relationships that this paper investigates concur that Federation inhibited the export relations of the larger states with the rest of the world, while encouraging their export relations with the smaller states. The Federation CU was in this manner 'nationalising' of the trade of New South Wales and Victoria. On the other hand, Federation encouraged the export relations of the smaller states with the rest of the world, while inhibiting their export relations with the larger states. With regard to the smaller states, then, the Federation CU was 'internationalising'. Finally, with the important but sole exception of Victoria, the export relation of the rest of the world with all states seem to have been discouraged. Here, again, the impact was nationalising.

Data Sources

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