

Lobbying and Trade Protection in Colonial Australia: An introduction

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Abstract

In the late nineteenth century, average levels of trade protection differed between the colonies of Australia. The importance of trade barriers in the context of economic development is well documented and there is a rich literature in public choice economics which attempts to explain the political aspects of protection. Very little empirical work has been conducted to explain the *structure* of protection in Australia during this key period of development. This paper takes the first step of examining the influence of lobby groups in the colony of Victoria in the late nineteenth century. We provide an overview of the structure of protection, and use modern public choice theory to begin an initial investigation into the potential role of special interest groups in the government's formulation of policy.

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1. Introduction

Grossman and Helpman, in the opening line of their 1994 paper ‘Protection for Sale’, make the observation:

When asked why free trade is so often preached but so rarely practised, most international economists blame ‘politics’ (page 833).

Their paper proceeds to present a model of endogenous tariff formation which incorporates the actions of special interest groups. This paper has become the ‘workhorse’ model for contemporary trade policy analysis.

Such literature has arisen because there is an almost overwhelming view in the economics profession that in general, trade is beneficial to growth and development. In this context, the deviations from free trade that are so often observed are thus counter-intuitive without a political explanation. When examining tariffs in the more distant past, however, economic historians have tended to rely more on arguments centred on infant industry protection, nation building and revenue generation. This is perhaps unsurprising given the massive data constraints associated with empirical testing of endogenous tariff formation models, such as the one proposed by Grossman and Helpman (1994). Nonetheless, this creates somewhat of an anomaly in the literature. While those studying trade in recent and current periods generally accept the role special interest groups have on policy formation, the historical literature has largely overlooked this issue.¹ It seems equally plausible, however, that if special interests are able to influence modern policy outcomes, then they would also have had such a capacity in the more distant past. Indeed, those who have examined this issue, such as Blattman *et al.* (2003), have explicitly called for more work in this area.

This paper is part of a research agenda aimed at examining the public choice aspects of trade and other policy outcomes in Australia during the late nineteenth and early twentieth century. To initiate this, we start by analysing tariff protection in the colony of Victoria in 1880. This colony represents an interesting case study as it was the most protective in Australia in the latter part of the nineteenth century.

We begin our investigation by first revisiting some of the ‘non-political’ arguments that have commonly been used to explain tariff protection. Following this, we investigate the literature relating to the politics of trade policy. As will become evident, this literature is rich, and the framework chosen to investigate trade protection critically turns upon the exact question being asked. Our goal is to contemplate the sectoral variation in tariff rates in 1880 Victoria from a political perspective, and as such we introduce the Grossman and Helpman (1994) model as a potential means by which to accomplish this. In this initial study, we also then introduce a variety of issues which need to be considered in estimating this model econometrically, and in particular, the problem of obtaining suitable data.

¹ Some notable exceptions to this are detailed later in this paper.

The final section of the paper examines some of the available data for the colony of Victoria. In doing this we rely heavily on Siriwardana (1985). We present some basic descriptive data and offer some very tentative regression analysis as a teaser to some of the ongoing work required. This paper concludes by indentifying an agenda for ongoing research in this area.

2. Determinants of protection

What are the fundamental determinants of the rates of protection experienced in the latter part of the 19th century? Blattman *et al.* (2003) have demonstrated that there was an increase in average rates of protection between 1865 and 1900; a so called drift in protectionism. O'Rourke and Williamson (2000) have documented the increases more specifically, with continental Europe imposing agricultural tariffs, England, Ireland and Denmark maintaining free trade policies and New World countries creating high tariffs on manufactured goods and increasing restrictions on immigration.² In this analysis, the primary trigger for Australia's emerging tariff wall and protectionist policies are changes in international market signals and the consequences of lower transportation costs. While the Heckscher-Ohlin analysis of the national response to changes to price signals provides a convincing overarching framework to explain many of the observed responses, it provides fewer insights into detailed changes that occurred in the economy and the process by which particular economy sectors 'won' or 'lost'.³

With the exception of approaches adopting a Heckscher-Ohlin framework, more 'traditional' country-specific explanations for tariff increases focus on local 'country-specific' elements such as the need for revenue, industrial development and associated labour market protection.⁴ Thus within the wider context of long-run decreases in transportation costs, we summarise some of the main country-specific factors below.

For a newly developing nation, perhaps the most prevalent line of thinking is that tariffs help to raise revenue. With small but growing populations and a need to undertake infrastructure development in the new colonies, the argument that protective tariffs raised much needed revenue is not unreasonable. From a local economic perspective and in terms of welfare enhancement, such a policy would need to generate public benefits through externalities associated with public spending which exceed the deadweight loss of protection. Optimal tariffs in such circumstances tend to be levied on those goods for which have an inelastic import demand elasticity.

Suppose for example that the government were to levy a tariff, t on a particular imported good. Total revenue from the tariff is given as:

² O'Rourke and Williamson (2000) Chapter 3.

³ *ibid*

⁴ We ignore the possibility of a terms of trade improvement that could be brought about from influencing world prices in this paper. While a possibility, it is unlikely that these arguments would have held only for the colony of Victoria. Moreover, as will be discussed later in this paper, it is likely that tariffs were welfare decreasing.

$$R = tpM$$

Where R is total revenue, t is the ad valorem tariff rate, p is the pre-tariff price and M is the quantity of imports. Assuming that export supply is perfectly elastic and solving the government's first order condition yields:⁵

$$t^* = \frac{-1}{1 + \eta}$$

where η is the import elasticity of demand. Note that a lower import demand elasticity implies a higher optimal tariff. Intuitively, a small consumption distortion implies higher revenue for the government. Additionally, though not captured by the simple specification of governments objective function here, is that a tariff would also be associated with a lower deadweight loss where import demand is inelastic.

The possibility that tariffs were primarily a revenue raising device gains support when considering decreases in agricultural productivity that occurred over the same period. Pincus (1995, p.56) notes that when land sale revenues in Victoria began to lag in the second half of the nineteenth century, tariff revenue was seen to be a suitable replacement. The incidence of such tariffs would also ultimately fall more heavily on relatively fixed factors of production. Both capital and particularly labour were viewed as relatively mobile and the costs of tariff protection would have been expected to fall on landed interests, hence acting as a pseudo land tax.

Consistent with this argument, Coghlan (191, pp 1136-43) states that not only did the Victorian Treasury find tariffs more politically digestible than direct taxation in the early 1860s, but that landowners and squatters were strongly opposed to customs duties- preferring land sales – which also happened to give them the opportunity to consolidate their holdings.

The second argument to explain trade protection during this period is that tariffs (and other restrictions) were used to foster domestic industrial development. Australia generally had an economy that was reliant on agriculture and mining. In Victoria, gold rushes and associated prosperity in the 1850s had attracted large amounts of labour. Shann (1948, p. 264) provides anecdotal evidence that many of these workers were mobile and threatening to leave the colony following the decline of gold mining. He cites the example of 9000 workers leaving for Otago and NSW in 1861 and the associated response by the Victorian government to enact policies aimed at increasing immigration. He argues that there was an argument that the state had an obligation to support the creation of an industrial sector, capable of employing newly arriving workers and those

⁵ See Irwin (1997). This assumption implies that the tariff is passed in full to domestic consumers. If export supply is not perfectly elastic, then the optimal tariff will *ceteris paribus* be higher

displaced by declining gold fields. Moreover, as argued often by the then editor and owner of the *Melbourne Age*, protection in order to foster industrial development was itself an economic and even social imperative:

Is it desirable that instead of carrying with us the arts of advanced civilisation from the parent State in Europe to this remote land, we should purposely, and as it were with 'malice aforethought', upon quitting the shores of that parent State, cast behind us and abandon the knowledge and the practice of those great industrial arts, which have constituted and still constitute the sole groundwork of her characteristic pre-eminence in trade commerce and wealth? Is it not on the contrary that we should endeavour to perpetuate amongst us.....trained industry which is a part of our national inheritance? (Syme: cited in Shann, 1948, page 265).

Notably, Syme also held a strong 'land for the people' belief and with displaced labour looking for work in Victoria, he may well have seen tariff protection as a complementary way to protect ordinary citizens from the special interests of squatter land owners (Sayers, 1976). Such a possibility demonstrates the complex relationships between the arguments presented above. Tariffs in this light could be seen as fostering industry to employ labour at the expense of fixed factors of production such as land.⁶

These changes were occurring within the period commonly referred to as the first wave of globalisation (Williamson 1996). A non-trivial driver of this process was that significant decreases in shipping costs facilitated expansion of trade (Singleton 2006). Thus while tariffs in the late nineteenth century Australia may therefore have been a simple response to decreases in the natural rate of protection, who 'won' and who 'lost' in this process is still of interest.

3. Special Interest Politics

The country-specific arguments have received some empirical validation (see for example, Blattman *et al*, 2003). However, questions do remain unanswered. Why for example, did NSW proceed with virtually no trade protection and enjoy prosperity and development similar to that of Victoria?⁷ More importantly for this paper, how do we explain the exact structure of protection within Victoria? Several authors have argued that tariffs did indeed hurt Victoria. This stands in contrast to the arguments presented above which imply protectionist policies to be welfare enhancing. For example, Siriwardana (1995) has shown that costs to unprotected industries were significant and thus tariffs were likely to have come at a net welfare loss. Importantly, his analysis shows that many of the 'loser' industries were also labour intensive. Citing Patterson (1968), Pincus (1995, p.57) writes:

⁶ By the 1920s the argument that tariffs would protect labour and wages, or both had become so identified with Australia that it was labelled 'the Australian case for protection' in the 1929 Brigden Report- a report which itself was the precursor to the Stolper-Samuelson theorem (Coleman et al).

⁷ Indeed, NSW professed that it wished to follow the policies adopted by the United Kingdom as closely as possible (Coghlan [1960] Vol II p 1136).

..the triumph of protectionism [was] not only due to the rhetoric of Syme, nor solely revenue hunger, but also to the industrial composition of Victoria in the 1860s: the abundance, relative to New South Wales, of men whose interests would gain from protection in manufacturing.

Coghlan too notes that (1918, p 1140):

Large numbers of artisans, who had gone to Victoria as gold-seekers, found themselves after 1855 anxious to turn from such a speculative occupation and pursue their regular callings, but they were persuaded that the demand for their services was diminished very much by the large importation of manufactured goods. Against this importation... there was a constant agitation among the artisans, especially in Melbourne, and the trade unions of Victoria frequently denounced the practice of importing manufactured goods. When, therefore an increase of revenue became necessary, an active propaganda of Protectionist theories took place. A tariff league was formed in 1859 with the object of securing such changes in the tariff as would encourage Victorian industries. There were, among the gold miners, a number of men from the continent of Europe and from America who were accustomed to protective duties, and the Americans especially regarded them as tending to high wages and industrial prosperity. This American element had already affected powerfully the land policy of Victoria, and it hoped to exert a similar influence upon the tariff.

Such an argument implies the possibility of political influences, and in particular special interest group politics. In most modern trade policy outcomes, it is accepted, albeit sometimes without empirical rigour, that special interest groups do exert influence over the decisions of elected (and non-elected) politicians. This stream of literature has generated numerous models which make endogenous the influence of special interest groups in policy formation. However, due to a paucity of data, much of it is relegated to theory. In this section we briefly review some of this literature and identify a suitable model, that proposed by Grossman and Helpman (1994), for use in an empirical estimation of who was protected and why in colonial Victoria.

3.1 Models of Endogenous Policy Formation

There is a vast literature which examines the political economy of trade policy; i.e. how special interest groups can influence trade policy outcomes. Excellent reviews of these approaches can be found in Hillman (1989), Rodrik (1995), and Grossman and Helpman (2002). Much of the literature has previously been categorised under three broad headings that capture the main areas of interest in the approach: direct democracy, political competition approach and political support approach.

The first category, *direct democracy* attempts to explain trade policy outcomes in the context of a political process whereby there is *no* direct lobbying activity by special interest groups. As

Patterson (1968) suggests, the outcome may simply be a result of the composition of society.⁸ In these models, voting takes place under restrictive circumstances: there is a single policy issue such as tariff protection to an import competing sector. An assumption of this model, which is clearly unrealistic in modern societies, let alone the 19th century Victoria, is that every citizen votes. Each citizen has a different endowment of a factor of production which is specific to the import competing industry and hence a different preference over the tariff rate. Those with a large endowment of the sector specific factor desire greater levels of protection, while those with a relatively low endowment of the same factor desire no protection, or even an import subsidy. Either side of the median voter, opposing voices regarding the level of the tariff are balanced. The rate which is optimal for the median voter thus characterises the equilibrium policy.

Such models, while providing a benchmark by which to start to consider how political motivations may influence policy are basically flawed. The assumptions of a single policy issue (single peaked preferences) and universal suffrage are restrictive and inconsistent with real world politics.⁹ Moreover, as noted by Grossman and Helpman (2002), concentrated ownership of the specific factor should lead to an equilibrium policy of negative protection. For example, suppose the sector-specific factor was wholly owned by one individual. In such a circumstance, the median voter would prefer an import subsidy over a tariff. In practice, however, positive protection is afforded to industries with concentrated factor ownership. There are several reasons why this might be so. For instance, Mayer (1984) argues that where voting is costly, only those who stand to gain more than the cost of voting will engage in the political process. The more concentrated the ownership of the specific factor, the fewer participants there are to share the rents associated with higher protection. Conversely, for those who do not own the specific factor, the individual's share of the gain from obtaining a lower level of protection will be small. If the gains for these individuals are so small that they do not offset the costs associated with voting, they do not participate in the political process. Thus, the small group of specific factor owners may be able to obtain protection for their sector.

Rather than having a passive role in influencing policy, an alternate view is that lobby groups undertake activities which help shape the political outcome.¹⁰ Grossman and Helpman (2002) discuss this in the context of the Mayer (1984) model, noting that the small group who owns the sector specific factor would be far more likely to succeed in overcoming the free-rider problem associated

⁸ Note of course, that Patterson need not have been arguing for a passive role of particular interest groups. Activities which might be undertaken and the manner in which they might be considered in a theoretical construct are considered shortly.

⁹ Interestingly in Australia we have had periods that are perhaps more aligned with the model than in other countries. For example, we have compulsory (and thus essentially universal) voting. The general election in Victoria in 1871 is said to have turned essentially on the issue of protection (Coghlan Vol 11, 1150). None the less in 1871 there was not universal suffrage in Victoria. More generally, in electorates where voting is costly and not compulsory, individuals who do not see their vote as pivotal will not participate.

¹⁰ Lobby groups undertake many different activities. These include making political contributions, educating the public, and acting as a source of information for the political elite (See Scholzman and Tierney (1983).

with forming a pressure group to argue for greater protection.¹¹ On the other hand, the remainder of the voting population, who on a per-capita basis stand to gain relatively little from changing trade policy are unlikely to be able to overcome free-riding problems. The *actions* of these pressure or lobby groups are of central importance under the *political competition* and *political support* approaches. A brief review of each is discussed more fully below, followed by an intuitive explanation of Grossman and Helpman's (1994) model; a model which advances our insights still further.

Political Competition

The first of these approaches was pioneered by Hillman and Ursprung (1988) and Magee, Brock and Young (1989). These authors modelled trade policy as being driven by political competition. Such models are characterised by rival political parties selecting policy positions to which they are credibly committed, should they gain office. It is assumed that there are two opposing lobby groups, each of which has opposite views regarding the level of trade protection, while the general public are assumed to be rationally ignorant of the effects of the policy. Announcement of the policy positions by each party generate political contributions from the organised lobbies. These contributions are then used by the political parties to sway the uninformed voters. In this manner, contributions determine the electoral success (or failure) of each candidate. The political competition approach thus formalises the relationship between the profit maximising objectives of lobby groups and the political motives of the candidates.

As first movers in this game, the political parties calculate the reaction functions of the lobby groups to policy announcements. In equilibrium, political competition determines the actions of the political parties, a phenomenon which Magee, Brock and Young (1989) coin as *the powerless politician effect*. A further result is that the interest groups make specialised contributions. Specifically, those wishing for free trade make contributions solely to the more liberal candidate and those advocating protection contribute only to the protectionist candidate.¹²

Hillman and Ursprung (1988) show the equilibrium trade policy depends on the instrument used. They find that tariffs are politically divisive, causing the protectionist candidate to choose a prohibitive tariff while her rival chooses free trade. As electoral success depends on the level of contributions made to each candidate, Hillman and Ursprung seek to identify when a particular party will secure more contribution funding vis-à-vis its rival. They find that the protectionist candidate

¹¹ See Olson (1965) for a discussion of the free-rider problem. Damania and Fredriksson (2000) show that more collusive industries have higher incentives to form lobby groups.

¹² This result, however, does not always reflect reality. As noted by Grossman and Helpman (2002), special interest groups often make contributions to all major parties (p. 185). Using the political competition approach, Mayer and Li (1994) identify an equilibrium where both lobbies make contributions to the same party, however, they are unable to explain multiple party donations by special interests.

will be more likely to garner contributions (and thus gain power) when imports and domestic goods are close substitutes and when domestic producers face lower levels of competition.

Political Support

The political competition approach, despite some drawbacks, is a useful tool for explaining the differing policy positions of rival candidates who are dependent on policy contributions for their electoral success. However, political contests are usually fought out over a wide range of issues, not just the stance over a particular policy. In addition, the finer details of the policies, as noted by Grossman and Helpman (1994), are often made without the constraint of a looming political contest. For example, whether a political party will adopt protectionist or free trade stance could well be investigated using the political competition approach. Details regarding the finer points of policy, such as which industries might receive protection, or which type of instrument is likely to be used, may be determined after an electoral victory. In such a circumstance, how is it that lobbies might still exert some influence over the incumbent policy makers? The political support approach seeks to explain how this might occur.

The basis of this approach is that in choosing policy, self-interested politicians are prepared to trade-off the welfare of the public at large with the policy driven gains which accrue to supportive industries. In essence, the incumbent government wishes to maximise the political support received from the supportive industry subject to the constraint that the marginal political costs of a change in policy (through falls in general welfare) do not exceed the marginal gain accruing to the special interests. The lobby groups are able to use this characteristic of the government to effect transfers of wealth from the general public to themselves. The nature of 'political support' is not explicitly defined, though it could naturally be assumed to include political contributions.

In this setting, the effect of contributions and rational ignorance of voters become redundant as there is no looming political competition.¹³ Further, contributions from lobby groups need not involve monetary payments to politicians, but instead could involve any form of patronage. The political support approach is particularly useful in providing insight into how special interests influence policy outcomes where political competition is low or non-existent.

In his seminal paper, Stigler (1971) lays down the arguments which form the basis of the political support approach.¹⁴ An empirical investigation into regulation surrounding the trucking industry in 1930 is undertaken to investigate his hypotheses regarding the influences on regulation. Stigler's argument suggests that rival rail interests were likely to have had an influence over policy. He finds that regulation was lower where the gains to rail interests were lower (for example, where the length of haul was larger, implying that truck based transport to be less viable) and the adverse welfare impacts on the public were higher, providing empirical evidence for his hypothesis.

¹³ Voters are however, assumed to be unable to overcome problems of free-riding as specified in Olson (1965) and as such, there is no special interest group representing their interests.

¹⁴ Peltzman (1976), provides a more formal framework for the approach.

Hillman (1982) formalises the ideas presented by Stigler (1971) to analyse the political incentives for providing protective support to declining industries. He considers the case where domestic producers in a small open economy are protected from imports by a government wishing to maximise its political support. In the government's objective function, the each lobby receives an exogenous weight. The case where domestic interests face a constant fall in their comparative advantage due to falls in the world price is considered. Under certain conditions, protection to the declining industry is shown to increase, however, it does not fully compensate domestic producers for the fall in world prices. As such, the best domestic producers can hope for is that the rate of decline will be slowed.¹⁵ Crucially, the government is predicted to 'soften the blow' in this manner only when the exogenous political weight attached to the industry is sufficiently high.

The Grossman and Helpman Model

Using the common agency framework set down by Bernheim and Whinston (1986), Grossman and Helpman (1994) (herein G-H) present a model where policy decisions are made by self-interested politicians who trade off the welfare of citizens against political contributions offered by lobby groups. No challengers are explicitly modelled and contributions are not assumed to influence political contests.¹⁶ Lobby groups within a small open economy offer contributions which are contingent upon the level of protection afforded to their industry. As such, the model follows the tradition of the political support approach.

In their formulation of the government's objective function, G-H move beyond the earlier political support literature where the government was assumed to place exogenous weights on the welfare of each group in society. They instead specify an objective function for the government which has political contributions and aggregate welfare of citizens as its arguments. The relative importance of contributions generated from policy favours against the associated welfare loss is determined by an exogenous weight.¹⁷ *Ceteris paribus*, the government is equally happy to receive contributions from any of the organised lobbies. However, the costs in terms of voter dissatisfaction and the preparedness of lobby groups to make contributions will differ across different industries.

¹⁵ Using a general equilibrium approach, Long and Vowsden (1991) find support for this result, showing that a declining industry will continue to decline.

¹⁶ An intuitive way to consider this is that each lobby group considers its own contribution relative to total contributions to be small, and thus consider the electoral effect of their contributions to be insignificant. While the model assumes that politicians must derive utility from contributions, the exact manner of how they are used is unimportant: they may be used for election campaign spending or for some other purpose (even private consumption). In justifying this approach, Grossman and Helpman (1994) point to evidence provided by Magleby and Nelson (1990) who note that more than three quarters of campaign contributions in the 1988 congressional campaigns went to incumbent candidates. More recent data also suggest a bias towards incumbent candidates. In the US 2006 election cycle for example, the *Center for Responsive Politics* note that house incumbents enjoyed more than a three-to-one fund raising advantage and the senate incumbents a two-to-one advantage over their challengers, for details, see:

<http://www.opensecrets.org/bigpicture/incumbents.php?cycle=2006>, accessed December, 2008.

¹⁷ In section 2.4, empirical studies which attempt to estimate this weight are presented.

A derivation of the Grossman and Helpman (1994) model, which follows that of Goldberg and Maggi (1997) appears in the appendix, however to highlight some of the important results of the model, we present a more formal description below.

The model considers a small open economy, made up of several sectors where production uses labour and one specific non-labour input. The society has a total population size which is normalised to 1. Returns to this specific factor are entirely determined by the price of the relevant good produced. Each individual owns a unit of labour and a maximum of one specific factor. Importantly, tariffs drive a wedge between the local and international price and hence have the capacity to raise the returns to specific factors in protected industries, generally rendering owners of these factors better off. It is assumed that some subset (L) of the population is able to form a lobby group, denoted as $\alpha_L \in (0,1)$. These lobbies can make political contributions and a ‘schedule’ can be derived which maps each possible tariff rate in a given sector to the level of contributions made. Around the equilibrium, contributions are ‘locally truthful’, that is, the marginal increase in contributions for a small policy favour is equal to the marginal increase in profits which result.

As noted, the government values aggregate welfare and contributions made by lobby groups and maximises the following objective function:

$$G = \sum_{i \in L}^n S_i + aW \quad (1)$$

Where $\sum_{i \in L}^n S_i$ denotes the sum of all contribution made by each lobby group in the subset L , W is a measure of aggregate welfare of all citizens (including those who lobby), and a is an exogenous weight ascribed to welfare. Specification in this form thus assumes that lobbyists receive a weight of $(1+a)$ while unrepresented groups receive a .

In the equilibrium derived in the appendix, the equilibrium tariff schedule can be expressed as follows:

$$\frac{t_i}{1+t_i} = \left(\frac{I_i - \alpha_L}{a + \alpha_L} \right) \frac{X_i}{M_i} \frac{1}{e_i} \quad (2)$$

Examining equation (2) yields some simple, yet interesting insights. For each sector, I is an indicator variable which is set to 1 if the sector is politically organised and zero otherwise. As the population is normalised to 1, and $\alpha_L \in (0,1)$, organised sectors will generally receive positive protection. The one exception is when all groups are represented, in which case free trade will prevail.¹⁸ Moreover,

¹⁸ In equilibrium, local truthfulness implies that each lobby pays according to the marginal benefit of a policy favour. Where all groups are represented, contributions convey the preferences of all competing groups, some

lobbies will be more successful when a relatively small proportion of the population is politically organised (in this case, $I - \alpha_L$ is larger).¹⁹ The equilibrium tariff in sector i will also be determined by the (inverse) import penetration ratio (X/M) and the import elasticity of demand (e). In particular, where X/M is relatively large or the import elasticity of demand relatively small, tariffs will tend to be greater. The intuition is that tariffs on goods with inelastic import elasticity will generate lower deadweight losses, and as the government cares about aggregate welfare (determined by the weight a), it is more reluctant to impose protective measures which hurt the population. If X/M is large, then this implies that relative to imports, domestic production is large and thus the gains from a tariff induced price are likely to be larger. At the same time, low import volumes again imply that the deadweight loss, at least in absolute terms, will be low. Finally, note the importance of the weight ascribed to aggregate welfare relative to contributions. In the case where $a \rightarrow \infty$, the optimal tariff is set to zero and free trade prevails. Note that the parameter a is not sector specific and this result would apply to all sectors in the economy.

3.2 Empirical Support for the Grossman and Helpman Model

There are several papers which empirically investigate the validity of the predictions emanating from the Grossman and Helpman (1994).

Goldberg and Maggi (1997) investigate the pattern of protection afforded to firms in the US for the year 1983. They identify that in the Grossman and Helpman model, the relationship between the ratio of domestic output to imports and the level of protection will differ depending on whether the industry is organised. In particular, the relationship will be positive if the industry is organised and negative if not. Their results suggest organised industries receive higher levels of protection. Further, they find a positive relationship between the ratio of domestic output to imports and the level of protection for this group.²⁰ The exogenous weight attached to aggregate welfare by the government relative to contributions is estimated and found to fall within the range of 50-88. The data reveal that overall, protection levels in the US in 1983 were quite low. The authors attribute this result to both the high weight attached to aggregate welfare and the high degree of representation by lobby groups (i.e. opposing interests neutralise each other).

of whom desire protection, others who would desire free trade or an import subsidy. Ultimately, the government sets tariffs as would a benevolent dictator maximising aggregate welfare, which in the case of a small, open economy, is free trade.

¹⁹ This can be made clearer by considering two extreme cases. In the first, where as described above, all groups are represented, all groups pay to achieve a free trade outcome. Hence, the government, which adopts the policy it would have in the absence of lobbying and suffers no political loss, hence capturing all of the surplus associated with its interaction with competing special interests. Conversely, when only one group is represented, the government is merely compensated for the political losses associated with deviation from the welfare maximising ideal. Intuitively, as the lobby group has no competition, it wields considerable political power and captures all of the surplus from its interaction with the government.

²⁰ Though this result is not significant, the authors find a negative and significant association between the ratio of domestic output to imports and protection for unrepresented industries, thus suggesting a difference in the pattern of protection between organised and unorganised sectors.

Goldberg and Maggi (1997) focus on the pattern of protection across industries, rather than the predictions from the Grossman-Helpman model regarding the behaviour of lobby groups. Gawande and Bandyopadhyay (2000), using US data for the same period, incorporate this aspect into their analysis. Again, the results suggest that for organised industries, the level of protection varies positively with the ratio of domestic output to imports and negatively with the absolute elasticity of import demand. The result is shown to be opposite for those industries which are unorganised. Consistent with Goldberg and Maggi (1997), they estimate a high value for the weight attached to aggregate welfare relative to contributions which implies that the government values aggregate welfare net of contributions almost equally to contributions received from the lobby groups.²¹ On the lobbying side, it is found that the level of contributions is rising with the deadweight loss incurred from protection. Specifically, it is shown that a doubling of the deadweight loss requires an almost two thirds increase in lobby group contributions. This provides some evidence for the prediction that contributions must compensate the government for the costs associated with adopting policies which favour special interests.

Cadot, Grether and Olarreaga (2003) revisit the issue of estimating the weight ascribed to aggregate welfare by government and note that estimates in other studies appear unrealistically high. Examining Indian data they find they obtain an estimate of 5.1 for this weight, which is significantly lower than the previous estimates.

Mitra, Thomakos, and Ulabaşoğlu (2002) examine protection in Turkey over the period 1983-1990. This study has two important distinctive features over those which have thus far been presented. First, they examine the structure of protection in a developing country. The second major contribution is that by using time series data, the conditions under which the weight attached to aggregate welfare changes can be identified. Their results again provide broad support for the Grossman-Helpman model. Of particular interest is the finding that the weight attached to aggregate welfare is higher in times of democracy relative to those where a dictatorship was in place. This result is consistent with results obtained by Branstetter and Feenstra (1999), who attempt to explain province level variations in foreign direct investment and trade flows in China. They find that the weight attached to net aggregate welfare is between 1/5th and 1/12th that of the weight applied to state owned enterprises welfare (who benefit from trade and capital restrictions). However, in years of greater liberalisation in China, this relative weight increases to approximately one half.

²¹ The authors estimate the parameter a in the government's objective function: $G = S + aW$, where S represents lobby contributions and W total aggregate welfare. This is equivalent (see Grossman and Helpman (1994, p838)) to the government maximising $G = a_1S + a_2(W - S)$, where a_1 and a_2 are the weights given to contributions and net aggregate welfare respectively, and $a = a_2 / (a_1 - a_2)$. Rearrangement yields

$a_2 = \frac{a}{1+a} a_1$. Thus, $a_1 \rightarrow a_2$ as the value of a becomes very large. Their estimated value for the parameter a of 3175 implies that aggregate welfare net of contributions is given almost equal weight as lobbyists.

McCalman (2004) uses data on trade protection in Australia in two periods, 1968/69 and 1991/92. Consistent with other empirical work examining the Grossman-Helpman model, the predicted relationships between import penetration ratios for organised and unorganised industries are shown to hold. More interesting, however, is McCalman's application of the model to explaining the process of trade liberalisation in Australia between the two periods. Two hypotheses are tested. First, it is argued that these changes may have arisen because of a change in government preferences. This is tested by estimating the weight given to aggregate welfare relative to contributions in each period. The second hypothesis is that increased representation among competing interests over the period possibly resulted in an equilibrium set of policies closer to the free trade level. The data provide only weak support for the first of these hypotheses with the weight in the latter period estimated as 43.41 compared with 40.88 in the first period, a difference which is found not to be significant. More robust support is found for the second argument however, with a statistically significant increase in the proportion of the population represented by lobby groups between the two periods (0.96 in the 1991/92 compared with 0.88 in 1968/69).

As should be clear from this discussion, much of the work examining lobby group influence on trade policy focuses on simply detecting whether such influence exists, or whether the data allow measurement of particular welfare weightings which change with policy change and in a direction consistent with the G-H hypotheses. Thus testing the validity of a G-H type model adds another dimension to trade policy analysis and assists in focusing on interests groups, other than the government, associated with policy change.²²

Analysing Tariffs in Nineteenth Century Victoria

A first step in examining tariffs in an historical perspective is to identify the exact question being posed. In terms of identifying potential reasons for regional differences, as attempted by Blattman *et al* (2003), the theoretical grounding of the political competition approach would seem to be more appropriate. Analysing the structure of trade protection in a given region (ie an individual colony) places the analysis firmly in the realm of Grossman and Helpman's 1994 framework.

As previously noted, there is some research that suggests tariffs were indeed welfare reducing in the colony of Victoria. This implies that a benevolent government should not have adopted these protective measures. Moreover, explanations consistent with revenue maximisation models would predict higher protection for industries with inelastic import demand. Such a result, however, is also consistent with the predictions of the G-H model. In this paper, our intention is to try work towards an empirical framework to test the G-H model using data from Victoria in 1880. First, there are several major issues to be overcome with such an empirical estimation.

²² Acceptance of the G-H approach does not preclude other explanations for policy change. For some examples see Lloyd (2002) or Schonhardt-Bailey (2006).

The first, is that of determining which groups were organised and which groups were not. Lobbying in the G-H model takes the form of political donations- and the existence of donations is used to infer that a group was organised. While some contemporary data on donations are available in some jurisdictions, it is frequently impossible to know which policies might have been the target of influence from such contributions. Such data are generally not available at all for the nineteenth century. While contributions have the problem of non-disclosure, another approach to detecting whether a group is 'organised' may be to assess 'contributions' in the form of personal, or other non-monetary favours; such an approach would be consistent with the intent of the model. Once again, most of these forms of contribution will not be observable.²³ Faced with similar data problems, McCalman (2004) considered an industry to be 'organised' if it successfully negotiated a review of its own tariff through a Tariff Board enquiry, and constructed a measure of the degree of political organisation contingent on the number of industries within a sector which successfully invoked a review.

The history of the introduction of tariffs in Victoria is replete with references to individual politicians and their views on protection (Coghlan 1918 p 1136-60). Furthermore the colony participated in the formation of a tariff league (1859) and parliamentary tariff enquiries. Importantly for this study, not only have the attitudes of particular politicians and groups of politicians been clearly located in the historical debate, by 1871 the parliamentary elections 'turned largely upon protection' (Coghlan, 1918 p1150). Indeed by that year there was an active tariff committee of the Victorian Industrial Protection League (ibid). Analysis and identification of the economic interests of the various individuals and groups in these debates may indeed provide useful information on which to test a model of interest group influence on tariff formation.²⁴ One source of political power came from workers, however, it is also reasonable to suspect that such groups may have had difficulties in forming effective lobbies. While union power had increased during the 15 years prior to 1880 (Coghlan, 1918), industries with large numbers of workers may still have faced significant coordination problems. One proxy measure for whether groups of workers were organised (or had the incentive to be organised) is via the value of their output. That is where the per-worker returns were greater, so too might have been the incentive to lobby for protection.²⁵ This approach is consistent with the work of authors such as Blattman *et al.* who use urbanisation as a proxy for the Stolper-

²³ Some forms of personal favour such as membership of exclusive clubs, or access to elite social events may be observable (after considerable research effort) and while only indirectly imply a 'contribution' was made, are still consistent with the model.

²⁴ This research is continuing. Close analysis of the debates also suggests a further element to be considered in any model of lobby group influence on debates; that with multiple objectives supposed 'supporters' of particular policies (ie free trade) may actually be more accurately described as opponents of other policies (such as expansion of government). Thus squatters reputedly opposed the introduction of tariffs, not because of their belief in keeping import prices low, but because of their fear that the introduction of export duties might be next.

²⁵ Note of course that this reasoning implicitly assumes that gains from successful lobbying will fall sufficiently to labour and not other factors involved in production (for example owners of capital).

Samuelson type distribution of lobbying power. In this paper, we calculate, using data from Siriwardana (1985) per-worker returns in each of 50 sectors of the economy.²⁶ A second possible measure, which has also been used as an instrument by authors such as McCalman (2004), is simply the proportion of workers in each sector. The idea here is that sectors with a large number of workers may have strong political power.²⁷ Note however, that each of these measures is somewhat contradictory. The first, profits-per-worker, proxy for the individual gains accruing to a worker from the sector. High returns imply that free-riding will be less of a problem (as individual gains might be larger) and hence we have greater lobbying potential. In the second case, numbers matter, but of course the argument could be made that free riding would be more of a problem and lobbying would be stifled by coordination problems. This is an ongoing area for research and indeed, in the empirical literature relating to endogenous trade models it has not been resolved.²⁸

Data for import elasticities are notoriously difficult to obtain, especially for this period. The solution put forward by Goldberg and Maggi (1997) and followed by several other authors, has been to include the elasticity measure on the left hand side of the estimating equation. Econometrically, this allows for measurement error from the original studies in which these estimates were obtained, yielding consistent results. As noted in the following section, we also follow this strategy. We use a variety of measures estimated by Shiells *et al* (1976), Stern *et al.* (1986) and Sawers (1988). In addition, following Siriwardana (1985), we construct a measure of price elasticity of demand for each sector using household expenditure elasticity estimates previously undertaken by Williamson (1967) and adapted by Siriwardana (1985).²⁹ While this does not directly measure the degree of substitutability between domestic and foreign goods, it is considered a reasonable approximation of the sensitivity of the economy to tariff induced price changes. In particular, deadweight loss is likely to be correlated with this measure. Moreover, the expenditure elasticity estimates of Williamson (1967) have been mapped into the sectoral specification by Siriwardana (1985). The former measures are assigned to sectors for which we do not necessarily have an exact match and in some cases a subjective judgment as to their allocation into particular 'like' sectors has been required. While

²⁶ This is calculated as total surplus of a sector divided by the number of workers for 33 separate sectors. For 9 agricultural sectors, only aggregated surplus figures were provided. To provide a crude measure of surplus for each sector, this was apportioned according to each sector's share in total production. Note too the additional complication to this approach; wages boards and other institutions that alter the distribution of returns to workers will decrease the clarity with which return-per-worker signal the incentive to lobby. Indeed it may be argued that the existence of such boards may themselves signal a different, but positive policy outcome for workers that resulted from successful organisation. Not all the efforts of a lobby group are necessarily devoted to influencing trade policy.

²⁷ Such a measure may also be dependent on the skills and circumstances involved in the workplace. Ie Shearers, while a smaller proportion of the working population than labourers, exerted significant influence on political structures post 1890s.

²⁸ One possible reason for this is that the process of lobby group formation is in itself not specifically modelled in Grossman and Helpman (1994). See also the comments in footnotes 25 and 26.

²⁹ For a detailed explanation of the process followed, see Siriwardana (1985, pp320-324). Williamson's 1967 data are taken from an expenditure survey in Massachusetts in 1875. Siriwardana, p321 shows that the budget shares between the colony of Victoria and the US were similar during the period.

unfortunate, this also allows for the necessary adjustments to be made (in terms of the share of household expenditures) in a manner that is consistent with the overall data set. A complete description of how this transformation was undertaken appears in the appendix. To calculate the average *ad valorem* tariff for each sector, we have used the total duties collected divided by the value of imports entering the colony. Due to data constraints, we ignore potential problems associated with smuggling and other unrecorded transactions (as occurred across the Murray-Darling).³⁰ Fortunately data used in this paper are taken from Siriwardana (1985) who importantly makes an adjustment for re-exporting. Siriwardana, also provides monetary estimates for domestic output by sector, hence from this we can calculate the inverse import penetration ratio for each sector.

A far greater statistical problem with the empirical analysis is the likelihood of endogeneity. For example, in this paper we use returns per worker as a proxy for whether the sector was organised and then seek to use this to explain tariff rates. However, industries which are politically organised may indeed have successfully lobbied for regulatory favours (not just over trade policy), leading to higher per worker returns. Hence, without suitable instruments, the estimates presented below are likely to be biased. Previous authors have used instruments relating to the composition of industry, such as the number of firms, geographic concentration and the degree of unionisation to attempt to overcome this problem. Identifying such instruments for the nineteenth century is difficult.³¹ Work on this problem is on-going and the identification of suitable instruments is currently being undertaken, Revised estimates are likely to follow.

A First Look at 1880 Victoria

Table 1 shows values of imported goods, duties paid, and average tariffs for Victoria in 1880. Given that our aim is to analyse the structure of protection, we have excluded industries which had no imported goods.³² Overall, there are 42 sectors presented. All data are recorded in 1880 pounds.

At first glance one striking feature of the table is that tariffs varied markedly between sectors. Hence, the notion of a ‘uniform tariff’ can be eliminated. The median tariff rate was 14 percent, and while some sectors enjoyed zero tariffs (for example, wool, coal, surgical instruments), others such as beer (102.2 percent) and tobacco (101.4 percent) had large duties imposed. Interestingly, agricultural products, which have been traditionally been accepted as not the target of tariff policy can be found at

³⁰ The relationship between tariff rates and illegal smuggling is an ongoing separate area of research. Studies in corruption (see for example, Pritchett and Sethi, 1994) have revealed that as tariff rates increase, duties recovered may actually fall. There is anecdotal evidence that the policy makers of the day actually realised that raising tariffs also raised the gains associated with smuggling (see for example, Patterson, 1958).

³¹ As an indication of this, Goldberg and Maggi (1997), examining tariffs in 1983, use 21 instruments to control for endogeneity of import penetration and political organisation. McCalman (2004), who examines the late 1960s finds only 8 instruments. This is potentially indicative of the data constraints as one travels further back in time.

³² This excludes an important possibility that a prohibitive tariff may have been imposed on imports for one of the dropped sectors. Authors such as Patterson, 1958 and Pincus (1995) have noted that there is no evidence of such tariffs being levied.

either end of the spectrum (wool had a zero tariff while ‘other agricultural’ and vegetable products had tariffs of 86.5 and 28 percent respectively). There seems to be some correlation between the size of domestic production and the tariff. In particular, the correlation coefficient between average sectoral tariffs and domestic output is -0.13.³³ On the one-hand, this indicates that higher tariffs were levied on smaller industries, perhaps consistent with an ‘infant industry’ argument. This might have particularly been the case in 1880 if tariffs had not yet fully enabled protected industries to reach their full potential. On the other hand, one would expect protected industries to be those which have some significance in terms of domestic output and moreover, one would expect such industries to be those which would more likely to successfully lobby for protection.

Fortunately the variation in tariffs, provides an opportunity to consider some of the possible explanations for the between-industry variance in rates. The traditional literature has largely viewed tariffs through the lens of being either revenue raising or protective in terms of trying to promote infant domestic industries. As shown in section 2, the revenue raising hypothesis would predict higher tariffs applied to those sectors whose goods had inelastic import demand. However, as discussed, such a result could also be consistent with G-H 1994. Before we embark on an attempt to disentangle these two theories, Table 2 presents average tariff levels and various measures of import demand elasticity. Simple correlation coefficients between average tariffs and each series of estimates for the elasticity of import demand (absolute measure) are: Stern *et al* (1976) -0.09; Shiells *et al.* (1986) -0.09; Sawers (1988) -0.23; and for price elasticity estimates (Siriwardana) -0.43. These correlations suggest that goods which were unresponsive to price changes were those which received higher tariffs, consistent with expectations in terms of both income maximisation and lobbying models.

As noted earlier, there have been several studies which attempt to examine the validity of G-H’s 1994 endogenous trade model. This too is our ultimate goal, however as noted, we are yet to be at a stage where issues such as endogeneity are sufficiently dealt with to provide meaningful results. The results below should therefore be considered very preliminary indeed.

Empirical Estimation of the G-H model

Recall from the previous section that the G-H model predicts that in equilibrium, the tariff chosen by the government satisfies the following:

$$\frac{t_i}{1+t_i} = \left(\frac{I_i - \alpha_L}{a + \alpha_L} \right) \frac{X_i}{M_i} \frac{1}{e_i} \quad (2)$$

Equation 2 can be modified to a form suitable for econometric estimation:

³³ Data on domestic production taken from Siriwardana, 1985, page 126.

$$\frac{t_i}{1+t_i}e_i = \beta_1 \frac{X_i}{M_i} + \beta_2 I_i \frac{X_i}{M_i} + \varepsilon_i \quad (3)$$

where:

$$\beta_1 = \frac{-\alpha_L}{a + \alpha_L}$$

$$\beta_2 = \frac{1}{a + \alpha_L}$$

Thus the coefficients β_1 and β_2 are both ultimately dependent on the proportion of the population that is politically organised ($\alpha_L \in (0,1)$) and the weight the government gives to aggregate welfare (the value of a). Given that both a and α_L are positive, the expectation is that $\beta_1 < 0$ and $\beta_2 > 0$. Moreover, the model predicts that $\beta_1 + \beta_2 > 0$. Hence, our initial exploration into this model and a potential link with 1880 Victoria is to check to see if the estimated parameters are consistent with these expectations. Simple OLS regression output is presented in the following table.

INSERT TABLE 3 HERE

The results in table three are consistent with the expected signs of $\beta_1 < 0$ and $\beta_2 > 0$ for all regressions apart from $\beta_1 > 0$ in the specification using elasticity values from Sawyer (1988). This provides some initial support for the notion that positive protection was offered to industries that were organised (as detected by our measures), and that the relationship between the import penetration ratio and protection does indeed turn crucially on whether or not an industry was organised.³⁴ There was little support for the hypothesis that $\beta_1 + \beta_2 > 0$, other than in specification c .

We have noted that there is likely to be endogeneity problems in this specification. Indeed, these results may be somewhat different after more rigorous analysis is undertaken. Nonetheless, there is some weak, but tantalisingly positive support for the notion that lobbying did have a role in influencing tariff protection in Colonial Victoria; at least in terms of the proxies we have presented in the context of the G-H model used here. Both the theoretical and empirical aspects of this study continue.

³⁴ In this first effort in estimating the model, an industry dummy was created to indicate whether it was politically organised. Those with above per worker surplus greater than the mean were denoted as organised. The arbitrary nature of this cut-off point is acknowledged, however an alternative cut-off of the mean plus one standard deviation yielded similar results (available on request from author).

Conclusions

There has been comparatively little work undertaken to investigate the role of lobbying interests in the formation of Australian tariff rates of the 19th century. This paper has taken a first step at applying some of the modern theories relating to endogenous trade protection to this period. In doing so, we note that there is a plethora of theories, many of which have not been empirically tested to any great degree. We use the Grossman and Helpman (1994) model as this seems most applicable in evaluating sectoral differences in protection within a region, as is our aim for Victoria in 1880.

Our discussion provides some guidance as to the issues associated with such a study. Of foremost concern is the potential lack of data, particularly with regards to the assimilation of instruments to combat endogeneity. Our results here are, at best, a first attempt to cast light on this issue, and while we find weak support for the predictions of the model, in particular that organised groups were likely to have greater protection, much work is needed before this can be trusted to any reasonable measure.

Finally, while we have chosen what we believe is an important model in terms of the public choice literature, we note that no one model is likely to explain what is a complex issue. Specifically, the early work by historians which examine motives such as developing local industries and revenue raising should not be ignored. Indeed, as noted by Rodrik (1995), the process by which protection remains a dominant paradigm over time is far from simple. He notes that tariffs introduced as revenue raising instruments may remain long after the need for such revenue is required, in part, because the politics of their removal (including the actions of special interests) is difficult, if not prohibitive. This indicates a path dependency of protectionist policies. Identifying moments in history when politics overtakes economic considerations is likely to improve our understanding of contemporary trade policy.

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Table 1 – Imports, Duty Collected for the Colony of Victoria, 1880

Sector	Duty collected	Total imports (c.i.f)	Average Tariff (%)
Wool	0	267954	0.00
Prints, pictures, etc	0	15249	0.00
Surgical instruments	0	6523	0.00
Coal	0	281403	0.00
Building materials	291	33774	0.86
Designs, metals and dyes	96	9824	0.98
Dairy	84	6328	1.33
Ships and boats	23	1187	1.94
Books and stationery	7196	219557	3.28
Agricultural matters	34643	725572	4.77
Other pastoral	43495	879181	4.95
Metal products	34682	684994	5.06
Tanning, fellmonging and woolwashing	9006	159953	5.63
Machines, tools and implements	10592	133930	7.91
Miscellaneous manufacturing	28435	352857	8.06
Textile and clothes	149183	1651198	9.03
Root crops	95112	974219	9.76
Bricks and Potteries	99	970	10.21
Fibrous materials	20488	176930	11.58
Woollen Mills	83347	655916	12.71
Meat and Milk products	12390	91968	13.47
Wheat	42	289	14.53
Chemicals	40787	277901	14.68
Clocks and watches	6567	42487	15.46
Soap and candles	6169	39493	15.62
Oats	2973	18898	15.73
Animal by-products	6151	38808	15.85
Arms, munitions	8257	51824	15.93
Gold, silver and precious stones	8776	50349	17.43
carving, figures, etc	3178	17487	18.17
Stone, clay, earthenware and glass	23403	128545	18.21
Carriages and harness	3063	16306	18.78
Flour and cereal	38	192	19.79
Non-alcoholic and other beverages	128946	642328	20.07
Other grains	36017	177316	20.31
Musical instruments	11176	49756	22.46
Barley	5371	23069	23.28
Furniture	9103	36700	24.80
vegetable products	49691	176347	28.18
Other agricultural	184129	212812	86.52
Beer	294344	290109	101.46
Tobacco, cigar and snuff	60200	58906	102.20

Source: Sirwardana (1985), page 153. All values in 1880 pounds. Average tariffs calculated as duty collected/value of goods (cif).

Table 2 - Imports, Import elasticity of demand estimates

Sector	a	b	c	d	Average Tariff
Wool	1.13	0.21	2.45	0.88	0.00
Prints, pictures, etc	3.00	1.46	2.09	0.56	0.00
Surgical instruments	1.08	0.44	6.64	0.74	0.00
Coal	0.96	16.11	6.80	0.37	0.00
Building materials	0.69	1.32	2.87	0.74	0.86
Designs, metals and dyes	1.02	0.88	1.96	0.74	0.98
Dairy	1.13	0.21	2.45	0.45	1.33
Ships and boats	3.28	1.24	0.81	0.74	1.94
Books and stationery	3.00	1.46	2.09	0.57	3.28
Agricultural matters	1.13	0.21	2.45	0.38	4.77
Other pastoral	1.13	0.21	2.45	0.52	4.95
Metal products	3.59	2.00	2.50	0.57	5.06
Tanning, fellmonging and woolwashing	1.02	0.21	1.10	0.63	5.63
Machines, tools and implements	1.02	0.88	1.96	0.56	7.91
Miscellaneous manufacturing	2.06	2.37	3.11	0.74	8.06
Textile and clothes	1.14	1.41	1.98	0.90	9.03
Root crops	1.13	0.21	2.45	0.31	9.76
Bricks and Potteries	2.85	1.37	2.43	0.56	10.21
Fibrous materials	1.14	1.41	1.98	0.56	11.58
Woollen Mills	1.14	0.21	1.20	0.88	12.71
Meat and Milk products	1.13	1.13	2.45	0.48	13.47
Wheat	1.13	0.21	2.45	0.30	14.53
Chemicals	2.53	6.82	3.52	0.74	14.68
Clocks and watches	2.06	2.37	3.11	0.57	15.46
Soap and candles	2.53	5.00	2.60	0.74	15.62
Oats	1.13	0.21	2.45	0.30	15.73
Animal by-products	1.13	0.21	2.45	0.63	15.85
Arms, munitions	2.06	2.37	3.11	0.74	15.93
Gold, silver and precious stones	2.00	1.18	2.16	0.74	17.43
carving, figures, etc	3.00	1.46	2.09	0.74	18.17
Stone, clay, earthenware and glass	2.85	1.37	2.43	0.57	18.21
Carriages and harness	3.28	1.24	0.81	0.74	18.78
Flour and cereal	1.13	0.21	2.45	0.31	19.79
Non-alcoholic and other beverages	1.64	1.60	1.30	0.31	20.07
Other grains	1.13	0.21	2.45	0.30	20.31
Musical instruments	2.06	2.37	3.11	0.57	22.46
Barley	1.13	0.21	2.45	0.30	23.28
Furniture	3.00	9.56	3.72	0.57	24.80
vegetable products	1.13	1.13	2.45	0.31	28.18
Other agricultural	1.13	0.21	2.45	0.30	86.52
Beer	1.64	0.70	1.30	0.31	101.46
Tobacco, cigar and snuff	1.13	1.57	1.50	0.30	102.20

a. Stern *et al.* (1976)

b. Shiells *et al.* (1986)

c. Sawers (1988)

d. Calculated from expenditure elasticities (Sirwardana, 1985) and household expenditure shares.

Table 3 – Coefficient Results from G-H Estimation

Dependant Variable: $\frac{t_i}{1+t_i} e_i$, where elasticity measure used is denoted in the table.

n=42

Robust standard errors estimated, p values in parentheses

	a	b	c	d
β_1	-0.000405 (0.003)	-0.00125 (0.026)	0.000283 (0.69)	-0.00294 (0.003)
β_2	0.000283 (0.000)	0.000874 (0.00)	0.00115 (0.002)	0.00091 (0.008)
$\beta_1 + \beta_2$	-0.000121 (0.165)	-0.000373 (0.329)	0.00143 (0.005)	-0.002 (0.004)

a. Siriwardana (1985), see appendix for calculation

b. Stern *et al* (1976)

c. Sawers (1988)

d. Shiells *et al* (1986)

Appendix 1 – Derivation of the G-H Model

This derivation follows closely the approach set down by Goldberg and Maggi, 1997.

Preliminaries

1. There are n citizens in a small, open economy, with individual utility given by:

$$u = z + \sum_{i=1}^n u_i(x_i) \quad (1a)$$

Where z is consumption of a numeraire good with world price equal to one, made under CRS using only labour. This implies in a competitive labour market, the wage rate equals 1. $u(x)$ represents utility derived from the consumption of good i .

2. Demand for good i is given as:

$$x_i = d_i(p_i)$$

For an individual spending E , the indirect utility function is specified:

$$V(p, E) = E + \sum_{i=1}^n \phi_i(p_i)$$

Where, s subscript i is the consumer surplus denoted from the consumption of good i , denoted as:

$$\phi(p) = u(d(p)) - pd(p) \quad (1b)$$

3. Production:

There are $n+1$ final goods (n goods plus the numeraire). Labour markets are competitive and hence $w=1$ for all sectors.³⁵ There is one importable, intermediate input. Other than the numeraire, all goods are produced using labour and one other specific sector input. Unsurprisingly, returns to specific factor i depend on the price of good i . Denote these specific factor returns as $\pi_i(p_i)$, $\pi_i' > 0$. By Hotelling's Lemma,

$$\frac{d\pi_i}{dp_i} = y_i(p_i), \text{ where } y_i(p_i) \text{ is the supply of good } i.$$

4. Tariffs

The government chooses a tariff (t) that drives a wedge between world and domestic prices such that $P_i = P_i^* + t_i$, where P_i^* is the world price of good i . The government is assumed to redistribute all tariff revenue to citizens equally.

³⁵ As the price of the numeraire is one.

5. Aggregate Welfare is defined as the sum of returns on the numeraire good, the sum of returns to specific factors, tariff revenue and consumer surpluses from consumption of all goods. Hence,:

$$W = 1 + \sum_{i=1}^n \pi_i(p_i) + \sum_{i=1}^n t_i M_i + \sum_{i=1}^n \phi_i(p_i) \quad (2)$$

Where $M = d_i(p_i) - y_i(p_i)$ and denotes the level of imports in sector i .

Lobbying

Assume that there exists L sectors which are politically organised such that, $L \subset \{1, 2, 3, \dots, n\}$. It is assumed that each individual in society owns a unit of labour and at most one specific factor. This implies the welfare of lobby group i to be:

$$W_i = \pi_i(p_i) + \alpha_i \left(1 + \sum_{j=1}^n t_j M_j + \sum_{j=1}^n \phi_j \right) \quad (3)$$

Where α_i represents the proportion of the populations represented by lobby i .

Each lobby is prepared to make political contributions, denoted by S in order to influence policy. These contributions are made contingent on the policy chosen, hence $S(t)$. Lobby i will maximise:

$$W_i - S_i \quad (4)$$

The government cares about both aggregate welfare (W) and contributions (S). The relative weight between each is determined by an exogenous parameter, a :

$$G = aW + \sum_{i \in L} S_i \quad (5)$$

Diverging from the menu auction method of solution set down by Grossman and Helpman (1994), Goldberg and Maggi consider the game as a Nash bargain, where joint payoffs of the government (which acts as a partial agent for citizens) and the lobbies. This solution implicitly implies equal bargaining power at this stage of the game.³⁶ By (4) and (5), joint surplus is given as:

³⁶ Grossman and Helpman draw on Bernheim and Whinston's (1986) 'menu-auction' approach.

$$\Omega = aW + \sum_{i \in L}^n S_i + \sum_{i \in L}^n W_i - \sum_{i \in L}^n S_i = aW + \sum_{i \in L}^n W_i \quad (6)$$

Note that the welfare of lobby groups appears in aggregate welfare (W) and as such, lobbies receive a weight of $(1+a)$ while unorganised sectors receive a . Equilibrium trade policies satisfy:

$$\frac{\partial \Omega}{\partial t} = 0 = \frac{\partial \Omega}{\partial p}$$

Defining $\alpha_L = \sum_{i \in L}^n \alpha_i$, the fraction of the total population that is politically organised, and using (2) and (3) in equation (6) yields:³⁷

$$\Omega = (a + \alpha_L)(t_i M_i + S_i) + \sum_{i=1}^n (a + I_i) \pi_i + a + \alpha_L \quad (7)$$

Where I is an indicator which takes on a value of 1 if the sector is politically organised and zero otherwise. Taking the first order condition yields:

$$\frac{\partial \Omega}{\partial p} = (a + \alpha_L) \left(-d_i + t_i \frac{\partial M_i}{\partial p_i} + M_i \right) + (a + I_i) y_i \quad (8)$$

From the F.O.C in (8):

$$t^* = \frac{I - \alpha_L}{a + \alpha_L} \frac{y_i}{M_i'(p_i)} \quad (9)$$

rearranging:

$$\frac{t}{1+t} = \frac{I - \alpha_L}{a + \alpha_L} \frac{z_i}{e_i}$$

³⁷ Full derivation of equations (7) – (9) available from the author on request.

Where $z_i = \frac{y_i}{m_i}$ and e_i is the import elasticity of demand for good i .