Essays on the Political Economy of Trade Policy

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Thomas Allen

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Thomas Allen

Abstract

My thesis develops three models of political economy, examining different factors that affect equilibrium in political markets.

The first paper develops a model based on that of Moutos (2001) whereby a government must choose between a tariff and an income tax in order to raise revenue to finance redistribution from rich to poor. I use a simple median voter model of political economy to show that an income tax may be preferred if it can raise more money than the tariff. This result links well with the empirical observation that more liberal trade regimes are often associated with larger government sizes.

The second paper explores the idea of interactions between different parts of a political party’s platform and the benefit that different groups can receive from those policies. I show that even when parties have no predisposition towards any particular policy their policy announcements may differ due to the difference in demand for policy favours from special interests. I also discuss how this difference in demand can affect the relative success of interests groups and of the political parties themselves, and apply these results to a simple model of trade policy to show that left-wing parties proposing higher income tax rates may attract support from groups who support trade protection in developed countries.

My third paper provides an extension to the well known model of special interest politics by Grossman and Helpman (1996). I introduce costly informative spending that special interests can use to convert uninformed voters into informed ones. This is advantageous to special interests when those being informed are of a similar political persuasion to the interest group members, thus skewing equilibrium policies towards the group’s objectives.
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1 Introduction

This thesis consists of three essays, each of which develops a new political economy model. Political Economy is a flourishing area of research, with many opportunities for new ideas, some of which are developed in this thesis. The chapters of the thesis follow a logical progression in terms of the main players in the political market. The first paper considers a political system driven by the preferences of voters, with policy being determined by the median voter in a relatively straightforward manner. The second paper looks at policy decisions driven by the demands of special interests, with any explicit modelling of politician or voter behaviour removed. Finally my third paper combines both elements in a paper where politicians explicitly consider both the preferences of voters, and those of special interests whose money they desire to finance their electoral campaigns. Therefore the complexity of the political system that is being modelled is deliberately built up throughout the thesis.

Though it should be emphasised that all three models could be applied to different political markets, I focus on an application to trade policy, explicitly developing this in the first and second papers. Trade policy is a particularly interesting topic because there remain unanswered questions about the reasons for trade protection (and the withdrawal of this protection) and because it fits into the category of a policy that is open to some degree of manipulation by special interests, due to its concentrated benefits and diffuse costs.

Trade policy also offers scope for the application of all the varying political models developed here. In particular it is suitable for discussion in the context of
mass participation, median voter driven political decision making when applied in the context of trade policy as a revenue raising tool in the developing world, where it is often the case that large amounts of government revenue still come from trade policy. But it is also suitable for application in a setting of special interest driven decision making. This is because special interest participation is often viewed as being most effective in issues with little salience to the general public or where the issue is considered too complicated and the information costs too high for voters to play a full role. As trade policy is rarely used as a significant revenue raising tool and is often now at a low level in developed countries, trade policy fits the application for the political model of chapter three, where special interests are the major force in policy formulation.

I will now consider each of the papers in a little more depth, and emphasise their original contribution.

In the first paper I adapt the model of Moutos (2001) to show how a liberal trade regime may be chosen when trade policy (in this case a tariff) is used as a revenue raising tool. The original paper models a developing country where imports are assumed to be only of luxury goods, and therefore only accessible by richer members of society, and the political system of direct democracy means politicians are driven to adopt the (relatively poor) median voter’s preferences. In this situation the chosen policy to raise a fixed sum of money will be a tariff rather than an income tax because the median voter will not contribute to the tariff. This therefore helps explain the greater reliance of developing countries on trade taxes as a source of government revenue. The observation that drives
my research in this paper is that poor countries are also increasingly liberalising their trade, so how can this model be modified to show that in fact a liberal trade regime (meaning an income tax rather than a tariff) is chosen. My main modification is to endogenise the revenue requirement of the government. This makes the model more complex but allows me to show that in conditions where an income tax can raise more money for redistribution than can a tariff, the poor median voter may still choose the income tax, even though they must also pay it. This also links nicely to the observation that trade liberalisation is associated with a growth in the size of government, therefore helping explain two phenomena in trade policy.

In the second paper I develop a model of policy interactions that affects the political market based on the model of Becker (1983). The motivation in this case was the observation that when special interests are considering how much money to give to politicians in return for the reward of a better policy, they should consider the other policies that politician is aiming to implement, and how that will effect the return to their desired policy change. This sort of policy interaction is ignored by other authors who tend to assume that if two parties adopt the same policy, then the special interest groups will treat them in the same way, ignoring the fact that the parties other policies may be different, and that these differences can affect the return to the policy of interest. I use this observation to find that political parties, even if assumed to be influenced by special interests in much the same way, will often be induced to choose different policies due to the differences in their fixed policies due to variations
in pressure placed on them by the special interests as a result of demand-side policy interactions. This also has implications for the success of the political parties, the more positive interactions a party can generate, the more money it can raise and the more electoral success it may have.

I apply these ideas to a Heckscher-Ohlin type model of international trade developed by Mayer (2002). I show that an income tax does indeed affect the returns that special interest groups see to trade policy, and that the pro-tariff supporters will see a relatively higher return from the higher tax party. They will therefore spend more money influencing them and the high income tax party will be induced to propose a higher tariff relative to the low tax party.

Finally in the third paper I consider the possibility of special interests using informative spending to their advantage, whereby uninformed voters who share similar preferences to those of the special interests are informed, thus altering the distribution of voters. I apply this idea to the model of Grossman and Helpman (1996) by introducing a preliminary stage of the game where special interests can conduct this informative spending. The crucial innovation over other authors who have considered how interest groups can use information to their advantage is that I consider the interaction with campaign contributions, a key result of the model being that costly informative spending is only useful if it reduces the cost of a given policy in terms of the contribution needed to persuade the politician to adopt it.
2 Trade Liberalisation in the Developing World: A Political Economy Approach

2.1 Introduction

One of the most important recent trends in the global economy has been the policy by many nations, both rich and poor, to liberalise trade. Evidence for this trend is apparent in the decreasing use of various instruments of trade protection, including import tariffs (McGuire, 1999) that has been partly responsible for the considerable increase in the volume of international trade in recent decades. In light of this dominant trend it seems pertinent to ask why so many nations have liberalised trade, particularly poor ones who have previously relied more heavily on tariff revenue. Moutos (2001) asks "why do poor democracies collect a lot of tariff revenue?", the aim of this paper is to answer the question of why they may not collect a lot of tariff revenue. The approach I take to answering this question also allows me to offer an explanation for the intriguing correlation between openness and larger governments (see for example Rodrik, 1998; Adsera and Boix, 2003).

Moutos’ model explains the choice of poor countries to collect high tariff revenues in the context of a model where voters are confronted with a choice between an income tax (open regime) and an import tariff (closed regime) as methods of raising a fixed sum of government revenue. Milner and Kubota

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1The model therefore differs from many others in this area in that the effect of trade policy on the individual is through public finances rather than through factor and output
(2005) show that there has been an increase in democracy in the developing world in recent decades, and that this seems to be related to the increase in openness also witnessed. This provides backing for the consideration of trade policy choice in the context of a developing world democracy. The political system is one of direct democracy such that the median voter’s preferences are reflected in the decisions of the government, and as with many models dealing with the redistributive impact of government policy it is the split between the poor and the rich that defines the redistributive conflict. The major modification of my model is to introduce a variable government size in a similar way to the Meltzer and Richard (1981) paper that explains the growth of government. This allows me to demonstrate that if an open regime can raise more government revenue than the closed one then it may be preferred by more voters and has a chance of being the policy adopted as the winning policy. This is different to the Moutos model, where a fixed revenue requirement means that the tariff is always the winning policy. This is related to Becker and Mulligan’s (2003) theory that the use of different tax instruments will affect the size of the government. Therefore I address the issue of government size as well as trade openness. I show that an open regime will be preferred by more voters when there is greater inequality, as this increases the median voter’s preferred income tax price changes as seen in Mayer (1984) for example.

Both Milner and Kubota (2005) and Meltzer and Richard explain the increase in openness and the growth of government respectively as being caused by the increase in democracy (formally represented as the extension of the voting franchise). Both these strands of thought are linked in this paper.
rate, therefore making it more likely that an income tax will raise more revenue. This is especially the case when it is a rich middle class that is the cause of this inequality. It may also be more likely if there is a reduction in the amount of poverty as this increases income tax revenue compared to tariff revenue.

In this chapter, I follow Moutos and other authors such as Mayer (1984) in considering the political economy of trade policy in terms of simple majority voting. This contrasts to other approaches that focus on interest groups and campaign contributions as key influences on the political process, issues I address in the following two chapters of this thesis. Both approaches are characterised by the ability of individuals or groups with political influence to shape government policy (Mayer and Riezman, 1987). I follow Moutos so that my results can be better compared to his and also because there is a strong argument that interest group influence is more prominent where the decisions affect either a small number of people, or many people but only by a small amount (Baron, 1994). The issue voted over here concerns the size of government, which affects everyone in a substantial way and therefore a model where voters preferences are most important may be more justified than one where interest group influence is paramount.

This paper looks at a developing country for the same reason as Moutos does, it is only in developing countries that tariff revenue any longer plays a significant role in government finances (Krugman and Obstfeld, 2003). Despite this fact many developing nations have increasingly liberalised their trade policies, whilst still tending to be more closed than developed countries. Figure 1 demonstrates
this trend for lower trade taxes and higher trade volumes for South Asia. The same is also true in other areas of the developing world. Between 1990 and 2002 trade tax revenue in the Middle East fell from around 16% to 12% of the total tax take and in Latin America from 13% in 1990 to a mere 5% in 2005 (World Development Indicators 2007).

FIGURE 1 (Source: World Development Indicators 2007)

Other attempts to answer questions concerning trade policy and public finance include the aforementioned Moutos (2001) as well as Kubota (2005) who
suggests that widening of the tax base is crucial to securing lower tariff rates. The central improvement on this strand of literature is to analyse not just the choice of tax instrument, but the choice of how much revenue to raise with that instrument.

Other authors have cited lower collection costs for tariffs compared to other taxes as a motivation for their use. This may be the case (though Moutos disputes this logic, noting in particular that other taxes have even lower administrative costs) but is not a sufficient explanation for their use. Lower collection costs may be an added incentive for the use of tax instrument, but there will be other considerations, in particular the redistributive impact of the taxes. I do not include collection costs in this model but they could be included without affecting the main result that an income tax may be the outcome of the political process if it can raise more revenue than the tariff. If collection costs were introduced to the model, then the lower the collection cost of the tariff compared to that of the income tax, the greater the extra revenue the income tax would have to raise.

2.2 The Model

The model developed in this section is influenced by, and combines elements of papers by Moutos (2001), Flam and Helpman (1987) and Meltzer and Richard (1981). The Flam and Helpman paper introduces the idea of trade in vertically differentiated products between the northern, developed world (the foreign country) and the southern, developing world (the domestic country) which is
essential to both the Moutos paper and the results of this paper. The Meltzer and Richard paper contains the element of voting over the size of government which is the central adaptation of the Moutos paper introduced in this chapter. I follow Moutos in abstaining from some general equilibrium issues concerning trade balance and wage determination that would only complicate matters, without adding to the analysis of choice between a tariff and an income tax as a method of funding the government, which is the aim here.

Agent $i$ has utility which is a function of the agents choice over consumption of leisure$^3$ ($L^i$), consumption of a privately provided, quality differentiated consumption good where quality is indexed by the parameter $z \in [1, \infty]$ and of consumption of a publicly provided good, which is provided only by the government and is funded by the income tax or tariff. The government chooses the level of public good provision in order to maximise their political support. All agents are assumed to work and consume exactly one unit of the private consumption good but must choose which quality they consume. Utility is quasi-linear in the following manner, and is identical for all agents:

$$U^i = z^i + V(L^i) + g$$ (1)

Where $z^i$ is the agents chosen quality level for the private consumption good and $g$ is the amount of the government funded good provided equally to all individuals. The $V(\cdot)$ function is strictly concave, invertible, and quadratic.

$^3$It is necessary to include leisure as part of the agent’s utility function so that there is an equity-efficiency trade-off within the model. Without this all agents with below average income would simply want a 100% income tax rate.
When making the choice between consumption of leisure time and using that time for work, the agents face a time constraint:

\[ 1 + x^i \geq L^i + n^i \]  

(2)

Where \( x^i \) is some positive finite number that represents individual productivity, and \( n^i \) is individual’s chosen labour supply. The left hand side of (2) can thus be thought of as an agent’s effective time allocation\(^4\).

The productivity parameter is the sole source of individual heterogeneity. There are four groups of individuals, the very low (K), low (D), medium (F), and high (H) productivity groups. These groups exist respectively in proportions \( \alpha^K, \alpha^D, \alpha^F \) and \( \alpha^H \) in the population, where \( \alpha^K + \alpha^D + \alpha^F + \alpha^H = 1 \). I make two assumptions consistent with the papers that this chapter follows about the structure of the population. Firstly I follow Meltzer and Richard in considering a ‘realistic’ income distribution by assuming that the proportions and relative productivities of the three groups are such that \( x > x^m \) where \( x \) is the mean productivity\(^5\), and \( x^m \) is the median. I also assume that the proportion of all the groups is strictly less than a half \( \alpha^K, \alpha^D, \alpha^F, \alpha^H < 0.5 \) so that no single group represents a majority, and that (reflecting the status of the

\(^4\)I adopt Persson and Tabellini’s (2000) formulation of the Meltzer and Richard model of redistribution in order to simplify the analysis. In particular, the adoption of the ‘effective time’ constraint avoids the complication of having to address the implications of some individuals choosing not to work at all. In this formulation taxes/tariffs have the same distorting effect on the choices of all individuals, no matter their productivity.

\(^5\)For notational convenience, variables without superscripts refer to averages throughout this chapter.
developing country) $\alpha^K + \alpha^D > 0.5$ so that the median voter is from the low productivity group. I deal in this paper with a 'central case' whereby only the highest productivity group will earn enough money to buy imported varieties of the private consumption good. The other groups will always buy domestically produced qualities.

The private consumption good is produced both by the southern and the northern country, but with differing costs. The cost of producing a given quality is given by $C^j(z)$ where $j = S, N$ tells us whether the good was produced in the north ($N$) or the south ($S$). The cost of production is linearly increasing in quality, $C^j_z > 0$ and $C^j_{zz} = 0$ (where subscripts denote derivatives). Each individual unit of a given quality is produced at constant cost. I assume that the Southern economy has lower fixed costs: $C^S(0) < C^N(0)$ but also that southern costs rise more rapidly as the quality of the good increases; $C^S_z > C^N_z$. This means that domestic producers will have a cost advantage for lower cheaper qualities, whilst foreign producers will have an advantage in higher, more expensive qualities. This in turn means that only more productive, and therefore richer individuals will buy imports, specifically in this case, the high productivity group.

I assume that markets are perfectly competitive. This means that prices are equal to the marginal cost of a unit of production, which is assumed to be constant. Thus $C^j(z) = P^j(z)$ and prices obey all the rules for costs discussed above, in terms of their relationship to the quality of the unit of production. Furthermore for simplicity we assume that the economy in question is a small
open economy (SOE), thus the price of finished goods is taken as given. The public good is produced domestically at a constant unitary cost. Domestic wages are normalised to unity.

The political system is characterised by simple majority voting with full political competition and full commitment by the government to enact the policies voted for by the citizens. All voters vote honestly. There are two votes, firstly on whether to adopt an income tax or a tariff as the method of raising government funds, and secondly at what rate the chosen tax will be levied at. This structure means that at the second stage majority voting will dictate that the median voter’s decision is the one adopted as the policy platform of the politicians. We will see in the next section that the first stage of voting is rather more complex.

The result of these assumptions in the set up of the model is that the median voter is never an importer, thus doesn’t pay the tariff (as with Moutos), and that the median voter has a lower than average income, therefore desires a positive income tax rate (as with Meltzer and Richard).

2.2.1 Income Tax Regime

If an income tax is adopted it is levied linearly at a rate $t$ from labour income $(n^t)^6$. These funds are used to fund the provision of the publicly provided good

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6I do not consider a nonlinear income tax primarily for simplicities sake. However it should be noted that if it were possible to employ such a tax this would only weaken the possibility of a tariff being preferred, thus strengthening my argument that trade taxes may be abandoned due to their relative deficiency in terms of raising revenue.
The quantity of the public good provided can be expressed as 
\[ g = tn \]
where \( n \) is the mean of all individuals labour incomes. The assumption of taxes funding a publicly provided good is slightly different to both Moutos and Meltzer and Richard (the latter assuming a lump-sum rebate to all members of the population), but the results presented here are still comparable to theirs. Some assumption on the nature of the redistribution has to be made to keep the model tractable, and this method is useful in helping to combine elements of the two models. The agent’s budget constraint is given by equation (3):

\[ P^i(z) \leq (1 - t)n^i \quad (3) \]

Where the right-hand side of the inequality represents total net income \((I)\). Each individual agent takes the tax rate and amount of the public good provided \((g)\) as given when deciding on their labour versus leisure trade-off. Constrained optimisation of the utility function (1) subject to the time and budget constraints (2) and (3), to derive optimal labour supply:

\[ \hat{n}^i = 1 + x^i - V^{-1}_L\left(\frac{(1 - t)}{P^j_z}\right) \quad (4) \]

Where the last term in the labour supply equation \((V^{-1}_L\left(\frac{(1 - t)}{P^j_z}\right))\) is the demand for leisure. Importantly it should be noted that an increase in the income tax rate or the responsiveness of prices to quality \((P^j_z)\) will increase leisure demand due to the concavity of \(V(\cdot)\) (such that \(V_L(\cdot)\) is positive but decreasing) and therefore reduce labour supply. Note also that all things being equal, more productive people (larger \(x^i\)) will work harder than less productive people. This is reinforced by the assumption that domestic manufacturers prices
rise quicker with an increase in quality than their foreign counterparts \( (P_z^S > P_z^N) \) meaning that importers will work harder (all other things equal) than those who consume domestic qualities because the income from this extra work goes further in buying a better quality private consumption good. Using the expression for an individual’s labour supply in (4) with the budget constraint (3) I can derive an individual’s demand for the optimum quality of the consumption good:

\[
\widehat{z}^i = (P^j)^{-1} \left( (1 - t)[1 + x^i - V_L^{-1} \left( \frac{(1 - t)}{P^j_z} \right)] \right) \tag{5}
\]

Therefore the indirect utility of agent \( i \) as a function of the income tax rate \( t \), the price responsiveness parameter \( P^j_z \) and both individual and average labour income, following equation (1), can be written as:

\[
W^i(t) = (P^j)^{-1} \left( (1 - t)[\widehat{n}^i(t)] \right) + V \left( V_L^{-1} \left( \frac{(1 - t)}{P^j_z} \right) \right) + tn(t) \tag{6}
\]

Each agent has a unique preferred tax rate \( t^i \) which is implicitly defined where \( W^i_t(t) = 0 \). Therefore to find individual \( i \)'s optimal tax rate we differentiate (6) with respect to \( t \), noting that by the envelope theorem, the components of the optimised labour supply differentiated with respect to the tax rate \( (\widehat{n}^i_t) \) are equal to zero, and where \( I \) refers to total net income, this gives:

\[
0 = W^i_t(t) = (P^j)^{-1} \left( -\widehat{n}^i(t) \right) + tn + n(t)
\]

\[
\widehat{t}^i = \frac{1}{n_t(t)} \left( \frac{\widehat{n}^i(t)}{P^j_z} - n(t) \right) \tag{7}
\]

We therefore see that the optimal tax rate for any individual is related to the gap between their own labour income and that of the average person,
controlling for the relative price of the private consumption good to that of the publicly provided good. An individual’s optimal tax rate is also related to the responsiveness of average income to changes in the tax rate (which takes a negative value).

As discussed earlier, the median voter \(i = m\) will be decisive in deciding the optimal tax rate. Because \(\hat{n}^i\) is increasing across the distribution of productivity this means preferences for the income tax rate are single-peaked and a clear election winning tax rate is guaranteed. The adopted tax rate will thus be:

\[
t_m = \frac{1}{n_t(t)} \left( \frac{\hat{n}_m(t)}{P_z^S} - n(t) \right)
\]

This will be positive as long as \(P_z^S\) is not too small, as we assume that the distribution of productivity - and thus of income - is right-skewed so that the median is less than the average and because average labour supply responds negatively to increases in the tax rate. For the remainder of this analysis we shall assume that there is indeed a positive income tax rate desired by the median voter. We can write the indirect utility of the median voter as:

\[
W_m(t_m) = (P^S)^{-1} \left( (1 - t_m)(\hat{n}_m(t_m)) \right) + V\left( L_m(t_m) \right) + t_m n(t_m)
\]

### 2.2.2 Import Tariff Regime

An ad valorem import tariff is levied linearly at a rate \(T\) on imported qualities of the consumption good such that those who import must pay \((1 + \frac{7}{P_z^I})\) respresents the extra quality of the private consumption good an individual can buy, the price of the publically funded good is unity. The larger is \(P_z^I\), the more expensive is private consumption relative to public, and the larger is the desired tax rate.
I have assumed that only the high productivity agents import thus the low and medium productivity groups (including the median voter) are not directly affected by the tariff. They are however indirectly affected as the tariff can be used to fund provision of the government provided good. The median voter will thus favour a policy which maximises government revenue. We can denote the government’s budget constraint as:

\[ g \leq \frac{TM(T)}{N} \]  \hspace{1cm} (10)

Where \( M(T) \) is the total value of imports into the economy (which is naturally a function of the tariff rate itself) and \( N \) is the number of agents in the economy. Maximising tariff revenue gives:

\[ T^m = -\frac{M(T^m)}{M_T(T^m)} \]  \hspace{1cm} (11)

Where the responsiveness of imports to the tariff rate \( M_T < 0 \). This accords with papers such as Grossman and Helpman (1994) who find that where import demand elasticities are high there is less deviation from free trade, in this case meaning that tariffs are lower, when imports are more responsive to prices.

As with the income tax there will be an effect on the labour supply of those directly affected by the tariff i.e. the rich individuals who can afford imports. The utility function and time constraint are (1) and (2) respectively. The budget constraint of the relatively rich, importing individuals under a tariff regime will take the form:

\[(1 + T)P^N(z) \leq n^H\]  \hspace{1cm} (12)
Given (1), (2) and (12) we can derive the rich agent’s optimal labour supply under a tariff regime:

$$\hat{n}^h(T) = 1 + x^H - V_{-1}^L \left( \frac{1}{(1 + T)P_S^N} \right)$$  \hspace{1cm} (13)$$

Here we can see that due to the concavity of $V(\cdot)$, increases in the tariff rate will reduce labour supply, as will increases in the marginal price of better quality imports.

Finally, to find an expression for the indirect utility of the low productivity median voter we first note that the budget constraint of the median voter under a tariff regime is simply:

$$P^S(z) \leq n_m$$  \hspace{1cm} (14)$$

Maximising (1) subject to (2) and (14) yields an optimal labour supply of:

$$\hat{n}^m = 1 + x^m - V_{-1}^L \left( \frac{1}{P_S^z} \right)$$  \hspace{1cm} (15)$$

With the last term being the optimal demand for leisure. This allows us to express the indirect utility of the median voter, in simplified form as:

$$W^m(T^m) = (P^S)^{-1} \left( \hat{n}^m(T^m) \right) + V \left( L^m(T^m) \right) + \frac{T^m M(T^m)}{N}$$  \hspace{1cm} (16)$$

\subsection*{2.3 Results}

The aim of this section is to analyse the potential political equilibria that can arise in this model, with the aim being to show the conditions under which an income tax (open regime) will be introduced in preference to a tariff. I will first consider the factors affecting individual’s preferences for a tariff or an
income tax, and find that the size of government is the deciding factor. I will then look at what combinations of voters can come together to form a majority in support of an income tax or a tariff before finally considering the effects of changes in the parameters on these equilibria.

2.3.1 Which scheme to support?

The size of the government is vital in determining which of the two schemes an individual will favour. As was discussed in the previous section, in the second stage of voting, direct democracy will mean that the median voter’s preferred tax or tariff rate will be adopted. Preferences over the rates are single-peaked, poorer people want higher rates, richer people want lower rates, so a unique winner is assured (Black, 1948). The first stage vote is thus essentially over which of the two sets of tax rates \([t^m, 0]; [0, T^m]\) will be adopted. However, as we shall see, analysing how a winning coalition forms at the first stage of voting is more complicated than considering simply what the median voter’s preferences are.

Firstly it is worth distinguishing between two cases, the first case being the simple one. If tariff revenue is larger than that from the income tax, all the non-importers will prefer the tariff and will vote for it accordingly, formally:

**Theorem 1** For an individual who does not buy an imported quality of the private consumption good, and has below average income to possibly prefer an income tax to a tariff, it must be the case that government revenue is larger
under the income tax scheme than it is under the tariff scheme.  

Corollary 2 If \( g(t) \leq g(T) \) then none of the very low, low or medium productivity group prefer the income tax and will not vote for it. Based on the assumption that these groups combined form a majority, the tariff will certainly win the first stage election.

The second, and more interesting case is where the income tax raises more revenue than the tariff, which Proposition One shows is a necessary (but not sufficient) condition for non-importing individuals who make up the majority of the population to support an income tax. As has been observed empirically, an open regime will be associated with a larger government than a closed regime (Rodrik, 1998 analyses this empirical relationship, but with a different explanation). This of course is a direct result of the fact that the income tax takes more of these individuals’s labour income than the tariff does. More generally we might say that an open regime will tend to be associated with a larger government than a closed regime in a poor democracy, whenever domestic taxes have a greater direct impact on the poorer voter’s income than do international taxes. It may be argued that in fact poorer people are unlikely to pay either tariffs or income tax. In this case an open regime will in fact be preferred by more people, as the main drawback to an income tax for a poorer person, having to pay it, would be removed.

I will now show that if the (low productivity) median voter prefers the income tax then this is the winning policy (It is sufficient, but as will be shown, not

\footnote{For proofs of all Theorems, see the Appendix.}
necessary). However the same is not true when the median voter prefers the tariff.

**Theorem 3** Poorer individuals are more likely to prefer the income tax. For a low productivity individual, if they are indifferent between the choice of a tax or a tariff: \( t \sim T \), then all individuals with lower income \((n \leq n^i)\) will prefer the income tax.

**Corollary 4** If the median voter has preferences such that \( t > T \), it will be the case that a majority of the population will also prefer the income tax, and the adoption of an income tax will be the winning platform. However if the low productivity median voter prefers the tariff, the very low productivity voters may still prefer the income tax, and which proposal gains majority support will depend on the preferences of the medium and high productivity groups.

We see therefore that the poorest people are more likely to support an income tax, this is because they have less to lose from paying the tax. We also see that the median voter’s preference over the method of raising government revenue is not necessarily reflected in the politician’s election winning policy. This allows us to make a point in reference to the findings of the original Meltzer and Richard (1981) paper on which the model developed here is partly based. That paper suggested that the growth of government was a result of an extension of the franchise to include poorer citizens, who demanded more redistribution. Theorem 3 would suggest that such an extension of the franchise would also
make the adoption of an income tax more likely, as it is poorer citizens who are most likely to benefit from an income tax relative to a tariff in this model.

So far I have looked only at non-importers preferences, now I consider the preferences of high productivity agents. The preferences of the high productivity group over whether to adopt a tariff or an income tax will be different to those of the poorer non-importers, because they must pay the tariff. Again it is helpful to distinguish between two different cases of relative government sizes.

**Theorem 5** A necessary but not sufficient condition for high productivity agents to prefer a tariff is if the resulting government revenue is smaller than that raised by an income tax: $g(T) < g(t)$.

As for the medium productivity group, their voting behaviour depends to a large degree on their income relative to the average. If members of the medium productivity group have below average income, then like the low and very low productivity groups their choice over which of the two taxes to support will rest on the amount of money raised by the income tax relative to that of the tariff. If members of the medium productivity group have above average income, then an income tax will only lower their income, whereas a tariff (which they do not pay) will increase it. Therefore in this scenario members of the medium group will always support a tariff, irrespective of revenue considerations.

### 2.3.2 Coalition formation

Having looked at the conditions for different agents to support an income tax or a tariff I now wish to discuss how the four groups of different productivity
individuals may combine to form a majority in support of one or other of the policies.

As alluded to earlier the first case to discuss is that where the tariff raises at least as much revenue as the income tax. In this case both the very low, and low productivity groups will favour a tariff (see Theorem 1) and by the assumptions of the model, these two groups form a majority. The medium group will also certainly favour the tariff. Therefore a politician will win the election by proposing a tariff, despite the certain support of the high productivity group for an income tax (see Theorem 5).

The case where the income tax revenue is larger is more interesting. Which group supports which policy depends on the exact magnitudes of the amount of government revenue raised. As established in the previous subsection, the very low and low productivity groups may prefer the income tax when it raise relatively little extra revenue, the medium productivity group will need the income tax to raise a relatively larger amount of extra revenue (if they have below average income) and the high productivity group will prefer an income tax when it raises a relatively small amount more than the tariff, and prefer the tariff when the income tax raises a lot more than the tariff.

There are therefore several possible winning coalitions arising in this specification of the model when the choice of an income tax will raise more government revenue that a tariff. If the income tax raises enough extra revenue in comparison to the tariff so that the very low productivity group prefer it, but not the low or medium productivity group, then it is possible that the high productiv-
ity group also prefer the income tax, as both the richest, and the poorest only require that the income tax raise a modest amount more than the tariff in order for it to benefit them relative to the tariff. Therefore a coalition may be formed between the richest, and the poorest in support of an income tax. Alternatively if the income tax raises enough extra revenue in comparison to the tariff so that the low productivity group also support it, then the low and very low groups will form a majority in support of the income tax, regardless of the preference of the medium or the high productivity groups.

This analysis highlights problems with models that assume a fixed revenue requirement such as the model of Moutos (2001). Moutos shows that given a fixed amount of revenue the government has to raise, a tariff will be preferred because it impacts less on the poor median voter. This result is of course rather obvious given the assumption of a fixed revenue requirement. When the size of government is endogenously determined we can help explain why many developing countries have chosen to rely less on tariff revenue to fund redistribution.

2.4 The Conditions for Trade Openness

In this section I will analyse the relationship between the parameter values and the political equilibrium of the model, that is the policy that will be adopted by politicians because it has majority support from the population. The main relationships between the parameters and the outcomes of the model are fairly straightforward to analyse, because the aim of this paper has been to show that
an income tax regime is a possible outcome in the setting of the Moutos model, when government revenue is endogenous, I will consider the parameter values that make an open, income tax regime possible. I will consider one special case in more detail, which is the effect of poverty on the outcome of the political process. The parameters of the model are the productivities of the four different groups (\(x^i\)) the proportions that these groups exist in the population (the \(\alpha\)’s) and the parameters of the price function, in particular the slope of the respective price functions with respect to increased quality (\(P^S_z\) and \(P^N_z\)).

The main result of the model developed in this paper is that for an income tax regime to be a possible outcome of the political process, it must (as a necessary but not sufficient requirement) raise more revenue than the tariff. The focus in this section will therefore be on what parameter values make this possible.

Income tax revenue is (from equation 8) expressed by:

\[
g(t) = \frac{n(t)}{n_t(t)} \left( \frac{n^m(t)}{P^S_z} - n(t) \right) \tag{17}
\]

Whilst tariff revenue (from equations 10 and 11) is

\[
g(T) = -\frac{M(T^m)^2}{M_T(T^m)N} \tag{18}
\]

Clearly tariff revenue is founded principally on \(M(\cdot)\) the value of imports, which is a proportion of the income of the rich. Income tax revenue on the other hand is founded on average income \((n(t))\) and the gap between average and median income (controlling for the difference in the price of private and public goods); \(\frac{n^m(t)}{P^S_z} - n(t)\). The key to generating a large gap between average
and median income, hence raising income tax revenue, without relying solely on high income of the rich (which also increases tariff revenue) is for the medium productivity group to have a high income, this increases average income, increasing both the gap between average and median income (and hence the tax rate) and the tax base directly, without increasing tariff revenue at all.

A similar effect occurs when considering the proportions of the total population represented by each group, the smaller the proportion of the high productivity group, the lower must tariff revenue be. Likewise the higher is the proportion of the medium productivity group, the higher will be income tax revenue, whilst having no effect on tariff revenue\(^9\).

The final point to make about important parameter relationships that cause the income tax to raise more revenue than the tariff concerns marginal prices. High marginal cost of extra quality in the north \((P^N)\) reduces the incomes of the rich, and therefore imports. This will also reduce income tax revenue, but by less, as only a portion of the income tax base (average income) is affected by the increase in marginal northern prices, whereas the entire tariff base (imports)

\(^9\)This point allows us to prove that there is a situation where the income tax is certainly the equilibrium policy proposal. This is the case when the proportion of high productivity agents approaches zero, and so does tariff revenue. In this case the income tax will certainly raise sufficiently more money than the tariff to be preferred by the two poorest classes, given that the medium productivity class would have to be large enough to maintain the assumption that average income is higher than the median.

This result clearly follows from the structure placed on who imports and who doesn’t. But this is very similar to that of Moutos, and still contrasts to the result of that paper that tariffs are always preferred by the poor.
is affected. Likewise lower marginal cost of extra quality in the south, increase
the incomes of non-importers, increasing the income tax base, whilst having no
effect on the amount of money a tariff can raise.

In summary therefore, the minimum requirement for adoption of an income
tax, that it raise more revenue than a tariff, is likely to be fulfilled when the
medium productivity group are relatively numerous and have incomes not much
less than the high productivity group. Furthermore a relatively high marginal
cost of extra quality from foreign producers will reduce the income of the rich
and therefore tariff revenue, more so than income tax revenue, as non-importers
are unaffected.

As well as analysing the parameter values that lead to an income tax raising
more money than a tariff, and therefore making the outcome of an income tax
possible, we can also analyse what population structure makes the income tax
more likely to gain a majority. In particular I wish to expand on the idea of
Theorem 3, that poorer people tend to prefer the income tax (for a given income
tax rate), to consider the effect of changes in poverty on the likelihood of income
tax adoption. To do this a more formal approach is required to consider the
preferences of the different groups in terms of which scheme delivers the higher
utility.

The parameter of particular interest if we are considering the effect of poverty
will be $x^K$, the productivity of the poorest group. Increases in their productivity
can be interpreted as a reduction in absolute poverty. It can be noted that
changes in this parameter have no effect on tariff revenue, therefore the effect
on the welfare of the different groups under a tariff scheme is very simple, the
utility of the very low productivity will increase as their productivity increases,
and no other group will be affected. The case of an income tax will be somewhat
more complicated as there is an affect on income tax revenue.

Beginning with the effect on utility of the low productivity group them-
19 selves, from equation 1 we have the differential of utility with respect to the
productivity of the very low group:

\[ \frac{dU^K}{dx_K} (t) = z^K + g + t_L \left( z^K + g + V_L \right) \]  

(19)

The direct effect on leisure being zero as productivity has no effect on leisure
demand (see equation 4). The effect on private consumption \( z^K \) is positive
as is the effect on government revenue \( g \) as average income increases. The
effect on the tax rate will also be positive. Using equation 8 we have \( t = - \frac{\alpha^K}{n\tau} \)
which is positive. In this model a tax rate increase is always good for those with
below average income, so overall an increase in productivity of the poorest group
improves the utility of the poorest group under an income tax regime.

Under the tariff regime the only effect of the change in productivity on utility
of the low productivity group is on private consumption, following equation 1
we have:

\[ \frac{dU^K}{dx_K} (T) = z^K \]  

(20)

This effect is positive. Comparing the two results we have it that an increase
in productivity of the poorest will increase their utility under an income tax or
a tariff, which is larger?
It is apparent from Theorem 3 that for given tax and tariff rates the marginal utility of a productivity/income change in larger under a tariff for a non-importer because this extra income is untaxed. The difference here is that the productivity increase induces a tax rate change (but has no effect on the tariff rate) which if large enough will mean a greater utility increase under the income tax than the tariff. This effect will be large, the larger is the tax base for the income tax.

I now consider the impact of a change in the productivity for the very low group on the low productivity group’s utility. For this group the effect of a change in productivity of the very low group can be expressed as:

$$U^D_{xK}(t) = g_{xK}$$ (21)

The only effect is through the tax system and because the income tax rate proposed by the politicians is the one which maximises the utility of the median voter (who is part of the low productivity group by assumption) then the term representing the net effect of a tax rate change; $$[z_i^t + g_t + V_L(\cdot) L_i^t]$$ is equal to zero through the application of the envelope theorem. We therefore just have a tax base effect, which is positive. Under a tariff regime the total effect on the middle group of a change in the productivity of the low group is zero, there is no direct effect, and no effect on government revenue. Therefore comparing the two, the popularity of the income tax regime is enhanced for members of the low productivity.

For the medium group, as established previously, they will either always prefer a tariff (if they have above average income) or behave in a similar way
to the other non-importing groups. In the latter case, differentiating indirect utility under an income tax scheme gives us:

$$U^F_{xK}(t) = g_{xK} + t_{xK} \left[ z_i^K + g_t + V_L (\cdot) L_t^K \right]$$  \hspace{1cm} (22)

The only effect is through the tax system, and there is positive tax base effect, and (as in this case we assume a less than average income) a positive effect due to a higher tax rate as well. Therefore a reduction in poverty increase medium individual’s utility under an income tax, when they have below average income.

Finally we have the effect on the utility of the high productivity group. Under an income tax we have:

$$U^H_{xK}(t) = g_{xK} + t_{xK} \left[ z_i^H + g_t + V_L (\cdot) L_t^H \right]$$  \hspace{1cm} (23)

There is a positive tax base effect but the increase in the tax rate has a negative effect for high productivity individuals with above average income. The relative sizes of these two effects will depend on the initial tax rate, the higher this is the greater the public consumption gain from the larger tax base, and the income of the high earner, the richer they are, the more they have to lose from a tax rate increase. The effect under a tariff is zero. So there is an ambiguous effect on the preference of the rich, dependent on the initial conditions of the equilibrium.

Overall then a fall in absolute poverty, as represented as an increase in the productivity of the very low group, will certainly make the low, and medium groups (when they have below average income) more amenable to an income
tax, as it will raise more money whilst having no effect on utility under a tariff regime. The reduction in poverty also (as one would expect) increases the utility of those in the lowest group, under either scheme. But whether the increase is larger under an income tax or a tariff depends on the initial conditions, with a large existing tax base meaning the increase will be larger under an income tax. Also for the high productivity group, the total effect depends on the initial state, with a higher initial income meaning the increased tax rate is likely to make richer individuals see a reduction in utility under the income tax.

To make matters clearer we can think in terms of the different possible coalitions discussed in the earlier section. A fall in poverty increases the size of government, so helps fulfill the minimum requirement for an income tax to be adopted. For this reason the low productivity group will see an increase in utility under the income tax regime in comparison to the tariff regime. Theorem 3 establishes that if the low productivity group prefers the income tax, then so must the very low group. Therefore a coalition of the low and very low productivity groups in support of an income tax becomes more likely. A coalition of the very low and high productivity groups in favour of an income tax, becomes less likely however. Whilst the very low will only see an increase preference for an income tax relative to the tariff if the tax base is high enough (implying other groups have large income) this will decrease the high productivity groups preference, as higher income makes them suffer due to the increased tax rate.

To sum up then, inequality, some degree of industrial competitiveness (expressed as marginal cost of higher quality of private goods, that is not so much
higher than those of northern producers), and potentially, a lower rate of absolute poverty, all make the adoption of an income tax more likely. A large and well-off middle class is also particularly important in generating a large income-tax revenue for redistribution to the poor majority.

2.5 Conclusion

I have compared an open and closed fiscal regime and shown that an open regime may be adopted in a developing country if more money can be raised for redistribution to the poor. This is in contrast to the model of Moutos (2001) where the poor majority will only ever support a closed regime. The key difference between the two models being the inclusion here of an endogenously determined government size. A larger government size under the open regime will occur when that country is relatively competitive in the production of goods and where there is a high degree of inequality (particularly with a large rich middle class) and potentially a reduction in poverty. This suggests that it is the middle-ranking countries, who have already gone some way towards development, that are most likely to choose an open regime, whereas the least industrialised countries are more likely to cling to trade protection as an important tool to fund redistribution from the rich to the poor.

By taking a public finance approach to the issue of trade liberalisation and the size of government I do not seek to deny that the effect of trade policy on factor prices or other channels of influence is not important, but that public finance considerations are vital to understanding why some countries choose
high trade taxes and others do not, especially in developing countries where trade taxes often account for a large portion of government revenue.

3 Analysing the Role of Interactions in the Market for Policy: With an Application to Trade

3.1 Introduction

The economic treatment of government policy determination as a marketplace is a topic that has been studied to a great extent by economists. Politicians are viewed as the suppliers of policy, with voters, some of whom may be organised into special interest groups (SIGs) as the consumers. For example the idea that politicians will alter their policies to better match with those of special interests in exchange for campaign contributions is a common one, as seen in Grossman and Helpman (1994) and Baron (1994). What this paper analyses is the effect that interactions with the other elements of a politicians policy package can have on these political markets. By interactions I mean the possibility that the returns a citizen sees to the adoption of one particular policy, may be affected by the other policies that are part of the politicians overall package. Therefore (to use an example analysed later in this paper) the returns from trade protection may differ, depending on the other economic policies that are also being proposed by that politician.

Such demand-side interactions between policies seem likely to be important in explaining some political behaviour, particularly that of SIGs who can wield
considerable resources and are generally better informed on policy issues than the average voter. The existing literature tends to treat the demand for policy by SIGs as identical for different politicians, irrespective of the fact that the other policies proposed by a politician, particularly economic ones, are likely to affect the outcome from the SIGs’ perspective. In effect therefore the approach of this paper is to treat demand for the policy favours of a particular politician as endogenous, because different politicians or political parties have different policies that will be enacted along with the policy or policies that a particular voter or group of voters organised as a SIG, care about.

The approach of this paper is to follow authors such as Baron (1994) and Grossman and Helpman (1996) who model each political party as having some set of exogenous fixed policies (for reasons of ideology, strong core voter preference etc.) as well as a number of pliable policies (to borrow Baron’s phrase) that they will change in order to gain an electoral advantage, including the possibility of pleasing SIGs in order to attract campaign finance. The implicit assumption in their analysis of the political market for the pliable policies is that the effects of these policies on the SIG’s welfare will be the same whichever candidate wins, and hence whichever set of policies, fixed and pliable, is then adopted after the election. Hence the demand for a pliable policy is assumed independent of whom the winning politician is, and what their other policies are. In this paper I consider how differences in the other policies of a party can affect the returns and hence demand in a political market.\(^{10}\)

\(^{10}\)A simplifying assumption of the model developed in the next section is that only the fixed
The model developed here shows us that a positive interaction, that is where the fixed policies of a party cause a SIG to see a higher return to any improvement in the pliable policy position (relative to that caused by the fixed policy platform of the other party) will mean that more money is spent attempting to influence that politician by all special interests and that this will mean an improvement in the policy position, from the perspective of the SIG experiencing the positive interaction. Therefore those special interests whose goals are better helped by the other successfully adopted policies will achieve a greater level of welfare. We therefore see that different political parties will propose different pliable policies due to these interaction effects. With each party having a different set of policies and special interests realising different returns, the parties have an incentive to favour special interests who benefit most from that party’s other policies. As these are different for each party we will see a divergence in the parties policy announcements. Introduction of demand-side interactions may also help explain the success of political parties as well as special interests.

I apply the policy interaction idea to a model based on that of Becker (1983) in which two SIGs with opposing interests compete to influence politicians, but policies impact on the returns of the pliable policies. It could of course be the case that there are interactions between all pliable policies. This would result in a rather complicated model so I consider the simpler case in order to better focus on the main results.

It also seems reasonable to consider that the fixed policies (which in the terms of this model simply means that special interests have no bearing on them) are likely to have a stronger impact on other policies, as it is fixed policies that are likely to be those having a large impact on the economy and society, hence more prone to determination due to ideological leanings and voter preference.
the idea could be applied to many models of political markets where differences in the proposed policy platforms of rival politicians can have important implications for the outcomes of the political market. In the final part of this paper I apply the idea of policy interactions to a model of trade policy to show how differences in income tax rates can affect the returns to trade protection.

How the differences between politicians affects political markets is a question that has been considered by several authors, but the focus of these other works is entirely on the supply-side of the market, that is how such differences affect the ability or willingness of politicians to supply policy favours to voters and SIGs. This differs to the demand-side effects generated by differences in politicians in this model. Examples of this strand of literature include Coate (1995) who makes the assumption of a "good" and a "bad" politician who behave differently, Grier and Munger (1991) consider the role of committee assignments for US politicians, with those in important roles on committees being able to effectively supply policy favours at a lower price. A similar idea is found in Snyder (1990) who posits that seniority, experience etc. will affect the amount of policy favours a politician is able to offer. Dixit and Londregan (1995) and Stratman (1992) both consider politicians with constituency interests or certain expertise who can deliver policy favours more efficiently or cheaply to these groups. So fundamental differences in politicians is something that has been analysed several times, how policy differences affect the demand for policy favours has not been.

An important aspect of the model developed in the following sections is the
lack of an explicit role for voters in the political decision making process. In this I follow authors such as Hillman and Ursprung (1988) who assume that political success is determined by campaign contributions rather than policies that appeal to voters. My principal reasoning is the desire to focus upon the dynamics of policy interactions on special interests and consequently the money they spend and the resulting electoral outcome. The importance of special interests is reliant on the fact that at least some voters are uninformed in some way concerning the election. This provides the politicians with the motivation to raise money from lobbyists so as to convince these uninformed voters to support them at the ballot box as with Baron (1994). The politician/party that has the highest level of contributions and therefore campaign spending is more likely to win the election. Whilst some authors (McKelvey and Ordeshook, 1986) would contest that a lack of information on the issues is necessarily an impediment to making a rational decision at the ballot box there is evidence that voters are uninformed on a large number of issues, particularly the "pliable" issues that are most likely to be manipulated by special interests (in that their benefits are focused on a limited segment of the population, whereas the costs are dispersed).\footnote{Evidence that campaign contributions have the greatest influence on policy proposals when the issue has low public visibility is provided by Schroedel (1986) amongst others.}

The issue of trade policy analysed later in the paper provides a good example of a policy on which many people have little awareness and/or understanding. For example Topalova (2004) finds from an analysis of Indian trade liberalisation...
that there was little popular interest in trade policy amongst voters. Similarly Bloningen (2008) analyses US survey data and finds that 30% of those surveyed felt that they did not have enough information to form an opinion about trade policy. Finally Conybeare (1991) points out there is often little resistance to protection for local industry because most of the costs are born in other areas. However there will be a range of economically important domestic issues that are part of a politicians platform, which many voters will care about and understand and which will, crucially, feedback to effect the demand for trade protection. Tullock (1972) makes the point that special interests are unlikely to wield such significant power in areas of major policy issues and much more likely in areas where there are small private benefits.

In the next section I outline the basic model of political economy, showing that an inclusion of interactions between policies can have results for the policies proposed by politicians, and the welfare of the special interests who make up the demand side of the political market. I then develop an application of this structure to the market for trade protection to show that the effects of differences in the economic policies of parties, in terms of their proposed income tax rate, has implications for the returns to trade protection and hence the equilibrium structure of policy.

3.2 The Model

I begin by outlining a simple model of a political market based on the model by Becker (1983). This model sees two special interest groups (SIGs) competing
for policy favours from politicians in the manner of an oligopoly in a more traditional economics setting. The SIGs’ members are assumed to be united around their common interest concerning just one of the parties pliable policies (members of the group may have diverse opinions on the other policies on offer).

The groups \( i = 1, 2 \) have total utility (encompassing all their members) functions as follows:

\[
W^i = w^i(p, F) \tag{24}
\]

Where \( p \) is the pliable policy over which the SIGs have influence, \( F \) represents the fixed policy of the political party. The fixed policy platform is the source of the demand-side interactions this paper analyses. For the sake of argument I will assume for the remainder of the analysis that in the region of the equilibrium, the two SIGs have opposing interests, that is, what is good for one group, will be bad for the other group. Group 1 is assumed to be the group benefitting from an increase in \( p \), group 2 the group that benefits from a decrease in \( p \), such that \( w^1_p > 0 \) and \( w^2_p < 0 \), where subscripts denote derivatives. Utility is assumed to be strictly concave in the pliable policy for both groups. The role of the fixed policy in the utility function will be discussed later in the analysis.

The level of the pliable policy is determined by the influence placed on the politician by the two SIGs.

\[
p = I^1(q^1, q^2, x^1) = -I^2(q^1, q^2, x^2) \tag{25}
\]

Where \( q^i \) is the pressure produced by group \( i \), and \( x^i \) represents some set of other variables that may affect the influence group \( i \) brings to bear on the
politician. An increase in pressure will always have a non-negative effect on the influence a SIG has, and hence the level of the pliable policy they receive; \( I^i_{q^i} \geq 0 \). Both groups face the same policy and so their levels of influence must be balanced, an increase in influence of one group that moves the policy in their favour must be matched by a decrease in the influence of the other group. This means that for any variable \( y \) it must be the case that \( I^1_y = -I^2_y \). I also assume that \( I^1_{q^i q^2} = I^2_{q^2 q^1} = 0 \) that is there is no effect of one SIGs pressure on the marginal impact of the other SIGs pressure\(^{12}\).

In this specification the political system is radically simplified so that the focus is on the motivations and actions of the SIGs, as is useful to me for my study of demand side effects of policy interactions. Pressure is produced by a SIG spending its resources in the following manner:

\[
q^i = q^i(m^i, n^i) \tag{26}
\]

Where \( m^i = c^i n^i \) represents the total resources directed at influencing the pliable policy of the politician by SIG \( i \), with the number of members of the group being denoted \( n^i \) and the spending per member being \( c^i \). This spending could be for lobbying efforts, direct campaigning on behalf of the candidate, or for monetary contributions to the party’s election campaign, amongst other reasons. I assume that \( q^i_{m^i} \geq 0 \), more resources put into the political process will

\(^{12}\)Becker makes much of the 'substitutability' (increased pressure by the other SIG reduces the marginal impact of a SIG’s pressure) or 'complementarity' (increased pressure by the other SIG increases the marginal impact of our SIG’s pressure) in the influence functions in his analysis, without offering much intuition as to what features of the political system would lead to these results. Because of this, and for reasons of simplicity, I assume these ideas away.
never have a negative effect on the production of pressure\textsuperscript{13}. The spending per member, \(c^i\) is the only choice variable in this model, and must take a positive finite value. When factoring it into the total group utility function of equation (24) in a linear manner we have:

\[
W^i = w^i(p, F) - n^i c^i
\] (27)

This utility will be maximised when the following condition holds:

\[
\frac{dw^i}{dc^i} \frac{1}{n^i} = 1
\] (28)

I follow Becker in making the simplifying assumption that each group takes the other’s actions as given when deciding how much pressure to produce in order to derive a non cooperative Cournot-Nash equilibrium. This leads, using the equations 25, 26, 27 and 28 to the following specification of the marginal effect of spending resources on political pressure in equilibrium for group’s 1 and 2 respectively:

\[
\frac{dw^1}{dc^1} = \frac{\partial w^1}{\partial p} \frac{\partial I^1}{\partial q^1} \frac{\partial q^1}{\partial m^1} = 1
\] (29)

\textsuperscript{13}There is mixed evidence on whether political campaigning actually brings any benefit to special interests, and where there is evidence of a positive effect, the strength and form of that benefit can also be contentious. For example Loomis and Sexton (1995) suggest that much PAC spending (Political Action Committees - one of the main channels for channeling campaign contributions in the USA) is wasted and Stratmann (2009) makes reference to the number of studies finding that political spending is ineffective. Stratmann helps explain this puzzle in the area of advertising by accounting for differences in advertising prices. At a minimum it seems clear with the amount of money going into politics in many countries that SIGs at least believe that there effort has some reward.
\[
\frac{dw^2}{dc^2} = -\frac{\partial w^2}{\partial p} \frac{\partial I^2}{\partial q^2} \frac{\partial q^2}{\partial m^2} = 1
\] (30)

These conditions can be solved for equilibrium values of \(c^1\) and \(c^2\) and hence of political pressure \(q^1\) and \(q^2\). Sufficient conditions for equation 29 to represent utility maximising levels of \(c^1\) are that \(I_{qq}, q_{mm}\) and \(w_{pp}\) are all negative and for equation 30 to give utility maximising levels of \(c^2\), that \(q_{mm}\) and \(I_{qq}\) are negative and that \(w_{pp}\) is positive\(^{14}\).

As this political market is comparable to an oligopoly we can discuss the reaction functions of the two SIGs, as Becker does in his original paper. In particular it is important to establish the slopes of the reaction functions. I follow Becker in establishing that (given the assumptions about functional forms already made) reaction functions are upward sloping, an increase in spending and pressure by one SIG, will be matched by increased spending and pressure by the other SIG also\(^{15}\). Stability of the equilibrium is assured by following Becker in assuming that group 1’s reaction function is steeper than group 2’s as depicted in Figure 2:

\(^{14}\)Full details of these conditions are contained in the appendix.

\(^{15}\)Proof of this is in the appendix.
With reaction functions as depicted here, any deviation from the equilibrium will be self-correcting\textsuperscript{16}.

So far I have followed Becker in discussing the political process in terms of two SIGs attempting to influence a single political entity. I now wish to extend this to include an election which will be the setting for the analysis of policy interactions. There are two parties (party A and party B) contesting for political power. Both SIGs perceive the same probabilities $\theta^A$ and $\theta^B$ of the respective

\textsuperscript{16}An assumption about relative reaction curve slopes is common in order to ensure stability, as is done in the Becker paper on which this section is based. Proof of the relevant conditions is beyond the scope of this paper.
parties winning the election\textsuperscript{17}. Expected utility for a SIG is therefore:

\[ EW^i = \theta^A w^iA(p^A, F^A) + \theta^B w^iB(p^A, F^A) - c^iA - c^iB \]  \tag{31}

The SIGs are engaged in influencing the \textit{proposed} pliable policies of the two parties, spending per member is a sunk cost to realise a potential gain if that party is first elected, and then implements their policy platform\textsuperscript{18}. The maximisation condition in the market for a particular parties policies, from equations 29 and 31, now becomes for group 1:

\[ \frac{dw^i}{dc} = \theta_i \frac{\partial w}{\partial p} \frac{\partial I^i}{\partial q^i} \frac{\partial q^i}{\partial m^i} = 1 \]  \tag{32}

With a similar condition for group 2 based on equation 30. I assume that the fixed policy platforms of the two parties are different for the remainder of the analysis; \( F^A \neq F^B \).

\textsuperscript{17}This follows other papers including Baron (1994) and Austen-Smith (1995) who both take the parties probabilities of being elected as exogneous. The special interests do however perceive the possibility of changing the policy offered to better suit them. The special interests are therefore focussed on an influence motive for giving rather than an electoral motive (Grossman and Helpman, 1996).

The evidence on whether special interests do in fact pursue an influence or an electoral motive is mixed. For example Magee (2002) finds that there is little evidence for an influence motive, whereas Strattman (1992) finds evidence for both an influence and an electoral motive.

In any case which motive is dominant is not vital to the key message of this paper which is the importance of interactions between policies. If we were to dismiss the influence motive and focus on an electoral one it would still be perfectly feasible to consider demand-side interactions between policies.

\textsuperscript{18}I assume that all promises are honoured in terms of the special interests paying their promised amounts and the politicians adopting the policies they say they will.
3.2.1 The role of policy interactions

I will now discuss how policy interactions affect the equilibrium of this model. The key original feature of this model is the interaction between the parties set of fixed policies and the returns that the special interests receive from the pliable policy. Whilst other papers assume that the same policy delivers the same returns regardless of who wins the election, I will explore the impact of policy interactions where the adoption of one policy systematically affects the return to another policy. From the perspective of the SIGs the two parties offer different ‘products’ due to their differences in fixed policies and the effect this has on the returns to the pliable policies. Examples of such interactions can easily be imagined. Lobbying to gain support for public investment in your industry may be more rewarding when directed to a party that is also promising to reduce the sales tax on the goods that you manufacture. Similarly gaining support for the approval of new prescription drugs may see a bigger payoff from a party promising to spend more on healthcare.

The markets for the two parties can be treated entirely separately due to the assumption that electoral probabilities are taken as given. The role of the fixed policy is described as follows (the specification being influenced by Grier and Munger, 1991). Generally I assume that for two differing fixed polices \( F^A \neq F^B \) then:

\[
W = w(p, F^A) \leq w(p, F^B)
\]  

(33)
Also (and more importantly) I assume that:

\[ \frac{d(\frac{\partial w}{\partial p})}{dF} \leq 0 \]  

(34)

Therefore the fixed policy programme of the political party is assumed to affect both the level of utility that a SIG acquires from some given level of the pliable policy, and the marginal rate at which utility changes as the pliable policy changes. I shall discuss more specific examples of what the differences will be, and their effects, later in the analysis.

How does this interaction with the parties platform of fixed policies affect the equilibrium discussed in the previous section? Clearly equation 34 showing the assumption of an effect on the marginal utility of a pliable policy change will affect equation 32 which is the equilibrium condition for this model. Let us consider a scenario where the fixed policy has no effect on the returns from the pliable policy for SIG 2 such that \( w^2(p, F^A) = w^2(p, F^B) \) and \( (\frac{\partial w^2}{\partial p})_A = (\frac{\partial w^2}{\partial p})_B \)

but for SIG 1 their is a positive interaction with the fixed policy platform of party A such that \( w^1(p, F^A) > w^1(p, F^B) \) and \( (\frac{\partial w^1}{\partial p})_A > (\frac{\partial w^1}{\partial p})_B \). What will the effects be when we compare the political equilibriums of the two parties?

From equation 32 we see that if \( \frac{\partial w^i}{\partial p} \) is larger for any given policy, as we are suggesting is the case for SIG 1’s relations with party A in this scenario, then to fulfill the equilibrium condition that the marginal benefit of political spending is equal to the marginal cost then it must be the case that SIG 1 will spend comparatively more money in producing political pressure in the market for party A’s proposed pliable policy platform\(^{19}\).

\(^{19}\)Proofs for the Propositions are contained in the appendix.
**Proposition 6** A positive interaction (higher marginal return to an improved pliable policy position) with a party’s fixed policy will lead a SIG to spend more money trying to influence that party’s policies compared to a party that generates no such positive interaction.

**Corollary 7** When reaction functions are upward sloping it is in fact the case that both SIGs will spend more money influencing the policy platform of a party whose fixed policies have a positive effect on the returns to a favourable pliable policy, even if this effect is only generated for one of the SIGs.

When both SIGs are spending more money to influence the political process we need to say something about the way in which equilibrium policy may be influenced.

**Proposition 8** The SIG that spends more money influencing a politician due to the positive effect their fixed policy has on the returns to the pliable policy proposal, will get a more favourable proposed policy.

These results create two more interesting implications. Firstly that parties who are identical in every other way, facing the same two SIGs’ attempts to influence their pliable policy platforms, will in fact propose different policies in equilibrium. This result is important because it gives an alternative reason for why political parties deviate from choosing the same policy. A simple spatial voting model will in equilibrium have both political parties locating at the median voter’s optimal policy, and whilst it is often true that parties do locate somewhere near the median, they are rarely identical and can often diverge in
an extreme manner.

Secondly a party that has fixed policies that create larger returns to the pliable policies that are influenced by interest groups, will see a greater amount of effort to influence them by both sides. To the extent that the effort of SIGs includes campaign contributions, this could give such a party an advantage in an election (though of course we take electoral probabilities as a given here, an extension to consider their endogeneity in this context would prove interesting).

So we see that a positive interaction due to a favourable fixed policy platform induces a SIG to spend more money, and even though their rival will also be induced to spend more money when reaction functions are upward sloping, that SIG will get a better policy. Clearly if both SIGs get an increased marginal welfare from one parties fixed policy platform compared to the other, then certainly even more money will be spent, and which SIG gets the better policy (relative to their being no role for policy interactions) will be less clear, coming down to which SIG sees the larger benefit from the interaction. All these results follow fairly simply from the specification of the impact that differences in the fixed policy will have on the marginal returns to a change in the pliable policy. As we will see in the next section however it is fairly easy to generate such effects in economic models, and that these can have important consequences on equilibrium policies.

What might be the relationship between the fixed policy interactions of the two SIGs with opposite interests in reality? It seems unreasonable to think that all groups with an interest on the same issue will necessarily see their returns to
changes in the pliable policy be affected by the fixed policies in the same way, but it remains a possibility. An example of this may be that parties who are generally 'pro-business' in outlook are likely to have policies that create positive interactions for businesses. So on an issue where there are businesses with opposite interests, firms on both sides of the issue may still perceive a higher return to getting the policy change they desire and will be more willing to contribute to the pro-business party. On the other hand an issue may be one where the businesses tend to be grouped against labour unions. In this case the pro-business party may generate higher returns for businesses. Whilst a pro-labour party may generate higher returns for unions. So in this case it is less clear which party is likely to be more successful. This idea is supported by Conway and Green (1995) who find that PACs representing business interests consider a candidates "attitude to business" the key determinant to their contributions.

3.3 An Application to Trade policy

In this section I will apply the model of political competition with policy interactions developed in the last section to a model of trade policy so as to highlight the role that my analysis of interactions can play. The application is to the Heckscher-Ohlin (H-O) trade model, and in particular the version from Mayer (2002) that considers the role of both tariffs and an income tax. This is clearly appealing as a model that the analysis from the previous section can be applied to. The income tax will be taken as the fixed policy platform and the tariff as the pliable policy of two political parties. Following the discussion in
the introduction this assignment of the two policies fits to the logic of fixed (or
at least less flexible policies) being those whose costs and benefits affect large
segments of the population in a substantial way, whereas pliable policies tend
to have concentrated benefits and diffuse costs, and are thus more susceptible
to manipulation by SIGs.

In terms of the differences in fixed policies platforms the two parties are
assumed to adopt broadly left and right-wing (economic) stances for their fixed
policies. That is two say one party (the left) will have higher income taxes and
the other (the right) lower taxes. This will be shown to have implications for the
trade policy adopted by the two parties, even though both parties are willing
to change their policies in a similar manner, and both face the same economic
interests in favour of, and opposed to trade protection.

3.3.1 The Trade Model

The model follows a standard H-O format, with two factors of production,
and two goods. Factors are perfectly mobile within a country but immobile
internationally. Factor and product markets are perfectly competitive, and we
assume the country of consideration is a small open economy (SOE) such that
world prices for goods are a given and for further simplification are equal to
one. Sector 1 is assumed to be the export sector and sector 2 the import sector.
Individuals preferences for private goods are assumed to be homothetic and
identical and indirect utility for individual \( i \) takes the form:

\[
W^i = w(p^d, Y^i) \quad (35)
\]
Where $p^d = (p^d_1, p^d_2)$ represents the vector of domestic prices faced by consumers in sectors 1 and 2, and $Y^i = (1 - t)I^i$ is after-tax income, with $t$ as the income tax rate and $I^i$ as factor income. The $w(\cdot)$ function is continuous and concave in both arguments, with increasing income having a strictly positive effect and increasing prices having a non-positive effect on utility\(^\text{20}\). Individuals

\(^\text{20}\)In the Mayer model, tariff and income tax revenue is used to fund public good provision, and this is part of the utility function of the citizens, affecting their preference for the use of the different instruments. Here I have omitted a discussion of the revenue and spending effects of the tariff, and their impact on the utility of the citizens. The justification for this is two-fold.

Firstly I have assumed (as do many other models of special interest group activity) that the SIGs in the model of political competition are organised around a single goal. The individual members of a SIG may care about other policies in different ways. Therefore to assume that the SIGs only care about the effect of the tariff on their (real) private income seems to fit best to this assumption. It also seems more reasonable if we are considering a more developed, capital-rich country as we are here, in developed countries tariff revenue tends to be an insignificant part of overall revenue and is unlikely to be a major concern for either pro or anti trade protection groups. Evidence to support this contention comes from Hanson et al (2007) who find that in the USA at least, public finance concerns do not affect voters attitudes towards trade policy. The authors claiming that this is consistent with US trade policy have a negligible fiscal policy impact. Of course in many developing countries revenue from trade policy instruments often does make up a large portion of revenue. Therefore this model may need adapting to include tariff revenue more prominently if it is to be applied to such countries.

Secondly, and related to the previous point, is the fact that the fiscal impact of the tariff (and the effect of the income tax upon it) would be the same for members of both groups, and what we are interested in is the differences between the groups, therefore introducing such fiscal concerns would only complicate the analysis whilst adding little of interest.
differ in factor ownership, and therefore in their factor income. All individuals are assumed to own one unit of labour, but differ in their ownership of capital. Factor income is represented by:

\[ I^i(p^s, K^i) = l(p^s) + r(p^s)K^i \]  

(36)

Where \( l \) is the wage rate, \( r \) is rental rate and \( K^i \) is individual \( i \)'s amount of capital, \( p^s = (p^s_1, p^s_2) \) is the vector of prices faced by domestic producers. Following Mayer we restate this factor income in the following manner:

\[ I^i(p^s, K^i) = \phi^i(p^s, K^i)I(p^s) \]  

(37)

Where \( I(\cdot) \) is national income and \( \phi^i(\cdot) \) is individual \( i \)'s capital ownership share. The \( \phi^i(\cdot) \) function is assumed to be strictly increasing in an individual's ownership of capital and will respond to price changes in a manner determined by the individuals relative factor ownership. This share is the crucial determinant of an individual's preferences over the tariff. Assuming that we are analysing a relatively capital abundant country (such that the export good from sector 1 is produced in a capital-intensive manner, and the import good of sector 2 is produced in a labour-intensive manner) then following the Stolper-Samuelson result relatively capital rich individuals will see their income fall as a result of an increase in the relative price of the labour intensive good, whereas relatively labour rich individuals will see their incomes rise. Finally I assume that the \( \phi^i(\cdot) \) function is strictly concave in both its arguments. The effect of
the tariff on imports of good 2 is as follows:

\[ p_2^d = p_2^* = 1 + \tau \]  

(38)

Clearly the effect of the tariff is to increase the price of imports of the labour intensive good 2. This means that relatively capital rich individuals will oppose a tariff, relatively labour rich individuals will support a tariff. This therefore is the set up for our two opposing SIGs that we saw in the political economy model developed earlier.

3.3.2 The Effect of Policy Interactions

The key variable from the earlier analysis of political equilibrium is \( \frac{\partial u^i}{\partial p} \), the marginal utility of a change in the pliable policy, this is assumed to be affected by the fixed policy, thus leading to the results discussed in the previous section. The pliable policy here is the tariff, so we must show how changes in the tariff affect utility in this trade model. The effect of changes in tariffs on utility is given by:

\[
\frac{\partial W^i}{\partial \tau} = w_{Y^i} \left[ -\phi^i D_2(\cdot) M(\cdot) + \partial \phi^i(\cdot) X_2(\cdot) + Y \frac{\partial \phi^i(\cdot)}{\partial p_2^*} \right]
\]

(39)

The derivation of this expression follows Mayer in using Roy’s identity and the assumption that agent’s preferences are identical and homothetic, implying that \( \frac{U^i(\cdot)}{U^{Y^i}(\cdot)} = -\phi^i D_2(\cdot) \) where \( D_2(\cdot) = X_2(\cdot) + M(\cdot) \) is the total demand for good 2 with \( X_2(\cdot) \) being domestic production of good 2, and \( M(\cdot) \) representing imports of good 2. The national after-tax income is expressed as \( Y = (1 - t)I(p^*) \). Equation 39 is therefore the equivalent of \( \frac{\partial w^i}{\partial p} \) in the political model.
it tells us the change in an individual’s welfare due to a change in the pliable policy. We can note immediately that \( \frac{\partial W_i}{\partial \tau} \) is a function of the income tax rate, and therefore differences in this fixed policy will have an effect in the political market for tariffs, therefore meaning that the political model of policy interactions developed earlier in the paper, is applicable here.

Whilst the marginal utility of an income change \( (wY_i(\cdot)) \), and the share of national income \( (\phi^i(\cdot)) \) will differ from one individual to the next, they will still have the same sign, it is the expression for the change in income share; \( \frac{\partial \phi^i(\cdot)}{\partial p^2} \) that has a different sign for different groups, and which distinguishes the differences in the two SIGs. For those owning a relatively large share of the abundant factor (capital in this case) the sign of this term is negative, for those relatively richly endowed in labour it is positive. Both groups lose out as consumers due to the increased price of the good, but only the labour rich may gain overall due to an increase in income share. For the relatively capital-rich, equation 39 is certainly negative. To make the analysis clearer and to fit in with the assumptions of the political model that the interests of the two SIGs are diametrically opposed I shall assume from now on that it is in fact the case that for those relatively labour-rich people who are members of the SIG representing their interests, that \( \frac{\partial W_i}{\partial \tau} > 0 \). Therefore those capital-rich individuals who are able to organise themselves into a SIG will be willing to give up money to influence the political

\[21\] For the analysis to be applicable, it is only required that the two SIGs have opposing views (in terms of the direction of policy change) across some range of values for the pliable policy.

It is perfectly possible that for some values, both would agree on an increase or reduction in the value of the pliable policy.
process for a reduction in tariffs, those who are labour rich, will be willing to pay money to get politicians to enact a higher tariff rate.

An important assumption for ensuring a unique equilibrium of the political model was that utility for the SIG was strictly concave in the pliable policy, so we must show that the condition in equation 39 can be concave, this is discussed in the appendix\textsuperscript{22}.

I now envisage a scenario where there are two political parties competing in an election. As part of their policy package both parties propose differing income tax rates, let party $L$ propose the tax rate $t^L$ and party $R$ the rate $t^R$ where $t^L > t^R$. What will be the effect of this on the market for trade protection that the capital and labour rich SIGs are engaged in? As shown earlier to understand the effect of the interaction with the fixed policy, we must analyse its effect on the marginal utility of the pliable policy change, in this case, equation 39. The marginal effect of changes in the income tax rate on equation 39 is given by:

$$\frac{\partial^2 W^i}{\partial t \partial t} = -w_{Y^i, Y^i}(\cdot)I^i \left[ -\phi^i(\cdot) M^i(\cdot) - \phi^i(\cdot) X^i(\cdot) t + Y \frac{\partial \phi^i(\cdot)}{\partial \rho^2} \right] +$$

$$w_{Y^i}(\cdot) \left[ -\phi^i(\cdot) M^i(\cdot) - \phi^i(\cdot) X^i(\cdot) - I \frac{\partial \phi^i(\cdot)}{\partial \rho^2} \right]$$

(40)

For the labour rich the first square-bracketed term is positive by assumption (see discussion of equation 39 above), concavity of the $w(\cdot)$ function means

\textsuperscript{22}Mayer simply assumes that utility is strictly concave in both tax instruments, in the appendix I go into some more detail about the conditions under which this is true. For the remainder of this analysis it is assumed that this condition is met, and that SIG utility is concave in the tariff, so as to ensure a unique political equilibrium, as discussed earlier in the paper.
\( w_{Y^i}(\cdot) \) is negative, therefore the whole first term is positive, the marginal utility from the extra income accrued from a higher tariff increases as higher income tax reduces real income. However the second square-bracketed term representing the change in the marginal income effect of the tariff due to an increase in the income tax rate, will be negative unless the \(-\phi^i(\cdot)M_t(\cdot)\) term is positive (representing the smaller loss as a consumer due to higher prices, because a higher income tax means less goods are consumed) is sufficiently large. The marginal utility of an income rise \( (w_{Y^i}(\cdot)) \) is positive therefore the second term is possibly negative. Therefore there are two competing effects on the marginal benefit of a tariff for a labour-rich individual, when income tax rates are higher. The marginal utility of the extra income is higher as the income tax reduces income (and the utility function is strictly concave), but the value of the actual income increase is reduced. Exactly the same logic can be applied for the relatively capital rich individuals. The marginal utility of a tariff reduction is enhanced by a higher income tax rate which reduces nominal income. But also the amount of extra income due to a beneficial tariff change is reduced by a higher income tax.

The effect on political equilibrium in this case then depends on which of these effects, the effect on the actual income change, or the effect on the marginal utility of the income change, is larger. What is worth noting here is that in this model, the relatively labour rich, are poorer than the relatively capital rich as we assume all individuals have the same amount of labour and only differ in their capital endowment. This means that the income tax effect of increasing
marginal utility of a given tariff induced income improvement will be larger for
the tariff supporting group. This means it is the relatively labour rich who will
see a larger marginal utility from a positive pliable policy change due to a higher
income tax.

What this means is that party \( L \) who are proposing a higher income tax rate
will create a higher marginal return to a tariff change for the pro-tariff group
compared to the relatively \( K \)-rich, anti-tariff group. Following Propositions
6 and 8 above, this will mean that the relatively labour abundant, pro-tariff
group will spend relatively more money influencing the high income tax party,
and will see a better proposed policy as a result. The party proposing a higher
income tax, will also propose a higher tariff, not because of any ideological
leanings, but because they are induced to by the influence exerted on them
by the pro-tariff group. The poorer, labour-abundant, group will spend more
money influencing the high income tax party, not because of any direct benefit
of a higher income tax, but because of the positive interaction this creates in
terms of the return to the tariff, in comparison to that generated by the low tax
party\(^{23}\). This highlights the role of policy interactions that I have envisaged,
differences in political parties other policies, create demand-side effects that
alter the equilibrium outcomes of political markets.

\(^{23}\)This pattern would of course be different in a relatively labour abundant country. If were
to maintain that the now anti-tariff, relatively labour rich individuals were poorer than their
capital-rich fellow citizens then the it would be the high income tax party who would create
higher returns for the anti-tariff group, and would therefore be induced to propose a lower
tariff than the low tax party.
3.4 Conclusion

I have developed a simple model of political economy based on the model of Becker (1983) focussing on the role of special interests and their demand for policy from politicians who can be influenced by SIG pressure. The main result of this analysis is that the fixed policies adopted by a political party will affect the demand for "pliable" policies from the special interests. In particular a positive impact on the marginal return to a policy improvement will lead to an increase in political activity by SIGs on both sides of the issue, whilst a negative effect will reduce the level of political activity. Recognising this fact we should expect that special interests will not treat different political parties in the same way, as has been assumed in so many other papers of political economy. For example it is not rational to give large sums of money to a party for them to change their policy in your favour when the benefits of that policy will be severely curtailed by the implementation of the other policies the party plans to introduce if they win the election. Therefore even if a generally pro-business party is willing to offer labour unions a good policy in one area, the benefit of that policy is unlikely to be as great as that obtained from the same policy, by a pro-union party who will also be introducing various other beneficial policies. The acknowledgement of the role of interactions can therefore help us understand the pattern of contributions from interests, and to a degree the relative success of different political parties.

I have also applied these ideas concerning the political market to a model of trade to show how differences in a fixed policy (an income tax) can affect the
returns that SIGs see to trade trade policy (a tariff). We see that differences in political parties fixed income tax platform do affect the marginal returns to trade policy, and that this effect is different for pro and anti-tariff groups. In particular I show that the high tax party will generate larger returns for the pro-tariff SIG than for the anti-tariff SIG, and will therefore propose a higher level of trade protection than the low tax party.

For future research the ideas in this paper could be tested empirically by analysing the pattern of campaign contributions in relation to the other policies adopted by political parties. I would also like to expand the model to consider a full "general equilibrium" in the political market where there are interactions not only from the fixed policies to the individual pliable policies, but between the set of pliable policies also. Finally the application of the political model to other trade policy models, and generally to other models of economic policy could provide a better understanding of the political equilibrium in such markets.

4 An analysis of the use of Informative Spending and the Influence of Special Interests

4.1 Introduction

The objective of this paper is to analyse the use of a particular strategy by special interest groups (SIGs) as a means of influencing the outcome of a political market where SIGs interact with politicians and voters to determine who holds power and what policies they implement. The policy I will consider is informative
spending (IS) whereby SIGs can, at a cost, provide information on the policy platform of politicians to a subset of voters who share their preferences over the direction that government policy should take. In particular I am interested in examining the effect of the policy on the political market and to what degree SIGs will find such a policy useful when they are also able to influence the political market through campaign contributions.

To answer these questions I adapt the well-known model of Grossman and Helpman (1996) which examines a political market where politicians aim to win votes by offering popular policies to informed voters (who are fully aware of the policies that the politicians are proposing) and by spending money to convince uninformed voters (who are not aware of the policies of the politicians) to vote for them. Politicians attract campaign finance by modifying their policy platform to appeal to the SIGs. I introduce informative spending into this framework as a distinct strategy available to SIGs. I show that this strategy can be beneficial if it reduces the cost to the SIG of a particular policy proposal. This will occur due to the bias in the political views of the informed electorate that is the result of IS as modelled here. This results from the creation of more informed voters with the same preferences as those of the SIG membership.

The central contribution of this paper is to show that when a SIG has access to both campaign contributions and informative spending as a means of influencing the political process, and when both are costly to the SIG, that it may use both in tandem, and that the effect of IS interacts with the role of campaign contributions. It is shown that Informative Spending has a bigger reward for
a SIG, the larger is the proportion of uninformed individuals in the population and the more extreme is the SIGs’ position relative to that of the average informed voter. In addition to this, the introduction of IS into the Grossman and Helpman model is shown to diminish the possibility of SIGs finding an electoral motive for contributing to a political campaign. The central motivation of SIGs as envisaged in this model is to influence the policy of the candidates rather than to see a particular candidate elected, and any desire for an electoral motive is reduced when informative spending is available as a strategy.

This analysis differs from other research in this area in two main ways. Firstly I consider the use of two policies in tandem, and how they complement each other, whereas the majority of papers focus on just one way in which SIGs can influence the political process, or model informational activity by politicians instead of SIGs. Secondly the informational aspect of SIG activity is explicitly modelled as being costly to the SIG, in a similar way to lobbying or campaign contributions, something which is not always the case in other research on the informational aspect of SIG activity. This means we must consider carefully the benefit that the informational strategy can bring, especially when there is another alternative policy available.

The issue of information and its role in the political process is one addressed by many other authors such as Baron (1994) and Coate and Morris (1995), both of whom, like Grossman and Helpman (1996) relies on the existence of uninformed voters to motivate the ability of politicians to "get away with" pandering to the preferences of the organised special interests. Evidence on this
issue comes from authors such as Rockey (2009) who finds that voters systematically misperceive their own ideological interests, this lack of information or understanding can explain voters supporting parties that do not support their interests, and motivates the informational role of SIGs towards their own affiliates explored here. Bloningen (2008) also investigates the origins of individuals political preferences, in this case about trade policy and finds that many people consider themselves to be uninformed on the issue, especially the low-skilled. McKelvey and Ordeshook (1986) consider the role of polling data and over informational cues as allowing less than fully informed voters to make more accurate assessments about the true nature of politicians. This type of argument can be used to motivate the informational role of SIGs in this paper, as providers of information that allow uninformed voters to make accurate assessments about the desirability of competing politicians platforms. Coate (2004) also has politicians trying to sway voters by providing information about themselves to uninformed voters through informative advertising campaigns. The difference with this paper is that here it is the SIGs providing the information to the electorate in order to further their own interests, not the politicians.

Grossman and Helpman themselves (2001) in a different paper from the one that will be the focus in the next section, consider the idea of SIGs informing their membership. They address a different issue however, which is that a SIG leadership which is better informed than the rank-and-file membership may choose to misrepresent the true nature of the political situation to their members for their own gain. In this paper I will not consider this issue of whether people
believe the information being given to them, on a technical level by simplifying
to groups where all members share exactly the same preferences, and intuitively
because we could imagine that repeated interactions between a SIG leadership
and members (and others with associated interests) over time could explain a
reasonable high level of trust, without which a SIG would likely fail. Instead
the focus here is on the effect of informational activity on the wider market,
in particular the policy outcome and the interaction with the use of campaign
contributions as an alternative strategy to informational spending.

Another paper that attempts to analyse the role of ‘informative campaigning’
is by Mueller and Strattman (1994). It is important to note that Mueller and
Stratmann largely dismiss informative spending as a realistic option. They
however do this for informative spending (IS) by political parties to a non-biased
section of the population (i.e. the informative spending has an equal chance of
reaching anyone). However as discussed below, it is perhaps more reasonable to
think of SIGs as well as, or instead of, political parties undertaking informative
spending and that they can reach a biased section of the population i.e. those
voters with interests similar to those of the SIGs. This is the framework I will
adopt and will show that contrary to Mueller and Strattman, IS does have a
role and can be beneficial to a SIG in these circumstances. Evidence for the
importance of this type of campaigning is the fact that much SIG activity is not
directed through politicians actual campaigns but is done independently. This
being explained in the USA at least in part due to spending restrictions that
exist on donations to political parties (Conway and Green, 1995).
The basic aim of SIGs in their informational activities is to shape public opinion to their advantage by painting their cause in a more favourable light, making voters aware of the politician’s stances on the issues of interest to them and in particular for the model developed in this paper, biasing the informed electorate towards those sharing the same views as the interest group. Such actions are visible in initiatives such as the NAM (National Association of Manufacturers) Prosperity Project in the USA that help employers inform their workforce about party policies and how politicians vote on issues of relevance to the sector they are employed in (Bombardini and Trebbi, 2007). Other examples include trade unions who provide members with information about party policies and how those policies may affect their members interests through magazines, newsletters etc. This kind of information is not just pertinent to fully paid up members of interest groups but to others such as family members, non-unionised workers or local businesses relying on a company’s presence in a town, who if made aware of the issues may change their voting behaviour accordingly.

Hrebenar and Thomas (1995) discuss the role of the Japanese lobbying in the US and note the strategy of indirect influence, particularly through education funding, which could also be interpreted as informational activity.

Empirical evidence on the role of SIGs is mixed. Stratmann’s (2005) review concludes that the literature has struggled to find a significant and positive role for spending in helping to win an election and mixed evidence that SIGs can buy policy favours. Stratmann (2009) explains this weak evidence on the impact of campaign spending in terms of differences in advertising prices, the question
of what campaign finance actually does, and whether it is useful, remains open however.

The rest of the paper proceeds as follows. In the next section I begin by outlining the model of Grossman and Helpman (1996) before introducing Informative Spending to show that it has a role to play in improving the policy received by the SIG and most importantly in reducing the campaign contributions a SIG must make. I then discuss the role IS may have in improving the electoral prospects of a political party and show that it has none. I then briefly consider the issue of group size, showing that an n-shaped relationship between group size and campaign contributions is a possibility in the model of Grossman and Helpman.

4.2 The Model

The model of informative spending is an adaptation of Grossman and Helpman's (1996) paper of campaign contributions. This model provides a platform for demonstrating the potential role of costly informative spending (IS) by special interest groups (SIGs) and how this interacts with the campaign contributions at the heart of the Grossman and Helpman model. Throughout this section I will consider the model with just a single organised SIG as this is the clearest way of analysing this model. I will also consider only the influence motive for SIG activity which is the focus of the Grossman and Helpman paper. That is the SIGs try only to change the proposed policies of the political parties, and do not try to improve the electoral prospects of either one. A brief discussion of IS
4.2.1 An overview of the Grossman and Helpman model

In this section I outline the main features of Grossman and Helpman’s 1996 model. There are two political parties, an exogenous number of special interest groups (as previously mentioned we focus on a situation with just one SIG here) and a continuum of voters who differ in their preferences. Some percentage $\alpha$ of these voters are uninformed, meaning that they have less than full information about the policy position of the parties and/or the effect these policies will have on them. The remaining $(1 - \alpha)$ percentage of the population are informed and have full knowledge of the policies and their effects. All voters (indexed by $i$) have some exogenous preference for party B; $\beta^i$ (a negative value denoting a preference for party A) based on these parties fixed polices, character of the politicians etc. Informed voters also care about the vector of pliable policies offered by the two parties and will vote for party A if and only if $u^i(p^A) - u^i(p^B) \geq \beta^i$ where $u^i(p^A)$ and $u^i(p^B)$ are the utility functions for the vector of pliable policies for parties A and B respectively, which are concave and differentiable. The parties are assumed to not be able to observe directly $\beta^i$ for any individual, but do know the distribution of this in the population which we call $F(\beta)$. This means that parties perceive a probability $F[u^i(p^A) - u^i(p^B)]$ that individual $i$ will vote for party A. Uninformed voters base their voting de-
cision on their \( \beta_i \) and the campaign spending of the two parties as described by the linear function \( H(C^A - C^B) \) which gives the fraction of the uninformed who vote for party A, where \( C^A \) and \( C^B \) are the total values of campaign spending for parties A and B respectively. The greater the spending by one party, holding the other parties, spending constant, the greater the fraction of uninformed voters who will vote for them.

We assume that the fraction of the seats in the legislature for a party matches the fraction of the vote received by them. The aim of the parties is to maximise this vote share. They will choose their pliable policy platform to maximise this vote share taking into consideration the preferences of the informed voters and how they may attract funds from the SIGs in order to win votes from the uninformed voters. The probability of a party enacting it’s platform is assumed to be an increasing function of the parties share of the vote in the election.

The special interest groups (SIGs) represent a subset of voters with a shared interest in the pliable policies. We assume that the preferences over the pliable policies are distributed entirely independently to those over the fixed characteristics of the parties and therefore the SIG has no aim as a group to influence the outcome of the election, other then that motivated by the pliable policies. SIGs aim to maximise an objective function of the form:

\[
V_j = \varphi(s)W_j(p^A) + [1 - \varphi(s)]W_j(p^B) - C_j^A - C_j^B
\]

(41)

Where \( s \) is the fraction of the vote received by party A, \( \varphi(s) \) is the probability of party A’s platform coming into effect, with \( \varphi'(s) > 0 \). The choice variables of the SIGs; \( C_j^A \) and \( C_j^B \) are the campaign contributions to the two parties.
by SIG $j$. The SIG’s aggregate welfare from a given vector of pliable policies is denoted by $W_j(p^K)$ where $K = A, B$. We take it that the special interests can implicitly communicate to the political parties the relationship between the policies adopted and the quantity of campaign contributions that will be forthcoming.

Grossman and Helpman use this set-up to show a subgame-perfect Nash equilibrium for this two-stage, noncooperative political game. The order of events in the game is as follows; in the first stage the SIGs independently communicate their contribution schedules (relating the amount of contributions to the policy adopted) to the parties, the parties then announce their policies. Once this is done the contributions are paid, the campaign waged and the election takes place. Finally the legislative body meets to implement one of the parties platforms. It is assumed that all promises are honoured and all expectations about future events are accurate.

The definition of an equilibrium used in this model is of a pair of feasible policy vectors (which are the choice variables of the politicians) for parties A and B $(p^A_0, p^B_0)$ and a set of contribution schedules for each SIG (the only choice variable of the SIG in the original GH model) such that the policy vectors maximise the respective parties vote shares, given the choices of the other agents. Also each contribution schedule must be differentiable and non-negative for all possible policy vectors, and for each SIG there will not exist contribution schedules that could lead to a higher level of utility, given the actions of all other parties.
Grossman and Helpman adopt specific functional forms in order to simplify the analysis. I will use these forms in all further analysis. In particular the distribution of fixed preferences $F(\beta)$ is taken to be a uniform distribution where preferences for the fixed policies/characteristics are distributed in the range:

$$\left( -\frac{1}{2f} - \frac{b}{f}, \frac{1}{2f} - \frac{b}{f} \right)$$

(42)

Where $f > 0$ is a parameter representing the diversity of views about the parties (the density of the distribution, a denser distribution meaning a given policy change will have a greater effect on the number of votes won/lost). The parameter $b$ represents voter bias in favour of party A. Therefore the probability of an informed voter voting for party A as perceived by the parties is given by:

$$F[u^i(p^A) - u^i(p^B)] = \frac{1}{2} + b + f[u^i(p^A) - u^i(p^B)]$$

(43)

for $u^i(p^A) - u^i(p^B) \in \left( -\frac{1}{2f} - \frac{b}{f}, \frac{1}{2f} - \frac{b}{f} \right)$

The $H(\cdot)$ function is linear and has the form $H(C^A - C^B) = \frac{1}{2} + b + h(C^A - C^B)$. The parameter $h > 0$ reflects the productivity of campaign spending. This specification is chosen by Grossman and Helpman so that if both parties endorse the same policies and receive the same value of campaign contributions then party A receives $\frac{1}{2} + b$ share of the vote, if $b = 0$ then the parties are equally popular, and both will receive exactly half the total vote, including informed and uninformed voters. Expressed formally, the expected vote share of party A ($s$) using these specific functional forms, combining the decision rule for an informed voter with that of the uninformed voter, is given as:

$$s = b + \frac{1}{2} + (1 - \alpha)f[W(p^A) - W(p^B)] + \alpha h(C^A - C^B)$$

(44)
Where $W(p^K)$ is the average welfare of informed voters when the policy vector is $p^K$.

**Equilibrium with one SIG**  With this framework Grossman and Helpman find results for the political equilibrium with a single SIG. When there is only one SIG, then that SIG can have whatever policies it can afford to buy from the two parties. Grossman and Helpman show that for a given policy vector chosen by the SIG there is a 'participation' constraint’ that must be fulfilled. This constraint is the amount of money required by the party to compensate for the loss of informed voters through changing policy in favour of the SIG. The money is used to persuade an equal or greater number of uninformed voters to vote for the party. The constraint, derived from equation 44, is given as:

$$C^K_j \geq \frac{(1 - \alpha)f}{\alpha h} [W(p^*) - W(p^K)] \quad \text{for } K = A, B \quad (45)$$

Where $p^*$ is the policy vector that maximises this average welfare i.e. the policy vector chosen by either party in the absence of any campaign contributions (hereafter referred to as the benchmark policy). The ratio of informed to uninformed voters is given by $\frac{1-\alpha}{\alpha}$ and the larger this is the more votes the party loses due to a diversion from $p^*$ and the less there is to gain from persuasive campaign spending, therefore political influence is more expensive. The density of the distribution of exogenous political views is measured by the variable $f$, the larger this is, the more informed votes will be lost by diversion from their welfare maximising policy so this is also positively related to contribution size. The more effective is campaign spending (larger $h$) the cheaper is influence. Finally
the further away is the SIG’s chosen policy from the optimum \((W(p^*) - W(p^K))\) is larger), then the more expensive it is to make the political party endorse that policy, as more informed votes will be lost. Grossman and Helpman go on to show that in equilibrium the SIG will make the parties behave as if they were maximising a weighted sum of average informed voter, and SIG member welfare such that a party’s maximisation problem is shown to be:

\[
p^K = \arg \max_p \left[ \varphi^K W_j(p) + \frac{(1 - \alpha)f}{\alpha h} W(p) \right] \text{ for } K = A, B \tag{46}
\]

Therefore the exogenously more popular party (with a greater chance of winning; \(\varphi^K\)) will pander more to the lobby, collecting more campaign funds, whilst the less popular party will adopt a platform closer to the welfare maximising one.

### 4.2.2 The effect of Informative Spending

I will now move on to an analysis of the central original element of this study which is to apply an analysis of informative spending to the Grossman and Helpman model outlined in the preceding sections. The key innovation of this paper being an analysis of how SIGs may use informative spending and campaign contributions simultaneously in their efforts to win favours through the political system. I introduce IS as a stage in the game that takes place before the stages analysed in the Grossman and Helpman model described in the preceding section. Therefore all of the analysis as above is taken as given by SIGs acting through backwards induction to the first stage of the game in which the SIG chooses how much money to spend on informative campaigning.
In this model every SIG has access to a group of uninformed individuals with preferences identical to those of the existing SIG members. By the logic of the model these individuals are not going to be contributing money to the collective cause because they are uninformed. In their 2001 book "Special Interest Politics" Grossman and Helpman define a group member as anyone the group leadership care about (and therefore enter the welfare function of the SIG). Here I impose a stricter definition of what it constitutes to be a group member, namely that only a voter with a "SIG-type" utility function who is informed at the very beginning of the game (with the one period game representing a single election campaign) is a group member (though not all such people need join the group). It is only these voters who are able to contribute money to aid the SIG’s cause and therefore it is these voters who are considered in the groups welfare function. Voters who share a SIG-type utility function but are not contributing are essentially free-riding. Models with multiple periods would help explain differences between groups in their ability to overcome such problems but we will not go into these issues here. This assumption that the newly informed voters are not to be considered proper group members and therefore only help the SIG’s cause indirectly is in fact an unhelpful one in trying to show that Informative spending is a useful strategy for the SIG.

The SIG may spend money on informative spending to convert some fraction of these uninformed individuals with SIG-type utility into informed voters.\textsuperscript{24}

\textsuperscript{24}It is of course a fairly strong assumption that the SIGs informational activities only apply to those who share their interests. The results of this model would still apply if there were 'overspill' so that others with different preferences were also informed, as long as there were
This 'conversion' process takes place according to the following function:

\[ T_j = G(IS_j)n_j^u \]  

(47)

Where \( T_j \) is the total number of converts, \( n_j^u \) is the positive and finite number of uninformed individuals a SIG has access to, and \( G(\cdot) \leq 1 \), is a concave function describing the percentage of these potential converts that are informed as a function of the amount of informative spending by SIG \( j \) (\( IS_j \)).

The effect of IS in this first stage of the electoral influence game is therefore to alter the distribution of informed voters preferences by creating more informed voters with SIG-type preferences, something the politicians must consequently consider when choosing their proposed policy vectors in the later stages of the game.

This process of introducing new voters does lead me to make one change to the Grossman and Helpman model which is to have a large but discrete number of individual voters rather than a continuum of voters as with the original model. This allows me to talk meaningfully about the effects of introducing a discrete number of new individuals with a certain type of utility function into the distribution of informed voters. This change does not alter the analysis\(^25\).

The direct effect of this informative spending is shown in two main ways, still some degree of targeting. It would just be the case that a given level of SIG spending would be less effective.

\(^25\)Grossman and Helpman themselves adopt a slightly different method concerning the distribution of voters in the version of this model published in their 2001 book, which is more similar to the one used here.
changes in the ratio of informed to uninformed voters, and a change in the function describing the utility of the average informed voter. Firstly consider the effect on the ratio of uninformed to informed voters. Informative spending turns one uninformed voter into an informed one, the effect on the total number of informed ($n_I$) and uninformed ($n_U$) voters (where $n_I + n_U = N$ the total number of voters) due to a change in the number of converts ($T_j$) is $\frac{dn_I}{dT_j} = 1$ and $\frac{dn_U}{dT_j} = -1$ respectively. The effect on the ratio of informed to uninformed voters; $\frac{n_I}{n_U}$ (or as employed earlier $\frac{1-\alpha}{\alpha} = \frac{n_I/N}{n_U/N} = \frac{n_I}{n_U}$) is $\frac{d}{dT_j} \left( \frac{n_I}{n_U} \right) = \frac{n_U + n_I}{n_U^2} = \frac{N}{n_U}$ where $N$ is the total number of individuals in the population. We can use this information to consider the effect of informative spending on the weight placed by the political parties on informed voters, which from equation 46 is; $\frac{(1-\alpha)f}{ah}$ which I will label as $z$. The assumption that preferences over pliable policies are unrelated to the fixed preferences means the variable measuring the density of the distribution of exogenous preferences ($f$) is unaffected by informative spending that changes only the distribution of preferences over the pliable policies. The assumption of linearity of the effectiveness of persuasive campaign spending function $H(\cdot)$ means that $h$ is also unaffected by informative spending. Therefore the overall effect is given as:

$$\frac{dz}{dT_j} = \frac{Nf}{n_U^2 h} \hspace{1cm} (48)$$

This is positive, showing that as informative spending increases the ratio of informed to uninformed voters, the weight placed on these informed voters, as shown in equation 46, increase also.

Informative spending also affects the average welfare of the informed voters,
another variable that is important in determining the equilibrium policy, and it’s cost as shown in equations 46 and 45 respectively. With a large but discrete number of voters average welfare for informed voters, for a given policy vector \( p \) is simply \( W(p) = \frac{1}{n_I} \left( \sum_{i \in I} u_i(p) \right) \). This can be split into components for SIG members, and everyone else; \( W(p) = \frac{1}{n_I} \left( \sum_{i \in -j} u_i(p) + W_j(p) \right) \) where \(-j\) is the set of all individuals who are not members of the SIG and \( W_j(p) \) is aggregate SIG welfare. This specification can be further broken down to account for non-SIG members who have SIG-type utility functions, a group which will include those voters newly converted by the SIG’s informative spending:

\[
W(p) = \frac{1}{n_I} \left( W_k(p) + (n_j + v_i)u_j(p) \right)
\]

where \( W_k(p) \) is the aggregate utility of all individuals with a utility function that is different from \( u_j(p) \); which is the SIG-type utility function, \( n_j \) is the number of SIG members, and \( v_i \) is the number of other individuals with SIG-type utility. The effect of informative spending on the number of such individuals is then simply that \( \frac{dv_i}{dT_j} = 1 \).

**Lemma 9** Informative spending will lead to an improvement in the baseline policy \( (p^*) \) for the SIG\(^{26}\).

This highlights the main favourable effect of IS from the SIG’s perspective, by biasing the distribution of informed voters by introducing newly informed individuals with SIG-type preferences the SIG sees an improvement in the baseline policy. These conditions clearly follow from the fairly simple way in which

\(^{26}\text{See the appendix for all proofs to lemmas, propositions etc.}\)
IS is introduced in this model. Given the large number of models of political markets that rely on the split between informed and uninformed voters, I consider this simple specification to be a justified one in analysing the effects of SIGs’ informational role on the political equilibrium.

4.2.3 Informative Spending and Campaign Contributions

Having considered the main effects of informative spending I now wish to analyse the role IS plays in determining the campaign contributions that a SIG will make. The single interest group can effectively have any policy they choose, at a cost. Therefore if the SIG is to find informative spending useful it should allow the SIG to attain it’s policy at a lower cost than through use of campaign contributions alone. The participation constraint in equation 45 gives us the relationship between the policy enacted and it’s costs to the SIG. We saw in Lemma 9 that IS will improve the baseline policy of the politicians in the SIGs favour. It is also the case that the weight placed on the interests of informed voters is increased, as there number is increased by IS. Following on from Lemma 9 we can fully derive the effects of IS on the participation constraint.

**Lemma 10** An increase in the number of informed voters with preferences the same as those of SIG members will reduce the gap between maximum average informed voter welfare $W(p^*)$ and the average informed welfare from the policy chosen by the SIG $W(p^K)$ so that the welfare component of the participation constraint $W(p^*) - W(p^K)$ is reduced.
There are therefore two opposite effects of informative spending on the cost of a given policy preferred by the SIG to the baseline policy. The effect of increasing \( z \) that tends to make a given policy more expensive, and the effect of reducing the welfare gap; \( W(p^*) - W(p) \) that tends to make a policy cheaper.

Having shown the effect of IS on the participation constraint we can now discuss the equilibrium spending on IS.

The level of IS is chosen by the SIG to maximise a modified version of the SIG’s expected welfare function as shown in equation 41 earlier:

\[
V_j = \varphi(s)W_j(p^A(T_j)) + [1 - \varphi(s)]W_j(p^B(T_j))
\]

\[-C_j^A(p^A(T_j), T_j) - C_j^B(p^B(T_j), T_j) - IS_j(T_j)\]

The share of the vote gained by a party \( s \) is taken as given. Recall from equation 47 that \( T_j = G(IS_j)n_j^u \), rearranging this gives \( IS_j = G^{-1}(\frac{T_j}{n_j^u}) \) representing the relationship between the fraction of the total number of available uninformed voters a SIG wants to inform, and the cost of this action. Differentiation of equation 50 with respect to \( T_j \) gives us our equilibrium condition for the amount of money spent on informative spending by a SIG which equates the marginal benefit of IS on the LHS to the marginal cost as shown on the RHS in order to maximise utility:

\[
\varphi(s)\nabla W_j(p^A) \cdot \frac{dp^A}{dT_j} + (1 - \varphi(s))\nabla W_j(p^B) \cdot \frac{dp^B}{dT_j} - \left( \nabla C_j^A(p^A, T_j) \cdot \frac{dp^A}{dT_j} + \frac{dC_j^A(p^A)}{dT_j} \right)
\]

\[- \left( \nabla C_j^B(p^B, T_j) \cdot \frac{dp^B}{dT_j} + \frac{dC_j^B(p^B)}{dT_j} \right) = G^{-1}'(\frac{T_j}{n_j^u}) \frac{1}{n_j^u} \]
Which can be reorganised as:

\[
\frac{dp^A}{dT_j} \left[ \varphi(s) \nabla W_j(p^A) - \nabla C^A_j(p^A, T_j) \right] + \frac{dp^B}{dT_j} \left[ (1 - \varphi(s)) \nabla W_j(p^B) - \nabla C^B_j(p^B, T_j) \right]
\]

\[
- \frac{dC^A_j(p^A)}{dT_j} - \frac{dC^B_j(p^B)}{dT_j} = G^{-1} \left( \frac{T_j}{n^a_j} \right) \frac{1}{n^a_j}
\]

(52)

In the second stage of the game it will be the case that policy is chosen by party A such that \( \nabla C^K_j(p^K, T_j) = \varphi(s) \nabla W_j(p^K) \) (see equation 46) and for party B such that \( \nabla C^K_j(p^K, T_j) = (1 - \varphi(s)) \nabla W_j(p^K) \) meaning that our expression for equilibrium levels of IS reduces to:

\[
- \frac{dC^A_j(p^A)}{dT_j} - \frac{dC^B_j(p^B)}{dT_j} = G^{-1} \left( \frac{T_j}{n^a_j} \right) \frac{1}{n^a_j}
\]

(53)

Which is to say that the utility maximising level of informative spending is one where the marginal cost of the IS equates to the marginal benefit, represented as the direct effect on reducing the campaign spending cost of getting politicians to endorse the chosen policy. This does not represent the entire benefit from IS, but it represents the benefit that could not be obtained by standard contributions. Informative spending is certainly beneficial to a SIG, but to be useful it has to be cost-effective compared to the alternative of campaign contributions. Therefore the thing that counts is the ability of IS to reduce the campaign contribution cost of a given policy.

We can express the left-hand side of this condition for the optimal level of IS in a more extensive form. From equation 45 we have \( C^K_j = z[W(p^*) - W(p_j)] \) for a binding participation constraint\(^{27}\) and defining \( W(p^*) - W(p_j) \) as \( X \) we

\(^{27}\)We discuss the possibility of a non-binding participation constraint when discussing an electoral motive for giving in the appendix.
have $\frac{\partial C^K_j}{\partial T_j} = \frac{dX}{dT_j} z + \frac{dz}{dT_j} X$ which using equations 48 and 49 with Lemma 10, gives us the condition for the marginal benefit of IS;

$$\frac{\partial C^K_j}{\partial T_j} = \frac{n_j f}{n_U h} \cdot \frac{n_k(u_j(p^*) - u_j(p_j)) + W_k(p_j) - W_k(p^*)}{n_j^2}$$

$$+ \frac{Nf}{n_U h} \cdot \frac{1}{n_I} [W_k(p^*) - W_k(p^j) + (n_j + v_i)(u_j(p^*) - u_j(p_j))]$$

Clearly for IS to take a positive value in equilibrium\(^{28}\) it must be the case that the marginal benefit from the strategy is positive, and this requires that the effect on costs in equation 54 takes on a negative value. Simplifying the condition by recalling that $\alpha = \frac{n_U}{N}$ gives:

$$\frac{\partial C^K_j}{\partial T_j} = (\alpha n_k + n_j + v_i) [u_j(p^*) - u_j(p_j)] + (1 - \alpha) [W_k(p^*) - W_k(p_j)] < 0$$

(55)

We have seen already (in the proof for Lemma 10) that $u_j(p^*) - u_j(p_j) < 0$ but also that $W_k(p_j) < W_k(p^*)$ meaning that IS will only reduce the costs of a policy under certain conditions. We can see from equation 55 that the condition for informative spending to reduce the campaign contribution needed to ensure a political party adopts the given policy depends on the difference in utility between $p^*$ and $p_j$ both for those with SIG-type utility functions, and for everybody else, as well as the size of the different groups within the population. As $W_k(\cdot)$ is a function of $n_k$ and because for a given number of

\(^{28}\)See the appendix for full discussion of the condition for equation 52 to represent a utility maximising level of IS.
informed individuals, a rise in $n_k$ means a lower value for $(n_j + v_i)$, IS is more likely to lower costs the smaller is the former, and the larger the latter. The larger is the percentage of uninformed individuals ($\alpha$) the more likely is IS to reduce costs, reflecting the relative reduction in $\frac{d\gamma}{dT} = \frac{Nf}{n^2U}$ as a result of an increase in $n_U$. On the cost side the larger the number of uninformed voters the SIG has access to ($n^u_j$) the lower is the cost of IS. The shape of the $G(\cdot)$ function that describes the percentage of the uninformed cohort that is being informed is also relevant, the larger is $G'(\cdot)$ the cheaper is IS. The $G(\cdot)$ function is assumed to be concave therefore the cost of IS is increasing as more is spent on it.

4.2.4 Group size Analysis

I have shown in the preceding sections that the relative sizes of the different groups in the population (informer, and uninformed, those with SIG-type utility and those without) is important in determining the equilibrium conditions for both campaign contributions and informative spending. In this section I present an analysis of the role of group size in this model.

The importance of group size in determining political influence is often supported in empirical investigations of political markets. For example there is evidence (from the USA, where most work of this type has been conducted) that larger industries are more likely to set up political action committees to channel money to politicians (Stratmann, 2005). Bombardini and Trebbi (2007) find evidence of an n-shaped relationship between the size of a SIG group (in
terms of the number of members) and the size of their campaign contributions, with the smallest and the largest groups giving the least money. Their model relies on SIGs promising the votes of all their members. Stratmann (2005) and Acemoglu and Robinson (2001) suggest that group size is a variable that is consistently important in explaining the type of group that donates to political causes. This is supported by Wearing and Wearing (1990) who found larger groups tend to make larger donations in Canadian politics. Theoretical evidence is perhaps a bit more mixed, providing motivation for a reconsideration of the issue here. Dixit and Londregan (1996) develop a model where group size is of little importance, ideological commitment of a group being the more important factor. On the other hand Stromberg (2002) and Acemoglu and Robinson (2001) both have models where over some range political power increases with group size and for the latter this is an important reason for inefficient forms of redistribution (such as trade policy).

The model developed may also help explain this type of relationship, but for somewhat different reasons, SIGs cannot promise the votes of their members but the relative size of a SIGs spending on IS and campaign contributions is affected by a group’s size. Firstly I wish to consider the role of group size in the original Grossman and Helpman (1996) model, something not analysed in detail in their original paper; before looking at the effect that the introduction of informative spending has to the analysis.

The relationship between group size and the amount of total contributions has both a positive and a negative aspect. I will first deal with the positive
relationship between group size and contributions in two stages. Firstly it is the case that larger groups get a more favourable policy, secondly it is true that a more favourable policy costs more.

A simple way to think of the effect of group size on the policy outcome of the political process is if all informed individuals were in the same SIG (the largest a group can be), the chosen policy would be \( p_j^* \) the SIG’s optimum policy, larger groups tend to get a better policy in this set up, the larger the group is, the more votes there are to be won for the politician by tailoring their policy to suit that group’s needs. Furthermore it is the case that a better policy (all other things equal) will always cost more money. The policy adopted without SIG \( j \)’s participation is the one that maximises the politicians vote share/welfare. The more SIG \( j \) wants to move away from this baseline policy to improve their own position, the more the politician loses and must be compensated with more money in the form of political contributions. For course a larger group can raise more funds if they are able to deal sufficiently well with possible free-rider issues.

There is also a possible negative aspect to the relationship between group size and total contributions that could help explain the n-shaped relationship found by Bombardini and Trebbi (2007). This aspect of the relationship can also be explained in two stages, firstly that groups with an optimal policy close to the baseline policy tend to make smaller contributions, and secondly that larger groups tend to have a preferred policy that is closer to the baseline policy.

Firstly consider the participation constraint in equation 45, it is straightfor-
ward to see that if the SIG chooses $p^K$ so that it is close to the baseline policy $p^*$ then that policy will not cost so much. Groups with optimal policies close to the baseline will only pay for policies that are also close to the baseline policy. It is the case that larger groups tend to have ideal policies close to the baseline policy. Secondly large groups make up a larger portion of the population of informed voters, and therefore are more likely to have an ideal policy close to the ideal for all informed voters. Consider adding another person with the same utility function to a group, making it larger, this would also mean that $p^*$ would move closer to that group’s ideal policy as shown in Lemma 9. This result is similar to that of Abrajano and Morton (2004) who find that the closer is a politician’s policies to those of the median voter’s the less money they will spend on adverts emphasising "style rather than substance".

These two factors affecting the relationship between group size and total campaign contributions therefore have opposite effects. Large groups have more to gain from a policy change, therefore having a more favourable policy in equilibrium and this tends to increase their contributions. But large groups also tend to be have more similarities to the average informed voter’s preferences, tending to reduce their need to make contributions. The n-shaped relationship between group size and contributions is therefore a possibility in the Grossman and Helpman model. This relationship exists for different reasons from those of Bombardini and Trebbi (2007) who rely on SIGs guaranteeing the votes of their members to create a possible negative relationship between group size and contributions across some range. In this case it is simply the representation
of the groups members in the population increasing the likelihood that a large
group is in effect a moderate group, and moderate groups tend to spend less
money in this model.

I now wish to address the role of group size on a SIG’s use of IS as I have
modelled it. Equation 53 gives us the equilibrium condition for use of IS. A
crucial variable in defining the level of IS spending in terms of its cost is $n^u_j$
the number of uninformed agents a SIG has access to as potential converts to
informed voters. As discussed earlier, these individuals are not considered to be
group members in the normal sense, even if they are converted, as they do not
contribute to the efforts of the SIG and are not counted in the SIG’s aggregate
welfare. It does however seem reasonable to imagine that the number of poten-
tial converts is larger for larger groups, possibly reflecting the greater free-rider
problems faced by larger groups (Lohmann, 1998). If it is the case that larger
groups have a larger pool of uninformed voters with SIG-type preferences then
their cost of IS $(G^{-1}'(\frac{T_j}{\pi_j})\frac{1}{\pi_j})$ will be reduced, increasing that groups capacity
for IS\(^{29}\).

With regards to the benefits of IS equation 53 shows us that it is the direct
effect of IS in reducing the necessary campaign contributions for a given policy
$(\frac{dc_{j|p}}{dT_j})$ that is relevant. The key variables relating to group size are $n_j + v_i$
where $n_j$ directly describes the number of group members and $v_i$ is the number

\(^{29}\)This is a similar result to that of Nelson (1974) who finds for product advertising that
brands which provide the highest utility have a greater incentive to advertise their quality.
Here the SIG which represents the larger number of people has a greater incentive to advertise
their work through informative spending.
of informed individuals with SIG-type preferences. A group finds IS has more benefit, the larger is \( n_j + v_i \), by definition a larger group means a larger \( n_j \) which tends to increase the benefit of IS, but how \( v_i \) might be related to group size is less clear. A fuller exploration of this issue would make for interesting further research.

4.3 Conclusion

I have aimed to show in this paper that informative spending can be a valuable tool for some special interest groups. I have used the framework of the Grossman and Helpman "Electoral Competition and Special Interest Politics" (1996) model to show that a pregame whereby SIGs can use informative spending to alter the distribution of the informed voters preferences can benefit some SIGs when they are able to inform a subset of voters with preferences identical to those of the existing SIG members. I believe this to be a strategy that many SIGs, such as trade unions, may use to help inform their membership of the importance of certain issues, and politicians stances on those issues that may otherwise been unaware of. The key originality in this paper is the interaction between the use of IS and the use of standard campaign contributions, with the possibility of IS reducing the cost of a policy in terms of the contributions needed being a key result if IS is to be part of a SIG’s strategy.
5 Appendix to Chapter 2

5.1 Proof of Theorem 1

Proof. Agents will favour an income tax only if it provides a higher utility than a tariff. For an individual in the very low, low or middle productivity groups we have from (9) and (16): 
\[(P^S)^{-1}((1-t)n(t)) + V(L(t)) + g(t) > (P^S)^{-1}(n) + V(L) + g(T).\]
Because it must be the case that if there were no government spending the tariff would be favoured over the income tax because non-importers do not pay the tariff: 
\[(1-t)n(t) + V(L(t)) < n + V(L)\] then for an income tax to be preferred it must be the case that 
\[g(t) > g(T).\]

5.2 Proof of Theorem 3

Proof. For non-importers 
\[W^i(T) = (P^S)^{-1}(\hat{n}^i) + V(\hat{L}^i) + g(T)\]
and 
\[W^i(t) = (P^S)^{-1}((1-t)\hat{n}^i(t)) + V(\hat{L}^i(t)) + g(t)\]
and therefore it is the case that because income for a non-importer is subject to an income tax but not to a tariff then 
\[W^i_n(T) > W^i_n(t)\] i.e. a change in gross income will have a larger effect on utility under a tariff regime then under an income tax regime. Therefore anybody poorer than an agent who is indifferent between the two options, must prefer the income tax.

5.3 Proof of Theorem 5

Proof. First assume that the tax and the tariff rates are such that the same percentage of an importing agent’s income is levied by both: 
\[1 - t = \frac{1}{1+T} \]
therefore \( t = \frac{T}{1 + T} \). Then any agent. In this case both post-tax labour income and leisure demand of high productivity agents will be identical under the two regimes (see equations (4) and (13)). The only factor differentiating utility under the two regimes is the amount of the government funded good provided. As all agents pay the income tax, but only high productivity ones pay the tariff (the income tax has a larger tax base) then the income tax will raise more money and; \( g(t) > g(T) \). Therefore \( U^H(t) > U^H(T) \), the income tax is preferred to the tariff because it leads to a higher utility. Because a higher tariff rate will only lower a rich agent’s utility \( (U^H_T < 0) \) we can say that only a lower tariff rate, and hence an even smaller government size under the tariff in comparison to that under the income tax, could lead to an importer’s preference for the tariff.

6 Appendix to Chapter 3

6.1 Second-order conditions for a maximum

The second-order condition for equation 29 to give utility maximising conditions for \( c^1 \) is as follows:

\[
\frac{d^2W^1}{(dc^1)^2} = (n^1)^2 w_p^1 \left[ I_{qq}^1 (q_m^1)^2 + I_{qmm}^1 \right] + \left[ I_{qmqmm}^1 n^1 \right]^2 w_{pp}^1 < 0 \quad (56)
\]

Sufficient conditions for this to be satisfied for group 1 (for whom \( w_p \) is positive) are if \( I_{qq}^1, I_{qmm}^1 \) and \( w_{pp}^1 \) are all negative. That is to say equation 29 will certainly give a utility maximising value for \( c^1 \) if the utility function,
influence function, and political pressure production functions are all strictly concave.

For group 2 we have;

\[
\frac{d^2W^2}{(dc^2)^2} = -(n^2)^2 w_p^2 [I_{qq}(q_m^2)^2 + I_{qq}^2 m_{mm}^2] - [I_{qq}^2 m_{mm}^2]^2 w_{pp}^2 < 0 \quad (57)
\]

For group 2 (for whom \( w_p \) is negative) this condition will be fulfilled if \( w_{pp}^2 \) is positive and \( q_{mm}^2 \) and \( I_{qq}^2 \) are negative i.e. all the relevant functions are strictly concave.

### 6.2 Slopes of the reaction functions

To analyse the slope of the reaction function consider the impact on the optimality condition shown in equation 29 \( (\frac{\partial w^i}{\partial c^i} = \frac{\partial w^i}{\partial p} \frac{\partial I^1}{\partial q^i} \frac{\partial q^i}{\partial m^i} = 1) \), of an increase in spending, and hence pressure, by the other SIG. Of the three terms in this condition, the marginal productivity of political spending in producing pressure \( (\frac{\partial I^1}{\partial m^i}) \) is unaffected, as is the marginal impact of pressure on influence, thanks to our assumption that \( I_{q^1 q^2}^1 = I_{q^2 q^1}^2 = 0 \). The only effect therefore is on marginal utility of a policy change; \( \frac{\partial w^i}{\partial p} \), which due to the concavity of the utility function will increase in size as the rival SIG exerts more influence, and receives an improved policy, which is a worse policy from our SIGs perspective. If SIG 1 were to do nothing in response to the increase in pressure by SIG 2 it would therefore be the case that \( \frac{\partial w^i}{\partial p} \frac{\partial I^1}{\partial q^i} \frac{\partial q^i}{\partial m^i} > 1 \). To maintain equilibrium it must therefore be the case that the SIG spends more money, produces more pressure, increases its influence, and moves policy in their favoured direction once again.

All these things reduce the size of the components of \( \frac{\partial w^i}{\partial p} \frac{\partial I^1}{\partial q^i} \frac{\partial q^i}{\partial m^i} \) due to the
assumed concavity of all these functions. The same logic applies for SIG 2 in response to an increase in pressure by SIG 1. Therefore reaction functions are upward sloping, an increase in pressure by one group will cause the other group to increase their pressure also, due to the concavity of the utility, influence and pressure functions.

6.3 Proof of Proposition 6

Proof. Optimal spending per member of a SIG is chosen in order to satisfy the condition from equation 32 that \( \frac{\partial w^i}{\partial p^j} \frac{\partial I^i}{\partial q^j} \frac{\partial q^i}{\partial m^j} = 1 \), a larger \( \frac{\partial w^i}{\partial p^j} \) for a given policy must mean that something else in this condition becomes smaller, in order to balance the optimality condition. The \( w(\cdot) \), \( I(\cdot) \) and \( q(\cdot) \) functions are all assumed to be concave in policy, pressure and spending respectively therefore one of these things must increase in order to reduce the size of the marginal condition. As policy can only be improved due to the SIG having more influence, and influence is only increased by more pressure, and more pressure is down to greater spending by the SIG, it follows that the larger is \( \frac{\partial w^i}{\partial p^j} \) the more money the SIG must spend in equilibrium. ■

6.4 Proof of Proposition 8

Proof. Proposition 6 shows that a SIG seeing a higher marginal utility of a policy change will put more resources into influencing the party, but with upward sloping reaction functions, so will the other SIG. If it is SIG 2 who is seeing a higher marginal utility due to a positive interaction, then the optimality
condition for SIG 1; \( \beta_1 \frac{\partial w}{\partial p} \frac{\partial f_1}{\partial q} \frac{\partial q_1}{\partial m} = 1 \) sees the \( \frac{\partial w}{\partial p} \frac{\partial q_1}{\partial m} \) term become smaller as the SIG spends more money to produce more pressure (due to the concavity of the \( I(\cdot) \) and \( q(\cdot) \) functions). Therefore to satisfy the optimality condition it must be the case that the \( \frac{\partial w}{\partial p} \) term becomes larger, which due to the concavity of the \( w(\cdot) \) function and noting that we have assumed \( I_{q_1q_2} = I_{q_2q_1} = 0 \), must mean a less favourable policy for this SIG. This in turn must mean that SIG 2 is getting a better policy proposal. The same logic applies when it is SIG 1 who is seeing the benefit of the interaction with the fixed policy.

### 6.5 The concavity of SIG welfare with respect to the tariff

We consider here the concavity of SIG welfare with respect to the tariff. Prices are linear in the tariff, income share \( \phi^i(\cdot) \) is strictly concave in prices. Differentiation of equation 39 gives:

\[
\frac{\partial^2 W^i}{\partial \tau^2} = w_{Y^iY^i}(\cdot) \left[ -\phi^i(\cdot)M(\cdot) - \phi^i(\cdot)X_2(\cdot)t + Y \frac{\partial \phi^i(\cdot)}{\partial p_2} \right]^2 + \]

\[
\quad w_{Y^i}(\cdot) \left[ \frac{\partial \phi^i(\cdot)}{\partial p_2} ((1-t)X_2(\cdot) - M(\cdot)) - \phi^i(\cdot)M_r(\cdot) + Y \frac{\partial^2 \phi^i(\cdot)}{(\partial p_2)^2} \right] \tag{58}
\]

To analyse the sign of this expression first we note that \( w_{Y^iY^i}(\cdot) \) is negative due to the concavity of the \( w(\cdot) \) function and the first square bracket is squared, so the first term is certainly negative; the increase in income for the relatively labour rich due to a tariff rise, drives down the marginal utility of income. The second term represents the change in the extra income from a tariff. Marginal utility of income \( (w_{Y^i}(\cdot)) \) is positive therefore the second term is negative if
imports \((M(\cdot))\) are sufficiently large relative to home production and the income share function \((\phi'(\cdot))\) is sufficiently concave. For the relatively capital rich the second square-bracketed term is certainly positive if again imports are sufficiently large and the income share function is concave. It must therefore be the case that the second term is larger than the first term in order to show concavity of utility in the tariff for the relatively capital rich group.

7 Appendix to Chapter 4

7.1 Proof of Lemma 9

**Proof.** The baseline policy \((p^*)\) is the one which maximises the average informed voter utility, and therefore satisfies the condition \(\nabla W(p) = 0\). In terms of equation 49 the appropriate expression is \(\nabla W(p) = \frac{1}{n_I}(\nabla W_k(p) + (n_j + v_i)\nabla u_j(p)) = 0\) therefore \((n_j + v_i)\nabla u_j(p) = -\nabla W_k(p)\), within this equality the only variable affected by informative spending is \(v_i\), with \(u_j(p)\) and \(W_k(p)\) assumed concave, this means an increase in \(v_i\) due to IS will mean \(\nabla u_j(p)\) is lower (unless \(\nabla u_j(p) = 0\) i.e. the baseline policy is already at the SIG optimum), reflecting a policy change that increases \(u_j(p)\). ■

7.2 Proofs of Lemma 10

Here I give two proofs of Lemma 10.

**Proof.** Say that \(W(p^*(T_j), T_j) - W(\overline{p_j}, T_j) = X\) where \(\overline{p_j}\) is some given policy that is preferred to the baseline policy by those with SIG-type utility: \(u_j(\overline{p_j}) > \)
\(u_j(p^*)\) and is therefore one that the SIG would pay to acquire. From this we have:

\[
\frac{dX}{dT_j} = \frac{dW(p^*(T_j), T_j)}{dT_j} + \nabla W(p^*) \cdot \frac{dp^*}{dT_j} - \frac{dW(p^*, T_j)}{dT_j}
\]

(59)

where \(\nabla W(p^*) = 0\) by the envelope theorem, leaving:

\[
\frac{dX}{dT_j} = \frac{dW(p^*(T_j), T_j)}{dT_j} - \frac{dW(p^*, T_j)}{dT_j}
\]

(60)

Using the earlier division of \(W(p)\) into components for SIG-type utility and others as shown in equation 49, we have \(\frac{dW(p^*, T_j)}{dT_j} = \frac{n_k u_j(p) - W_k(p)}{n_f^2}\) where \(n_k\) is the number of informed voters without SIG-type utility. Using this specification in equation 60 gives:

\[
\frac{dX}{dT_j} = \frac{n_k (u_j(p) - u_j(p_j)) + W_k(p_j) - W_k(p)}{n_f^2}
\]

(61)

By the definition of \(p_j\) it is the case that \(u_j(p) - u_j(p_j) < 0\) and it is also the case that if \(p^*\) maximises \(W(p) = W_k(p) + (n_j + v_i)u_j(p)\) and \(u_j(p_j) > u_j(p^*)\) then \(W_k(p_j) < W_k(p^*)\). Therefore we show that \(\frac{dX}{dT_j} < 0\).

**Proof.** Let us call the original set of informed voters set A, the newly informed voters with preferences more similar to those of SIG members set B, and the combined set of both groups, set C. Consider the average welfare of groups from the SIGs chosen policy \(p^K\), a policy which SIG members will prefer to \(p^*\) then; \(W^A(p^K) < W^C(p^K) < W^B(p^K)\) and for a fixed \(p^*\); the policy which maximises the average welfare of the members of set A; \(W^A(p^*) > W^C(p^*) > W^B(p^*)\). Comparing the gap between the two we can therefore say that \([W^A(p^*) - W^A(p^K)] > [W^C(p^*) - W^C(p^K)] > [W^B(p^*) - W^B(p^K)]\) showing this gap is reduced for a fixed \(p^*\). However \(p^*\) is not fixed and will also change as

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more informed voters are added. Because the newly informed voters have preferences close to those of SIG members then we know that $p^* \rightarrow p^K$ and therefore that $W(p^*) \rightarrow W(p^K)$ which also leads to a shrinking in $W(p^*) - W(p^K)$.  

7.3 Second-order conditions for Equation 53

Rearrangement of equation 53 gives:

$$G' \left[ n_j^u \left( -\frac{dC_A^j(p^A)}{dT_j} - \frac{dC_B^j(p^B)}{dT_j} \right) \right] \frac{n_j^u}{T_j} = 1$$  \hspace{1cm} (62)

The second derivative with respect to $T_j$ gives us the condition for equation 53 to represent the utility maximising equilibrium level of IS spending:

$$\frac{n_j^u}{T_j} \left[ G''(\cdot)n_j^u \left( -\frac{dC_A^j(p^A)}{dT_j} - \frac{dC_B^j(p^B)}{dT_j} \right) + \right. \left. \frac{G'(\cdot)}{G''(\cdot)} \left( \frac{d^2C_A^j(p^A)}{(dT_j)^2} - \frac{d^2C_B^j(p^B)}{(dT_j)^2} \right) - \left( -\frac{dC_A^j(p^A)}{dT_j} - \frac{dC_B^j(p^B)}{dT_j} \right) \right] \right]$$

$$-G' \left[ n_j^u \left( -\frac{dC_A^j(p^A)}{dT_j} - \frac{dC_B^j(p^B)}{dT_j} \right) \right] \frac{T_j + n_j^u}{T_j^2} < 0$$  \hspace{1cm} (63)

Sufficient conditions for this to hold are that the $G(\cdot)$ function is strictly concave, that $\left( -\frac{dC_A^j(p^A)}{dT_j} - \frac{dC_B^j(p^B)}{dT_j} \right)$ is positive (i.e. IS actual has some effect in reducing the cost of a policy through campaign contributions), and that $\frac{dC_A^j(p^A)}{dT_j}$ and $\frac{dC_B^j(p^B)}{dT_j}$ are also concave.

We can explore the issue of the concavity of the cost functions with respect to the number of newly informed individuals. Equation 45 shows there are two components to cost the weight on informed voters ($z$) and the welfare gap. The second order condition for the $z$ is: $\frac{d^2z}{dT_j^2} = \frac{2Nf}{n_k^h} > 0$ therefore $z$ is in fact convex. However the welfare gap component of the participation constraint $W(p^*) -$
$W(p^K)$ is concave in the number of newly informed voters, $T_j$. Differentiating with respect to $T_j$ we have:

$$\frac{d^2X}{dT_j^2} = -\frac{2\left[n_k(u_j(p^*) - u_j(p_j)) + W_k(p_j) - W_k(p^*)\right]}{n_j^3}$$

which is positive, Lemma 10 shows that the first derivative is negative, therefore the welfare gap is concave in newly informed individuals. Overall in relation to costs we have one component ($z$) that is convex in the number of newly informed individuals due to IS, and another ($W(p^*) - W(p)$) that is concave in them. Therefore to have a unique equilibrium it must be the case that the concave element outweighs the convex element.

### 7.4 Informative Spending and an Electoral Motive

In this section I wish to briefly discuss the difference between an influence and an electoral motive for SIG activity and what role IS has in this. Grossman and Helpman (1996) define an influence motive as one whereby a SIG simply wants to change the platforms chosen by the political parties. An electoral motive is where the SIGs will actively try to increase the vote share of one of the parties. In the first case the participation constraint will be binding, the SIG gives just enough money for the party to adopt their chosen pliable policy vector without changing the parties election prospects. In the case of an electoral motive the SIG may give more than is necessary to get the party to endorse a particular policy vector, in order to improve that parties election prospects. Grossman and Helpman show that this electoral motive will only be in effect for the exogenously more popular party as they are the ones whose platform will be closer to the
SIGs preference (see equation 46). In all the results described above I have ignored this electoral motive, assuming a binding participation constraint and a vote share \((s)\) which is a given from the SIGs perspective. I shall now consider the impact of IS on the vote share of the parties.

Without any campaign contributions the parties would both set their policies to the baseline and get the votes shares \( \frac{1}{2} + b \) for party A and \( \frac{1}{2} - b \) for party B. Therefore the exogenous preference parameter \( b \) decides the vote share. Due to the assumption that preferences over the pliable policies are unrelated to the exogenous preferences, informative spending has no impact on \( b \) and therefore no direct impact on the parties vote share. Informative spending affects the distribution of preferences over the pliable policies only. It is worth noting that a more complicated model where the distributions of the exogenous party preference \( F(\beta) \) and the preferences for the pliable policies \( u^i(p) \) were related then IS could play a direct electoral role by creating newly informed individuals with different exogenous preferences to the existing informed average, thus benefiting one party over another.

Parties vote shares only differ from \( \frac{1}{2} + b \) and \( \frac{1}{2} - b \) if SIGs find an electoral motive for giving excess contributions. Therefore we should consider the effect of IS on this motive. We can in fact show fairly simply that Informative Spending will reduce the chances of SIGs finding an electoral motive for campaign contributions. There are two reasons for this. Firstly Grossman and Helpman (1996) show\(^{30}\) that a necessary condition for an electoral motive to

\(^{30}\)Proposition 5, page 278
ward party A to exist (with a similar condition existing for party B) is that \( \varphi'(s)\alpha h[W_j(p^A) - W_j(p^B)] > 1 \). Therefore an electoral motive is more likely to be in operation the greater the difference between the policies of the two parties, the more effective is campaign spending and the greater is \( \varphi'(\cdot) \) the rate at which the probability of a parties platform being adopted increases with their vote share\(^{31}\). The direct effect of IS is to reduce \( \alpha \), making the condition for an electoral motive less likely to hold.

With regards to the welfare gap caused by differences in the policies of the two parties \( W_j(p^A) - W_j(p^B) \) the policies are chosen to maximise \( \varphi^K W_j(p) + zW(p) \), if SIGs made no campaign contributions the baseline policy \( p^* \) would be adopted by both parties. The larger is \( z \) the weight placed on the welfare of the average voter, the closer is \( p^K \) to \( p^* \) so that as \( z \to \infty \) it is true that \( p^K \to p^* \) and \( [W_j(p^A) - W_j(p^B)] \to 0 \). As analysed previously, one effect of IS is to increase \( z \), therefore reducing the welfare gap and helping make an electoral motive less likely.

\(^{31}\)For example in the case where a party simply requires a majority to be able to adopt their platform with certainty then \( \varphi'(\cdot) \) will be zero for the more popular party that is already going to get over 50% of the votes and there will be no electoral motive.
8 Bibliography

References


