Abstract

This paper examines the rationale for the rules on domestic subsidies in international trade agreements through a framework that emphasizes commitment. We build a model where the policy-maker has a tariff and a production subsidy at its disposal, taxation can be distortionary and the import-competing sector lobbies the government for favorable policies. The model shows that, under political pressures, the government will turn to subsidies when its ability to provide protection is curtailed by a trade agreement that binds tariffs only (policy substitution problem). When factors of production are mobile in the long-run but investments are irreversible in the short-run, the government cannot credibly commit vis-à-vis the domestic lobby unless the trade agreement regulates production subsidies in addition to tariffs (policy credibility problem). We employ the theory to analyze the Subsidies and Countervailing Measures (SCM) Agreement within the WTO system. We show that WTO rules on nullification or impairment solve the policy substitution problem, while serious prejudice rules can address the policy credibility problem in sectors with tariff commitments.

Keywords: Trade Agreements, Trade Policy Credibility, Subsidy Rules, WTO.

JEL Codes: F13, F55, H25, D72.
1 Introduction

The appropriate treatment of subsidies in trade agreements is an issue of continuing debate among practitioners and academics. At the Doha Ministerial Meeting in November 2001, WTO ministers stated that "In the light of experience and of the increasing application of these instruments by Members, we agree to negotiations aimed at clarifying and improving disciplines under the Agreement on Subsidies and Countervailing Measures" (paragraph 28 of the Doha Ministerial Declaration). On the academic side, the purpose and the design of subsidy agreements -namely the regulation of domestic subsidies within the WTO- have been criticized in several recent contributions (Sykes, 2005 and 2010, Bagwell and Staiger, 2006, Bagwell, 2008, Rodrik, 2010).

What is the role of subsidy agreements within international trade treaties? Why do governments value such agreements? And what is the appropriate treatment of subsidies in the multilateral trading system? In this paper, we focus on production subsidies to the import-competing sector and develop a political economy theory to address these questions. Political considerations may support excessive protection for a given sector and trade agreements allow the government to commit to welfare improving policies. But in a political environment where special interests compensate the government for deviations from welfare maximizing policies, it is not clear that the government would be willing to limit its discretion. We argue that, since capital is allocated in anticipation of the protection it may receive, the government can benefit from trade agreements because they prevent the misallocation of capital. Subsidy rules play an important role because they prevent the erosion of gains from reduced tariffs caused by shifting protection from one policy instrument to another.

The role of rules on domestic subsidies in the multilateral trading system has a substantial history in the literature. It has long been recognized that subsidies can be used to achieve domestic policy objectives. Bhagwati and Ramaswami (1963) and Johnson (1965) argue that when taxation does not result in large distortions, a subsidy may be a first-best policy tool that government can use to address market imperfections (such as externalities) that lead to domestic under-production. This is preferable to an import tariff, which has a similar boosting effect on domestic production, but has the cost of distorting consumption. When the taxes required to finance the subsidy are themselves distortionary, a combination of tariffs and subsidies may be the best way to address a domestic market failure.

The above argument, however, disregards the fact that domestic subsidies also have an impact on trade. Since securing market access is arguably a key objective of trade agreements, the omission can be seen as problematic. In the terms-of-trade theory of trade agreements (Bagwell and Staiger, 1999 and 2002) countries bind their tariffs to escape a terms-of-trade driven prisoner’s dilemma. Through an international treaty, signatories lower their tariffs to grant reciprocal, and welfare-enhancing, market access to their trading partners. In the absence of rules on domestic sub-
sidies, however, governments may use these measures to erode market access commitments made in previous tariff negotiations. Furthermore, as trading partners anticipate this incentive, they might be reluctant to accept a tariff cut in the first place, suggesting that there is a role for constraints on a government’s ability to set domestic subsidies.

Taken together, these arguments imply that a subsidy agreement needs to strike a balance between the benefits of government discretion in using domestic subsidies to address market distortions and the need to limit governments’ flexibility as a means to secure market access commitments. Agreements that are too permissive with respect to subsidies can be self-defeating. But agreements that are too strict will be unappealing to governments with justifiable domestic public policy objectives. Within the framework of the terms-of-trade approach to trade agreements, Bagwell and Staiger (2006) show that subsidy rules that are too restrictive could have a "chilling" effect on trade negotiations. Specifically, if under an international treaty welfare-enhancing domestic subsidies could be challenged and removed, a government may prefer not to sign the agreement when it values flexibility more than the trade-liberalizing effect of the tariff reduction.

Terms of trade considerations are not the only reason why countries may value trade policy rules. A separate -and complementary- approach emphasizes the commitment role of trade agreements (Staiger and Tabellini, 1987, Maggi and Rodriguez-Clare, 1998).¹ When a government faces a credibility problem in setting trade policy (for reasons of time-inconsistency or because of political pressures by domestic interest groups), signing a trade agreement can improve welfare as it provides a device to enforce commitments to the efficient policy. Maggi and Rodriguez-Clare (1998) consider a political economy framework à la Grossman and Helpman (1994) where a lobby pays political contributions to the government to obtain tariff protection. When capital is mobile in the long-run but investments are irreversible in the short-run, tariffs distort the allocation of capital between different activities and have long-run negative effects on social and government welfare. For this reason, the policy-maker values an agreement that allows it to commit its trade policy vis-à-vis domestic special interests.²

The economic literature on the commitment approach to trade agreements has for the most part focused on border measures (tariffs and export subsidies) rather than behind-the-border policy tools, such as domestic subsidies and regulations, that constitute the core of government activities. Relevant exceptions include Staiger and Tabellini (1987), who consider production subsidies, and Limao and Tovar (2011), who model non-tariff barriers. This paper contributes to the literature by studying the role and design of rules on domestic subsidies when the problem that the trade agreement is solving is one of policy credibility. An important argument that circulates among

¹Maggi and Rodriguez-Clare (2007) develop a model that combines the terms-of-trade rationale for trade agreements with the commitment approach and formally show the complementary nature of the two theories.

²Staiger and Tabellini (1999) provide evidence that GATT/WTO rules have helped the US government to make trade policy commitments to its private sector. More recently, Tang and Wei (2008) have found that accession to the GATT/WTO increases credibility of policy commitments, particularly for countries with poor domestic governance.
practitioners is that when liberalizing trade, governments may be pressured by special interests into an inefficient use of domestic measures.\textsuperscript{3} Intuitively, import-competing producers lobby for protection as tariffs increase the domestic price of imported goods and boost their profits. Tariffs redistribute income from domestic consumers to protected domestic producers. A trade agreement that lowers import tariffs hurts producers in the import-competing sectors, who have an incentive to lobby for other (domestic) policies that will benefit them. Production subsidies are obvious candidates for such alternative policy measures.\textsuperscript{4} We refer to this as the policy substitution problem. Under political pressures by import-competing sectors, a trade agreement which binds only tariffs may lead a government to set an inefficiently high level of subsidies, thus undoing (at least in part) the trade effects of tariff reduction.\textsuperscript{5} Furthermore, as the level of support granted to the import-competing sector is determined by the tariff and the subsidy, a trade agreement that binds tariffs but leaves complete flexibility on domestic subsidies may not solve the trade policy credibility problem. This is why—we argue—multilateral (WTO) and regional (e.g. EU) organizations supporting economic integration contemplate disciplines on the use of domestic subsidies.

Our first goal is to introduce these considerations into the political economy theory of trade policy. We do this with a modification of the standard "Protection for Sale" model (Grossman and Helpman, 1994). We assume a two-sector small open economy, where the government has at its disposal an import tariff and a production subsidy. Taxation is distortionary. Capital, which is used in the production of both the numeraire and the manufacturing good, cannot be moved across sectors. Manufacturing producers are organized to lobby and exert political pressures on the government to obtain favorable policies. Our simple structure is sufficient to show our first set of results. A tariff-only agreement (i.e. an agreement that binds tariffs, but not subsidies) is subject to the policy substitution problem: in presence of political pressures, governments will turn to subsidies when their ability to impose tariffs is curtailed by a tariff binding. In this environment, a country achieves higher social welfare under a tariff & subsidy agreement (i.e. an agreement that binds both policy measures) relative to a tariff-only agreement.

While insightful, the model with fixed capital allocation suffers from two main problems. First, it does not provide a rationale for a trade agreement. In a political environment where

\textsuperscript{3}WTO (2012) makes this point for non-tariff measures in general and provides preliminary evidence that governments tend to use these tools in sectors with more stringent (applied) tariff. In a book on the treatment of subsidies in the multilateral trading system, Gary Hufbauer makes the following case for international disciplines on subsidies (quoted in Sykes, 2010): "Unbridled and competing national subsidies can undermine world prosperity ... Because the concentrated interests of producers command greater political support than the diffuse interests of consumers, national governments find it much easier to emulate the vices of protection than the virtues of free trade. This lesson has prompted the international community to fashion guidelines that distinguish between acceptable and unacceptable national subsidy measures and to codify these guidelines both in bilateral and multilateral agreements".

\textsuperscript{4}Other policies include different forms of subsidies and government transfers, non-tariff barriers (e.g. protectionist sector-specific regulations), contingent measures (e.g. anti-dumping), etc. While this paper focuses on production subsidies, the logic applies to other measures as well. We come back to this point in the conclusions.

\textsuperscript{5}For a simple model that captures this idea, see Brou and Ruta (2009).
special interests compensate the government for deviations from the welfare maximizing policies, it is not clear that a government will be willing to enter a trade agreement that limits its discretion - even if aggregate welfare is higher. Second, trade agreements are long-run commitments and capital is likely to be mobile across sectors. We, therefore, turn to study an economy as in Maggi and Rodriguez-Clare (1998), where investment decisions are irreversible in the short-run, but capital can move to different uses in the longer term. In this setting, capital allocation anticipates the outcome of the lobbying game between the interest group and the government. This timing does not allow the government to credibly distance itself from the lobby and results in a trade policy credibility problem. The availability of another policy instrument, namely a domestic subsidy, complicates the design of an efficient trade agreement. Intuitively, a tariff-only agreement does not commit the government to the efficient policy mix as it leaves open the policy substitution problem. The government is better off under an agreement that also imposes rules on the use of domestic subsidies because policy credibility vis-à-vis special interests can effectively be restored only under a more complete trade agreement.\footnote{The model that we employ is more general than the basic MRC setting, as it does not rely on specific functional forms and allows for positive tariff bindings.}

Our final step is to examine the proper design of rules on domestic subsidies in light of the commitment approach. We look at the GATT/WTO rules contained in the Subsidies and Countervailing Measures (SCM) Agreement that apply to subsidies to import-competing sectors: nullification or impairment (i.e. non-violation) and serious prejudice complaints. Under nullification or impairment rules, WTO members can challenge subsidies that frustrate access to foreign markets after the agreement has been signed. We argue that this mechanism eliminates the policy substitution problem, as it binds the subsidy at the level existing before a tariff commitment was undertaken. However, non-violation complaints may not suffice to fully eliminate credibility problems when subsidies were inefficiently high at the time the trade agreement was signed. Under serious prejudice rules, WTO members may challenge any subsidy that lowers market access independently of the existence of a tariff binding. When applied within the context of our model, we show that serious prejudice rules are efficient -in the sense that they eliminate policy substitution and credibility problems- when a tariff commitment is in place.

In addition to the papers discussed above, several works provide alternative economic rationales for rules on subsidies in international trade treaties. Agreements that focus on subsidies in isolation have been studied by (among others) Bagwell and Staiger (2001a) and Leahy and Neary (2009). These works assume that governments can only set subsidies (and not tariffs) and look at the effects of subsidy agreements under different hypotheses.\footnote{See Bacchetta and Ruta (2011) for a collection of key contributions on subsidies and the WTO.} Recent works that focus on subsidy rules within trade agreements include Potipiti (2006), Mrazova (2009), Saure (2010), Bagwell and Staiger (2012) and DeRemer (2012). With the exception of the first paper, which focuses on the commitment...
value of export subsidy rules, these studies abstract from the commitment rationale for subsidy rules. An argument that shares some similarities with ours is in Horn, Maggi and Staiger (2010). In their model, the trade agreement is an endogenously incomplete contract and governments choose what policy domain they intend to regulate in the agreement as a result of a basic trade-off between the benefits of a more detailed agreement and the costs associated to writing it (transaction costs). While the framework is very different from ours, they stress that instrument substitutability between tariffs and subsidies may affect the efficient design of an agreement. However, it should be emphasized that the type of substitutability in the two papers is also quite different. In our model, subsidies can be used by governments to boost import-competing sectors’ profits when tariffs are constrained. In Horn et al. (2010) subsidies are exploited as a substitute for terms-of-trade manipulation.

Our work also relates to a second branch of the literature which deals with the choice of border and domestic policies. In particular, our paper is similar to the recent work of Limao and Tovar (2011) who also model the choice between tariff and non-tariff measures. Their primary goal, however, is to explain why governments may use inefficient policy tools to redistribute income towards organized groups when more efficient measures are available (the "inefficient redistribution" puzzle). Our model abstracts from the inefficient redistribution puzzle and allows the non-tariff measure (in our case, a production subsidy) to be a part of the trade agreement to which the government can commit. Finally, Korinek and Serven (2010) show that when the multilateral trading system imposes strict rules on domestic subsidies, governments may use reserve accumulation as a second-best policy to promote a tradable sector characterized by positive learning externalities. While their paper is clearly different from ours, it shares the idea that policy substitution is a concern for the efficient design of international rules.

The paper is organized as follows. Section 2 provides the structure of the model. Section 3 focuses on an economy with a fixed allocation of capital in the two sectors. The long-run value of commitment to tariff and subsidy rules is investigated in Section 4. We analyze the WTO agreement on domestic subsidies in Section 5. Concluding remarks follow.

2 The economic and political structure

This section introduces a simple model that explores the rationale for international agreements that regulate both import tariffs and production subsidies. The model has several salient features: the government’s policy choice can be influenced by special interests; there are two types of measures available to the policy-maker, both of which impose some cost on society: a border measure (a tariff) and a domestic instrument (a production subsidy). Tariffs have the usual distortions while

---

8 Early works, in the context of trade agreements, include Copeland (1990) and Bagwell and Staiger (2001b).
subsidies are funded through costly taxation. Furthermore, the allocation of capital within the economy occurs in anticipation of the process that determines the policy outcome.

Using this set up, we show that there are two related problems which can be addressed by international agreements that regulate both tariffs and subsidies. The first problem is static. In the face of political economy considerations, both the tariff and the subsidy levels may be different from their welfare-maximizing levels. Trade agreements that constrain only tariffs will have opposing effects on aggregate welfare: lower tariffs directly reduce the political distortion, but at the same time induce a lobby representing the interests of the import-competing sector to seek additional protection through a relatively more costly policy tool. We refer to this as the policy substitution problem. The second problem can be thought as an intertemporal problem. Political considerations sustain high protection in a politically organized sector. Anticipating higher returns, capital owners over-invest in the protected sector. The misallocation of capital is costly for the government (and society as a whole). Following the literature, we call the government’s inability to avoid this distortion the trade policy credibility problem. We show that tariff and subsidy agreements are superior to tariff only agreements in addressing these two problems.

Consider a small open economy with two sectors (called, respectively, manufacturing and numeraire) and three factors of production, labor ($l$), capital ($k$), and land ($z$). Each agent is endowed with one unit of labor and population is normalized to 1. The amounts of capital and land are fixed and owned by a subset of the population of measure zero. Capital is used in both sectors so that $k = k^n + k$, where $k^n$ is the capital employed in production of the numeraire, $k$ is the capital used in production of the manufactured good, and $k$ is the total capital endowment for the economy. Similarly, $l = l^n + l$. Land is only used in the numeraire sector.

The numeraire sector produces a good that is freely traded internationally at a price which we normalize to one. Production of the numeraire good requires the technology $x^n = l^n + f(k^n, z)$, where $f$ is a function that is homogenous of degree one. The marginal productivity of capital can be expressed as $\pi^n(k) = f_k(\bar{k} - k, z)$ and represents the per unit rate of return to capital in the numeraire sector, which is increasing in $k$. The rate of return to land is given by $\rho^n(k) = f_z(\bar{k} - k, z)$. In equilibrium, the wage rate will be equal to one.

Production in the manufacturing sector exhibits constant returns to scale in the two factors it uses: labor and capital. It will be useful to express the return to capital in the manufacturing sector, i.e. the quasi-rents or revenue minus labor costs, as $\Pi(p_x, k)$, where $p_x$ is the producer price in manufacturing. Constant returns to scale allow us to write these as $\Pi(p_x, k) = \pi(p_x)k$ so that $\pi(p_x)$ represents the per unit (gross) return to capital in the manufacturing sector. By Hotelling’s

---

9The choice of this constant returns to scale technology allows for two important features. First, the fixed input (land) allows for diminishing returns to capital, which is important for the equilibrium allocation of capital between sectors. Second, production in the numeraire sector picks up any labor not used in the manufacturing sector and simplifies the analysis.
Lemma, equilibrium output is then \( x (p_x, k) = \Pi_p \).

Consumer preferences are quasi-linear and take the form \( y^n + u(y) \), where \( y^n \) and \( y \) are the quantity consumed of the numeraire and of the manufacturing good, respectively. Consumers receive income from labor, tariff revenue and (possibly) from capital and land ownership, and pay taxes to the government. It is straightforward to show that indirect utility is the sum of income net of taxes and consumer surplus, denoted by \( S(p_y) \), where \( p_y \) is the domestic price of manufacturing. By Roy’s Identity, demand for the manufactured good is \( y(p_y) = -S_p \).

The government conducts trade and fiscal policy that affect the import-competing sector. Under free trade, the manufactured good is imported at the international price \( p^* \). The government has at its disposal two policy instruments: a tariff \( t \geq 0 \) and a production subsidy \( s \geq 0 \). Thus, the domestic price of the manufactured good is \( p_y = p^* + t \), while the producer price is given by \( p_x = p^* + t + s \). The government uses tax and tariff revenue to finance the production subsidy and any other expenditures (denoted as \( E \)). We assume that in order to spend 1 unit, the government has to raise \( \lambda \geq 1 \) units. In other words, taxation imposes a deadweight loss to society equal to \( (\lambda - 1) \).\(^{10}\) The government balances its budget,

\[
T + t(y - x) = \lambda(sx + E),
\]

where \( T \) is a lump-sum tax on labor and \( t(y - x) \) is tariff revenue.

Aggregate welfare consists of factor incomes and consumer surplus. Exploiting the fact that, in equilibrium, the wage rate will be equal to one and using the government budget constraint, aggregate welfare is given by:

\[
W = 1 + t(y(p_y) - x(p_x, k)) - \lambda(sx(p_x, k) + E) + \rho^u z + \pi^n(k - k) + \pi(p_x)k + S(p_y).
\]

We assume a simple political structure. Capital owners in the manufacturing sector are organized to lobby the government for favorable policies. The objective of this lobby is to maximize profits net of contributions for its members: \( \Pi - C \), where \( C \) is the aggregate lobbying contribution from the manufacturing sector. Other groups in society, workers and owners of capital in the numeraire sector and landowners, are not able to solve their collective action problem and are not politically organized.\(^{11}\) As in Grossman and Helpman (1994), politicians care about a combination

\(^{10}\) Since the early work of Arnold Harberger in the 1960s, a large body of literature has been devoted to the measurement of dead weight losses of taxation (for a review, see Auerbach and Hines, 2002). In a setting similar to ours, Matschke (2008) assumes that collecting domestic taxes is relatively more costly than collecting trade taxes and finds evidence consistent with this assumption for the US. In her model, imposing a tariff is efficient as tariff revenue lowers the cost of domestic taxation. While the results of our paper do not depend on how costly revenue raising is modeled, our formalization ensures that \textit{laissez faire} is the first-best policy mix (see Lemma 1). This facilitates the comparison of our findings with the rest of the literature on trade agreements.

\(^{11}\) These assumptions are admittedly \textit{ad hoc}. They serve the purpose of setting the stage in favor of protection in the manufacturing import-competing sector, which allows focusing on the driving elements of the model: the distortions created by the lobbying process and the substitutability between the import tariff and the domestic subsidy.
of social welfare and political contributions by the interest group:

\[ G(t, s, k) = W(t, s, k) + aC(t, s, k), \]  

(3)

where we make explicit that government welfare, social welfare and contributions are functions of both the policies and the capital allocation, while \( a \geq 0 \) captures the political bias in the government objective function.\(^\text{12}\)

The timing of the game is as follows. In the first stage, capitalists choose whether to invest their capital in the numeraire or manufacturing sector. Investors are small, non-strategic and are not politically organized (i.e. the lobby is only formed after the capital is invested).\(^\text{13}\) Investment decisions are irreversible so that once investment is made, capital cannot be moved to a different sector. In the second stage, policy is determined as a result of bargaining between the government and the lobby. A trade agreement signed before investment decisions are made (i.e. at stage zero) allows the government to commit to limits on the policies available in the final stage. The model is solved by backward induction.

3 The political economy of import tariffs and domestic subsidies

In this section, we focus first on the policy determination stage, where the allocation of capital across sectors is taken as given. This ‘short-run’ perspective will give us an insight into the role played by rules on tariffs and subsidies within a trade agreement in the presence of political pressures and introduces the *policy substitution problem*.

3.1 Welfare maximizing policy

An important first step is to establish the impact of the policy variables on aggregate welfare (2). Both policies directly increase the producer price and result in an increase in domestic production and returns in the manufacturing sector. In the case of the tariff, there is also a direct impact on tariff revenue, but together with the increase in profits, it is offset by a loss of consumer surplus. In the case of the subsidy, its impact on profits is more than offset by the costly taxation required to raise the subsidies. In both cases, the increased domestic production results in a greater cost of

\(^{12}\)Note that in the Grossman and Helpman (1994) approach adopted in this model, contributions are equally valued by the government and the lobby. While this assumption is reasonable in certain contexts (most notably if contributions consist of cash transfers and there are no limits on lobbying payments), there are policy environments where the non-transferability of utility between the government and the lobby may be a more appropriate representation of reality. See Drazen and Limao (2008) and Limao and Tovar (2011) for a model where contributions do not enter linearly in the government objective function.

\(^{13}\)In the literature of lobbying and trade agreements, the absence of ex-ante lobbying is a common preliminary assumption which allows sharpening the predictions of the theory (see, among others, Maggi and Rodriguez-Clare (1998) and Limao and Tovar (2011)) for a model where contributions do not enter linearly in the government objective function. However, it is well understood that ex-ante lobbying may be relevant at least for certain industries (Maggi and Rodriguez Clare, 2012). We come back to this issue in the Conclusions.
subsidizing this production and in lower tariff revenues. These effects can be seen in the first-order conditions for maximizing aggregate welfare, with respect to tariffs and subsidies, respectively:

\[ W_t = t (y_p - x_p) - \lambda s x_p = 0 \]  

\[ W_s = -(t + \lambda s) x_p - (\lambda - 1) x = 0. \]  

The following lemma follows from the above conditions.

**Lemma 1.** For any capital allocation \( k \), the welfare maximizing policy choice is \((\hat{t}, \hat{s}) = (0, 0)\).\(^{14}\)

Neither policy provides a net benefit to society and it is clear that welfare is maximized by setting both the tariff and the subsidy equal to zero.\(^{15}\)

### 3.2 Politically determined policy

Tariffs and subsidies are chosen in a political economy environment where the government is subject to political pressures. The government and the lobby representing capital owners in the manufacturing sector bargain efficiently over tariff and subsidy policy as well as contributions. We model this as a simple Nash bargaining game in which we assume for simplicity that the government has no bargaining power vis-a-vis the lobby (we discuss the sensitivity of our results to this assumption in Section 4).

Taking the allocation of capital \( k \) as given, the outcome of the bargaining process \((t(k), s(k), C(k))\) is characterized by two conditions. First, the tariff and subsidy are chosen to maximize the joint welfare of government and lobby:

\[ \Omega(t, s, k) = W(t, s, k) + a \Pi(p_x, k), \]  

subject to any constraints on \( t \) and \( s \) imposed by international agreement. Second, contributions are a weighted average of the changes in government and lobby welfare resulting from the distortion of policy:

\[ C(t, s, k) \equiv c(t, s, k)k = \frac{1}{a} [W(0, 0, k) - W(t, s, k)], \]  

\(^{14}\)In fact, the first-order conditions imply a negative subsidy as long as domestic production is positive in the absence of tariffs and subsidies, i.e. \( x(p^*, k) > 0 \), so that the non-negativity constraint on subsidies is binding. This possibility is ruled out because a negative subsidy is attractive in this setting only because it would be a way for the government to raise revenues while ‘avoiding’ costly taxation.

\(^{15}\)In the working paper version of this article, we introduce the possibility of an externality in the production of the manufactured good. In that case, the socially optimal policy will depend on the capital allocation. See Brou and Ruta (2012) Section 5 for further details.
where $c$ is defined as per unit of capital contributions.

We will consider the determination of policy under three alternate regimes: the government has discretion over setting tariffs and subsidies (full discretion); the government has previously committed to a binding ceiling on tariffs with no commitment on subsidies (a tariff-only agreement); and, the government has previously committed to binding ceilings on both policy instruments (a tariff & subsidy agreement).

3.2.1 Full discretion

When the government faces no restrictions on the policy space, the choice of $t$ and $s$ will maximize condition (6). The choice will reflect the costs and benefits of using tariffs and subsidies, respectively:

$$\Omega_t = t(y_p - x_p) - \lambda sx_p + ax = 0$$  \hspace{1cm} (8)

$$\Omega_s = -(t + \lambda s)x_p - (\lambda - 1)x + ax = 0.$$  \hspace{1cm} (9)

These conditions embody the same costs to social welfare discussed in the previous subsection since the government values aggregate welfare. Both conditions, however, are augmented by a term that reflects the political importance of manufacturing profits and has the expected impact of inducing some positive level of support for the manufacturing sector. The policy mix used to provide this protection depends on the distortionary effect of taxation, $\lambda$, relative to the responsiveness of imports to price changes (which we denote as $A \equiv (y_p - x_p)/(y_px_p) > 0$). When taxation is not distortionary ($\lambda = 1$), influencing the subsidy rate is the most convenient way for the lobby to achieve its objective. When $\lambda \geq 1 + \frac{a}{Ax_p}$, taxation is highly distortionary. In this case, tariff protection is the cheaper alternative. When the tax distortion is positive but relatively small, i.e. $\lambda \in \left(1, \lambda_0\right)$, taxation is not very costly. The lobby does not concentrate on just one policy, as it recognizes that it will cost less to induce a positive tariff and subsidy, than concentrating on a single policy dimension.

**Lemma 2.** The equilibrium policy mix under discretion depends on the extent of the tax distortion ($\lambda$):

1. If $\lambda \geq \lambda_0$, then $\bar{s} = 0$ and $\bar{t}(k) = -\frac{ax}{y_p - x_p} > 0$;

2. If $\lambda \in \left(1, \lambda_0\right)$, then $\bar{s}(k) = \frac{1}{\lambda} \left[a - (\lambda - 1)Ax_p\right]x > 0$ and $\bar{t}(k) = -\frac{x(\lambda - 1)}{y_p} > 0$;

3. If $\lambda = 1$, then $\bar{s}(k) = \frac{ax}{x_p} > 0$ and $\bar{t} = 0$;
4. For any $\lambda$, the producer price is greater than under the social optimum: $p_x(k) = p^* + \tilde{t}(k) + \tilde{s}(k) > \tilde{p}_x = p^*$.

Note that the equilibrium producer price is always greater than the international price.\footnote{Note that for $\lambda < \tilde{\lambda}$, the tariff is always greater under the political equilibrium (i.e. $\tilde{t} > \tilde{t}$). This is because $x(\tilde{p}_x, k) > x(p^*, k)$.

16} The extent of the political economy distortion is affected by the parameters of the model. The larger the government bias for contributions (i.e. the higher is $a$) the higher are the tariff and production subsidy that the lobby receives. The political preference accorded to the organized group is constrained by two factors: the distortionary effect of taxation and the responsiveness of imports to changes in domestic prices. When the lobby has the choice of seeking additional returns either by affecting the tariff or the subsidy or both, it concentrates its activity to distort the policy or the policy mix which has a lower social cost.\footnote{These results generalize the findings in Grossman and Helpman (2001, chapter 7) on lobbying when a government has at its disposal multiple policy tools. As a caveat, let us stress here the role of the assumption on the transferability of utility between the government and the lobby implicit in condition (3). As shown in Drazen and Limao (2008) and Limao and Tovar (2011), removing this assumption can generate a different political equilibrium, where lobbying distorts inefficient policies (i.e. policies with higher social cost).

17} This, in effect, is a cheaper way to obtain preferential treatment from the government, because the nature of contributions is "compensating".

3.2.2 Tariff-only agreement

We define a tariff-only agreement as one where the government commits to a binding ceiling on the tariff rate. No restrictions are placed on the other instrument. More formally, assume the government has entered an agreement that imposes a tariff ceiling, $\bar{t}$, such that the equilibrium tariff rate, $t^T$, must satisfy $t^T \leq \bar{t}$. It is clear to see that for any $\bar{t} \geq \tilde{t}(k)$, the ceiling will not be binding and $t^T = \tilde{t}(k)$. Alternately, if $\bar{t} < \tilde{t}(k)$, the ceiling is binding and $t^T = \bar{t}$. Without loss of generality our focus will be on ceilings that are binding.

Intuitively, a tariff-only agreement imposes a binding constraint on the tariff that alters the relative cost of obtaining additional subsidies from the government. If we consider the gross profit of the organized sector, $\Pi$, the two policies are perfect substitutes. Each boosts the return to capital by raising the producer price. But their relative costs, in terms of contributions, are different. When the government has full discretion, the lobby is able to minimize the cost of protection. As the tariff is forced below the level under discretion ($\tilde{t}$), the subsidy becomes more attractive to the lobby.\footnote{Notice from equation (9) that the marginal benefit of a subsidy is greater as $t$ is lower.

18} The lobby must "settle" for the relatively more costly policy mix and the total level of support for the lobby falls. To see this, note that the equilibrium tariff level will be $t^T = \bar{t}$ and the subsidy, which we denote by $s^T(\bar{t}, k)$ is implicitly determined by condition (9). Differentiating the expression yields
\[
\frac{ds_T}{dt} = -\frac{\Omega_{st}}{\Omega_{ss}} = -\frac{(\lambda - a) x_p - (\bar{t} + \lambda s) x_{pp}}{(2\lambda - 1 - a) x_p - (\bar{t} + \lambda s) x_{pp}} < 0,
\]

which is less than one in absolute value. The tariff reduction is followed by a less than proportional increase in the subsidy.\(^{19}\)

Furthermore, the corresponding producer price under a tariff-only agreement, \(p_T^x\), satisfies

\[
p_T^x(k) = p^* + \bar{t} + s_T^x(t, k) < \bar{p}_x(k).
\]

The above discussion is summarized in

**Lemma 3.** For any binding tariff ceiling, \(\bar{t}\), the equilibrium policy mix under a tariff-only agreement consists of a higher subsidy and lower producer price than under full discretion. The producer price (subsidy) is increasing (decreasing) in the tariff ceiling.

We have established some interesting preliminary results. First, while the tariff-only agreement reduces the equilibrium tariff, the subsidy increases in response. The political distortion "relocates" from the tariff to the subsidy. Second, the producer price in a tariff-only agreement falls compared to the full discretion equilibrium. At the full discretion equilibrium, the lobby uses each policy tool up to the point that their costs are the same. In the tariff-only agreement, as the lobby is prevented from using the tariff to its full potential, additional protection comes from the relatively more costly subsidy. Third, the reduction of the tariff moves policy in the direction of the social optimum, but the increase of the subsidy has the opposite effect.

### 3.2.3 Tariff & subsidy agreement

Next, we define a tariff & subsidy agreement as a treaty where the government commits to a binding ceiling on both the tariff and subsidy rates. Specifically, consider an agreement where a tariff ceiling, \(\bar{t}\), is imposed such that \(t^{TS} \leq \bar{t}\) and the subsidy rate is also constrained so that \(s^{TS} \leq \bar{s}\). As above, we restrict our attention to \(\bar{t} < \bar{t}(k)\), so that the ceiling is binding and \(t^{TS} = \bar{t}\). Given \(\bar{t}\), it is clear to see that for any \(\bar{s} \geq s^T(\bar{t}, k)\), the ceiling will not be binding and \(s^{TS} = s^T(\bar{t}, k)\). Alternately, if \(\bar{s} < s^T(\bar{t}, k)\), the ceiling is binding and \(s^{TS} = \bar{s}\). Without loss of generality our focus will be on ceilings that are binding. The policy substitution effect is limited and the lobby is prevented from turning to the alternative - and more costly - source of protection in the form of a subsidy. Both constraints will be binding since at the policy combination \((\bar{t}, \bar{s})\) the lobby would be willing to ‘pay’ the political cost of increasing either policy instrument. Thus we have that the policy enacted

\(^{19}\)One technical problem is that, when \(\lambda > \bar{\lambda}\), so that the subsidy is not used under full discretion, a tariff reduction will result in a positive subsidy only if it is sufficiently large (as can be seen from (9)). We focus on this more interesting case in the remainder of the paper.
under a tariff & subsidy agreement is \((t^{TS}, s^{TS}) = (\bar{t}, \bar{s})\), and it is straightforward to verify that the producer price is lower in this instance than under a tariff-only agreement

\[
p_{x}^{TS} = p^{*} + \bar{t} + \bar{s} < p_{x}^{T}(k). \tag{11}
\]

The reduction in the tariff and the absence of a policy substitution effect unambiguously move policy in the direction of the social optimum.

### 3.3 Welfare effects of agreements

Thus far we have established that, for a given allocation of capital, the combination of \(s\) and \(t\) is greatest under full discretion and falls as constraints are added to the policy space. We now turn our attention to the welfare effects of the different regimes. Using (7), per unit net returns to capital for the lobby are given by

\[
\pi(p_{x}) - c(t, s, k) = \pi(p^{*}) + \frac{1}{\alpha k} [\Omega(t, s, k) - \Omega(0, 0, k)], \tag{12}
\]

where the first term represents the lobby’s welfare at the social optimum and the second term represents the surplus created by the policy distortion. It is straightforward to rank the preferences of the lobby with respect to the different regimes since only the second term varies and it has an unconstrained maximum at \((\bar{t}, \bar{s})\) and a constrained maximum at \((t^{T}, s^{T})\).

Because of the compensating nature of contributions, government welfare is given by \(G(t, s, k) = W(0, 0, k)\). Finally, aggregate welfare is maximized at free trade and diminishes as the government and lobby have more freedom to distort the policy instruments. We summarize the findings of this section in the following

**Proposition 1.** Consider an economy with a fixed capital allocation. A comparison of the social optimum (denoted by \(^*\)), complete discretion (denoted by \(^\sim\)), a tariff-only agreement (denoted by the superscript \(T\)), and a tariff \& subsidy agreement (superscript \(TS\)) yields:

1. \(\bar{p}_{x} = p^{*} \leq p_{x}^{TS} < p_{x}^{T}(k) < \bar{p}_{x}(k)\),
2. \(\pi(p^{*}) \leq \pi(p_{x}^{TS}) - c(\bar{t}, \bar{s}, k) < \pi(p_{x}^{T}(k)) - c(\bar{t}, s^{T}(\bar{t}, k), k) < \pi(\bar{p}_{x}(k)) - c(\bar{t}(k), \bar{s}(k), k)\),
3. \(G(0, 0, k) = G(\bar{t}, \bar{s}, k) = G(\bar{t}, s^{T}(\bar{t}, k), k) = G(\bar{t}(k), \bar{s}(k), k)\),
4. \(W(0, 0, k) \geq W(\bar{t}, \bar{s}, k) > W(\bar{t}, s^{T}(\bar{t}, k), k) > W(\bar{t}(k), \bar{s}(k), k)\).

Proposition 1 establishes a first rationale for subsidy rules on welfare grounds. Political influence distorts policy away from the social optimum. A tariff only agreement leaves open the possibility that lobbies, constrained by limits on tariffs, will target alternative measures and lead to policy substitution between tariffs and subsidies. Subsidy rules in a trade agreement can address this problem.
The above analysis abstracts from two important issues. First, in the short-run the government has no incentive to sign an agreement that limits its discretion (with or without subsidy rules), as contributions by the lobby compensate the government for any reduction in welfare. The question of why policy-makers value commitment is left unanswered. Second, in the long-run capital can move across sectors and is likely to respond to whether it can influence policy. As a result, the equilibrium capital allocation may be different from the one that maximizes the welfare of society. The distortion interacts in a complex way with the political economy considerations of this stage of the game. We turn our attention to these two questions in the next section.

4 The value of commitment

In this section we introduce a political economy rationale for signing a tariff & subsidy agreement. We turn our attention to the first stage of the game when capitalists decide in which sector to invest. This decision is made in anticipation of the policies described in the previous section. Intuitively, more capital will be allocated to the manufacturing sector if greater protection is expected. This is problematic for the government for two reasons. First, the misallocation of capital causes a reduction in aggregate welfare. Second, since lobbying occurs after capital has been allocated, the government receives no compensation for this misallocation. This interaction is at the root of the trade policy credibility problem. The government may want to sign a trade agreement to solve this problem and induce the efficient allocation of capital across sectors. In the absence of such an agreement, it cannot do so credibly because once capital is in place, the government benefits from contributions. In the first subsection we take a closer look at the commitment role of trade agreements in a setting with multiple policy measures. In the second subsection, we show that a tariff-only agreement is not as effective a commitment technology because of the policy substitution between tariffs and subsidies. The value of subsidy rules within trade agreements is that they restore (at least in part) trade policy credibility.

4.1 Investment decisions and the scope of commitment

The capital allocation decision plays a crucial role in understanding the scope for commitment. We want to derive the conditions under which the government is worse off when it has full discretion over policy. Since compensating contributions allow the government to achieve the same level of utility as in the social optimum for a given allocation of capital, then government utility comparisons can be achieved by contrasting the allocation of capital under different regimes.

---

20 Our model includes Maggi and Rodriguez-Clare (1998) as a special case, where there is no labor. Without labor, production in the manufacturing sector depends only on capital and cannot react to changes in policy. As such, a subsidy would not serve as a substitute for a tariff.
Investors anticipate the policy mix and choose the allocation of their unit of capital in one of the two sectors. As the total amount of capital in the economy is fixed at \( \bar{k} \), we have that 
\[
\bar{k} = k + k_n.
\] Recall that the per unit rate of return to capital in the numeraire sector is given by \( \pi^n(k) \), with \( \partial \pi^n / \partial k > 0 \). In the manufacturing sector, instead, the per unit, net return to capital takes the form \( \pi(p_x) - c(t, s, k) \).

First consider the allocation of capital in the absence of lobbying.\(^{21}\) Investors choose the capital allocation anticipating no tariff or subsidy. The return from investing in the manufacturing sector at this stage is, therefore, given by \( \pi(p^*) \). Investors allocate capital across the two sectors up to the point where returns equalize. We define \( \tilde{k} \) as the allocation of capital in the manufacturing sector implicitly determined by the following condition
\[
\pi(p^*) = \pi^n(\tilde{k}).
\] (13)

To ensure that these curves intersect only once, we assume that \( \partial \pi^n / \partial k > (\pi(p^*) - \pi^n(0)) / k \) for all \( k \). Figure 1 represents the allocation.

\textbf{INSERT FIGURE 1 HERE}

The top panel depicts net returns per unit of capital in the numeraire and the manufacturing sectors, while the bottom panel shows social welfare as a function of the amount of capital in manufacturing. Note that the top panel relies on the result from Lemma 1 that the socially optimal policy is to provide no protection regardless of the capital allocation. The bottom panel highlights the fact that the allocation chosen by capitalists coincides with the one that maximizes social welfare. In the absence of market failures and government intervention, the market allocation corresponds to the social optimum.\(^{22}\)

Now consider the allocation when the government has full discretion, as described in Section 3.2. Domestic producers in the manufacturing sector face the price \( \bar{p}_x(k) \). In order to receive this level of support, the lobby must compensate the government for deviating away from the welfare-maximizing policy. In anticipation of the favorable policy, capital is allocated to the manufacturing sector up to the point that its net return per unit is equal to that in the numeraire sector. The equilibrium allocation of capital under full discretion (denoted \( \tilde{k} \)) is implicitly determined by
\[
\pi(\bar{p}_x(k)) - c(\tilde{k}(k), \tilde{s}(k), k) = \pi^n(k),
\] (14)

\(^{21}\) An equivalent interpretation is that the government can credibly commit to the socially optimal level of (zero) tariff and subsidy. The organized group would have no incentive to lobby in this case.

\(^{22}\) Technically, this can be seen by maximizing the aggregate welfare function, evaluated at \( t = s = 0 \), with respect to capital. Applying Euler’s Theorem yields \( \pi(p^*) - \pi^n(\tilde{k}) = 0 \).
and is depicted by the point where the $\pi - \tilde{c}$ schedule intersects the $\pi^n$ schedule in the top panel of Figure 1.

The extent of the scope for commitment is described in the following

**Proposition 2.** Full discretion results in an over-allocation of capital to the manufacturing sector relative to the social optimum, $\kappa > \kappa$. The government unambiguously prefers commitment to full discretion $G(\tilde{t}(\kappa), \tilde{s}(\kappa), \kappa) < G(0,0,\kappa)$.

**Proof.** From Proposition 1, we have that $\pi(\tilde{p}_e(k)) - c(\tilde{t}(k), \tilde{s}(k), k) > \pi(p^*)$ for all $k$. Since $\partial \pi^n / \partial k > 0$, this ensures that $\kappa > \kappa$. The second part of the proposition follows directly from the fact that $\kappa = \arg \max_k W(0,0,k)$ and that compensating contributions ensure that $G(\tilde{t}, \tilde{s}, k) = W(0,0,k)$.

The commitment value is most obvious here because the government has no incentive to provide protection to the manufacturing sector other than to elicit contributions. The welfare maximizing allocation coincides with the allocation of capital when the optimal policy is expected. To the contrary, we see from (14) that discretion induces capitalists to over-invest in the manufacturing sector and reduces government utility, as shown in Figure 1. The government would benefit from committing to any policy that provides a level of support lower than the equilibrium support under discretion and brings the capital allocation closer to its efficient level.

### 4.2 The commitment value of subsidy rules

Now consider the possibility that the politically-motivated government has an option, before investments are made, to sign a tariff-only or a tariff & subsidy agreement. What type of trade agreement will the policy-maker sign? We show that the government will prefer to commit to an agreement that regulates its domestic subsidy policy. Intuitively, the extent to which a policy credibility problem is mitigated depends on how strong a constraint the trade agreement places on the government’s use of trade and domestic policy as a tool for redistributing income to the lobby. An agreement that constrains only the tariff level and imposes no rules on domestic subsidies is subject to the *policy substitution problem*. Capitalists anticipate that a tariff-only agreement allows them to influence the subsidy and, therefore, continue to over-invest in the manufacturing sector. An agreement that constrains both policy instruments protects against this outcome.

In a tariff-only agreement, the policies that the lobby anticipates are given by $t = \tilde{t}$ and $s = s^T(\tilde{t}, k)$. In this case, the allocation of capital (denoted with $k^T$) is implicitly determined by

$$\pi(p^T_e(k)) - c(\tilde{t}, s^T(\tilde{t}, k), k) = \pi^n(k).$$

Notice that the capital allocation varies with the level of the tariff ceiling. In particular, we can write $k^T(\tilde{t})$ with $k^T(\tilde{t}) > 0$. As the tariff ceiling is raised, the lobby is able to extract more
favorable policy which results in greater net returns. Anticipating this, more capital is allocated to the manufacturing sector. It follows directly from Proposition 1 that less capital is allocated to the manufacturing sector under a tariff-only agreement than under full discretion, and \( k^T(\bar{t}) < \bar{k} \) for any binding \( \bar{t} \).

Under a tariff & subsidy agreement, both the tariff and subsidy are constrained by binding ceilings so that \( t = \bar{t} \) and \( s = \bar{s} \). The equilibrium allocation (denoted \( k^{TS} \)) is implicitly determined by the equal returns condition

\[
\pi(p_x^{TS}) - c(\bar{t}, \bar{s}, k) = \pi^n(k).
\]

We let \( k^{TS}(\bar{t}, \bar{s}) \) denote the solution to the equation above. The allocation \( k^{TS} \) is increasing in both ceilings as long as they are binding. Proposition 1 establishes that net returns in the manufacturing sector are lower under a tariff & subsidy agreement than under a tariff-only agreement for any given \( k \). As can be seen in Figure 2, for the same tariff ceiling \( \bar{t} \) and any binding subsidy ceiling, over-investment is greater in the absence of subsidy rules \( (k^T(\bar{t}) > k^{TS}(\bar{t}, \bar{s})) \). Furthermore, aggregate welfare increases as \( \bar{s} \) decreases (the ceiling becomes more restrictive) both because the policy mix and the capital allocation move toward the social optimum. The government is also better off as \( \bar{s} \) decreases.\(^{23}\) As a result we have

**Proposition 3.** (i) Government and social welfare are higher under a trade agreement that binds the tariff and the subsidy than under a trade agreement that binds the tariff only. (ii) The gains from a tariff reduction are decreasing in \( \bar{s} \).

**INSERT FIGURE 2 HERE**

When there is scope for commitment, a politically motivated government will prefer to sign a trade agreement that imposes rules on subsidies along with commitments on the tariff rate. This is also what is best from the point of view of social welfare. An incomplete trade agreement is less efficient as the lobby can work its way around it by influencing the level of the non-committed policy tool, leading to a long-run distortion of investments, for which the government is not compensated. A tariff & subsidy agreement not only results in higher aggregate welfare, as previewed in Proposition 3, but it is also preferred by the policy maker.

Note that we have assumed that the government has no bargaining power and therefore does not share in the surplus created by policy distortions. This assumption, also used by others in

\(^{23}\)Recall that \( G(\bar{t}, \bar{s}, \bar{k}) = W(0, 0, \bar{k}) \) so that \( dG/d\bar{s} = W_k(0, 0, \bar{k})d\bar{k}/ds \). The first term is negative for any \( k > \bar{k} \) and the second term is positive. Similarly, \( dW/d\bar{s} = W_s + W_k d\bar{k}/ds \). The first term is negative for any \( s > 0 \) and the second term is negative.
the context of trade agreements (e.g. Maggi and Rodriguez-Clare, 2007), was helpful in generating stark results because it allowed us to focus on the value of commitment derived from the correction of a long-run misallocation of one of the factors of production. But it is natural to ask if our results are robust to the introduction of government bargaining power. As government bargaining power increases, two considerations arise. First, the government’s incentive to commit decreases directly since it can extract some of the rents from the lobbying game. Restricting its choice of policy would require giving up these lobbying rents. Secondly, as government bargaining power increases, it reduces the rents that accrue to the lobby. This diminishes the net returns in the manufacturing sector and as a consequence the misallocation of capital is smaller as are the gains from commitment. The effect of introducing government bargaining power in our model is then just to limit the scope for government to be willing to sign any kind of agreement. In fact, it can be shown as in Maggi and Rodriguez-Clare (1998), that there is a critical level of bargaining power below which the government benefits from full commitment. Similarly a critical level of bargaining power can be derived for each comparison between agreements. This insight does not add considerably to our analysis so we omit it from the model.

5 Commitment and GATT/WTO rules on domestic subsidies

This section revisits the question of the efficient design of rules on domestic subsidies in the multilateral trading system in light of the commitment theory presented above. The model analyzed in the previous sections highlights two main policy problems related to the treatment of domestic subsidies within trade agreements. First, there exists a policy substitution problem between tariffs and subsidies. If, through a trade agreement, a government commits only to one instrument (the tariff) below its equilibrium level under discretion, the import-competing lobby will demand protection through the uncommitted measure (the subsidy). Policy substitution partially offsets the trade gains from tariff cuts. Second, there is a policy credibility problem. Lobbying pressures by domestic producers lead to inefficiently high tariffs and subsidies. The political distortion induces excessive investment in the protected sector that lowers social (and government) welfare. \(^{24}\) An efficiently designed trade agreement should provide a set of rules that address these problems.

Do GATT/WTO subsidy rules address the policy problems identified in this paper? To answer this question, we need to represent the key features of these rules within the context of our model. To do so, we consider starting from an equilibrium under discretion, imposing a trade agreement and allowing capital to re-allocate. We consider different GATT/WTO approaches to regulating subsidies as different trade agreements consistent with our framework, and compare the outcomes.

\(^{24}\) As discussed in previous sections, the two policy problems are related. Specifically, if the trade agreement does not solve the policy substitution problem, the government cannot credibly commit to its policy.
The GATT/WTO system regulates the use of subsidies. Before the Uruguay Round, two mechanisms were in place that allowed foreign governments to react to domestic subsidies. If the subsidy to domestic producers frustrated (nullified or impaired) market access after a tariff commitment had been negotiated, then the negotiating trading partner could formalize a non-violation complaint. Given a tariff ceiling, $\bar{t}$, and the pre-existing subsidy, $\bar{s}$, a subsidy violates nullification or impairment (NI) rules when it reduces market access as represented by the level of trade flows, $y - x$. We formally define nullification or impairment:

**Definition (Nullification or Impairment).** A domestic subsidy, $s^{ni}$, violates nullification or impairment (NI) rules if and only if $y(p^* + \bar{t}) - x(p^* + \bar{t} + s^{ni}, k) < y(p^* + \bar{t}) - x(p^* + \bar{t} + \bar{s}, k)$, where $\bar{t}$ is the tariff commitment.

Note that, by preserving market access, NI rules constrain the government’s ability to offer a higher subsidy to import competing sectors after the tariff ceiling is imposed, as any $s^{ni} > \bar{s}$ would violate the condition in the above definition. In terms of our framework, NI rules are characterized by the following:

**Lemma 4.** A trade agreement with NI rules is equivalent to a tariff & subsidy agreement with $\bar{s} = \bar{s}(k)$.

In other words, a trade agreement with NI rules only regulates the use of "new" subsidies - i.e. subsidies that the government would offer above and beyond those it offered under full discretion.

The Uruguay Round introduced the Agreement on Subsidies and Countervailing Measures (SCM), which extends WTO subsidy regulation beyond GATT rules. The SCM Agreement revolves around a so-called "traffic light" system. Some subsidies, such as export subsidies, are prohibited ("red light"). All other forms of domestic subsidization are actionable ("amber light") - that is, they are permitted, but can be challenged by affected trading partners. According to SCM Article 5, no member should cause, through the use of any subsidy, adverse effects to the interests of other WTO members. Adverse effects include the old GATT provisions - injury and nullification or impairment - and introduce serious prejudice to the interest of another member as a cause that could legally trigger a reaction by trading partners. Article 6.3 of the SCM Agreement describes four

---


26 It is also true that if the subsidy offered to exporters would cause injury to foreign producers, a trading partner could impose a countervailing duty. Since the focus of our model is on transfers to the importing sector, injury does not apply.

27 The original SCM Agreement also contained a "green light" category of subsidies that could not be challenged (e.g. subsidies to research activities, assistance to disadvantaged regions, green subsidies). This category offered an exception to subsidy commitments in certain pre-specified sectors, independently of their trade effects. In our working paper, we discuss a justification for this exception based on the existence of production externalities. The provision, however, expired in 2000 and has not since been renewed by WTO members.
cases where serious prejudice may arise. Articles 6.3(a) and 6.3(b) are concerned with trade volume effects, suggesting that the effect of the subsidy on the world price is either small or nonexistent (as for small open economies). Namely, these articles deal respectively with the effects on the imports (6.3a) and on the exports (6.3b) of another WTO member. We focus on Article 6.3(a), which provides that serious prejudice may arise when a domestic subsidy displaces or impedes imports of another member into the subsidizer’s market. Importantly, serious prejudice can be invoked in cases where the subsidy was already in place at the time of the tariff negotiation ("old" subsidy), as there is no mention in Article 6.3 of existing tariff commitments. We first provide a definition of serious prejudice based on Article 6.3(a) of the SCM Agreement and then discuss its implications within the model.

**Definition (Serious Prejudice).** A domestic subsidy, $s^{sp}$, violates serious prejudice (SP) rules if and only if $y(p^* + t) - x(p^* + t + s^{sp}, k) < y(p^* + t) - x(p^* + t, k)$.

For a given level of the tariff $t$, any positive subsidy offered to the import-competing sector lowers imports and, hence, is susceptible to creating serious prejudice to other WTO members. Therefore, a strict reading of Article 6.3(a) implies that any such subsidy (if challenged) should be removed. Note also that in Article 6.3 there is no reference to the existence of a tariff commitment. We look first at the effect of SP rules in the absence of a tariff commitment and then focus on the case where such a commitment exists. If the tariff on manufacturing products is not bound in the trade agreement, SP rules create a policy substitution problem from subsidies to tariffs. This is in effect a "subsidy-only agreement". Specifically, the effect of the constraint on the subsidy is to push the lobby of domestic producers to demand support through higher tariff protection. The substitutability between subsidies and tariffs leads to an excessive use of the latter policy as the interest group would relocate its political pressures from the domestic to the border policy. To see this formally, note that the equilibrium subsidy level is $s^{sp} = 0$, while the equilibrium tariff is implicitly determined by condition (8) and denoted by $t^{sp}(0, k) > \bar{t}$. On the other hand, if the tariff is committed in the agreement at $\bar{t}$, then the SP rules are such that the agreement is equivalent to a tariff & subsidy agreement with $\bar{s} = 0$.

**Lemma 5.** If a trade agreement imposes no ceiling on the tariff, the equilibrium policy mix under SP rules consists of $s^{sp} = \bar{s} = 0$ and $t^{sp}(0, k) > \bar{t}$. For any binding tariff ceiling $\bar{t}$, a trade agreement with SP rules is equivalent to a tariff & subsidy agreement with $\bar{s} = 0$.

---

28 Article 6.3(c) may best be thought of in the context of a large economy, whose subsidies change the world price in addition to the domestic price and trade volume. Article 6.3(d) deals with the volume effects of a subsidy in a third-market. The issues contemplated by Articles 6.3(c,d) of the SCM Agreement do not arise in the model developed in the previous sections which assumes a small open economy.
In brief, under the current GATT/WTO rules (nullification or impairment and serious prejudice), "old" and "new" subsidies are both within the scope of the agreement if they are found to create a level of trade distortion.\textsuperscript{29} Policy measures inconsistent with the rules may be challenged via the WTO dispute settlement mechanism. If the complaint is successful, WTO rules require the subsidizing government to remove the subsidy.

In order to assess the desirability of past and present GATT/WTO approaches to subsidies, we compare the outcomes under each regime to those achieved under a tariff-only agreement. As shown in the previous section, because it leaves open the possibility of substituting a production subsidy for the lowered tariff, a tariff-only agreement does not allow the government to credibly commit to a low level of support for the import-competing sector and results in over-investment in that sector. Both aggregate and government welfare are lower than if the government could fully commit to not providing politically motivated support to the import-competing sector.

In the case of NI rules, the government partially overcomes its credibility problem because it effectively imposes a cap on subsidies. As established in Lemma 4, subsidies cannot be higher than they would be under full discretion. The imposition of a tariff binding and NI rules improve over a tariff-only agreement, as they impose a ceiling on the subsidy at $\tilde{s}(k)$, but this set of rules does not fully eliminate the credibility problem. Even in the special case in which the tariff binding is set at its efficient level ($\tilde{t} = \hat{t} = 0$), the policy mix implies a high level of support to the manufacturing sector above the social optimum, which distorts investment decisions. This suggests that rules that intend to limit "new" subsidies have an economic foundation within the commitment approach to trade agreements. However, if the problem that the agreement is trying to solve is one of policy credibility, binding tariffs and limiting "new" subsidies (as nullification or impairment rules do) do not go far enough.

Serious prejudice rules impose a stricter constraint on subsidies. As demonstrated in Lemma 5, any production subsidy is actionable under SP rules. By signing a tariff agreement with SP rules, a government can more credibly commit to not providing politically motivated support for the import-competing sector. Investors have less incentive to over-allocate capital to this sector and both aggregate and government welfare are improved. In fact, the welfare maximizing policy mix of free trade and no subsidy can be implemented by a combination of SP rules and a tariff binding at $\tilde{t} = 0$.

**Proposition 4.** Government and social welfare are higher when an international agreement on

\textsuperscript{29}Of the 456 trade disputes listed in the WTO website for the period 1995-February 2013, 97 (that is, 21.3\%) dealt with subsidies. Most of the cases that relate to domestic subsidies involved large producers (e.g. US -cotton; China -apparel and textile products), but there are also disputes that are targeted at smaller producers, such as the recent dispute on Indian support for solar cells and solar modules production. Moreover, WTO subsidy rules are likely to discourage the use of domestic subsidies in the first place (see Rodrik, 2010), which implies that few disputes are actually observed in equilibrium.
tariff reductions contain NI rules as compared to an agreements that encompasses tariff reductions on their own. In addition, government and social welfare are higher if the trade agreement contains SP rules as compared to NI Rules.

Proof. Follows directly from Lemmas 4 and 5 and Proposition 3.

An interesting policy question is what can be learned about the efficient design of rules on domestic subsidies from both the terms-of-trade and the commitment approach to trade agreements. While these are separate (even if, possibly, complementary) rationales for trade cooperation, there is some overlap in their implications for subsidy rules. Both approaches recognize that non-violation complaints play an important role in the multilateral trading system. Governments have an incentive to revert to subsidies once a tariff commitment has been signed (to manipulate the terms of trade or to redistribute income to organized interests). A ban on "new" subsidies, as implied by nullification or impairment, eliminates this dangerous temptation. This similarity should not be a great surprise, as it derives from the instrument substitutability between tariffs and subsidies. From an efficiency point of view, whether a government distorts the subsidy or the tariff for terms of trade manipulation or for redistributive concerns, rules that limit the use of one measure will affect the policy-maker’s choice of the other.

The key difference between the two theories relates to how strict the constraints on subsidies should be. We can restate this difference in terms of the implications for "old" subsidies. The terms of trade literature argues that too strict constraints on subsidies may not allow the government to address domestic goals and, as a result, governments will be reluctant to enter into agreements at all. These domestic goals can include aggregate welfare improving measures to address domestic externalities, as well as some political economy considerations. Our approach differs in that it finds a justification for stricter constraints that eliminate pre-existing (i.e. "old") subsidies as a way for domestic governments to better commit to policies that prevent the misallocation of resources.

6 Conclusions

This paper revisits the commitment approach to trade agreements when the government has at its disposal a tariff and a production subsidy, the import-competing sector is politically organized and taxation is distortionary. In this framework we establish several results. First, trade agreements that bind tariffs but leave complete government discretion on domestic subsidies create a policy substitution problem that partially offsets the trade and welfare effects of tariff cuts. Second, when a tariff commitment is undertaken, rules that limit the policy-maker’s flexibility in setting subsidies reduce or eliminate the problem. Third, when the political process distorts the long-run allocation

\[ \text{We make a similar argument in the working paper version.} \]
of resources, policy discretion creates a credibility problem. The government prefers a tariff & subsidy agreement rather than a trade agreement that only allows for tariff commitments. Fourth, WTO rules on nullification or impairment only partially solve the policy substitution problem, while serious prejudice rules can solve the policy credibility problem in sectors where there is a tariff commitment.

There is an important caveat to this set of results. The model abstracts from market failures, so it assumes that the economy achieves efficiency under *laissez faire*. Market distortions, however, can be relevant in certain sectors. For instance, in the case of positive production externalities in manufacturing, support to the import-competing sector in the form of positive tariffs and/or subsidies is justified from a welfare perspective. Intuitively, if the government could commit in a trade agreement to the first-best policy mix (i.e. the combination of tariff and subsidy that support the efficient investment in the manufacturing industry), then the policy substitution and credibility problems would be solved. However, real-world trade agreements do not commit governments to a specific policy mix, possibly because information on exact first-best policies is not available at the commitment stage. Rather trade agreements encompass a set of rules and exceptions: rules generally commit the government to a policy mix that guarantees a maximum and binding level of protection; exceptions essentially leave certain sectors out of such broad-based commitments. In the working paper version of this article (Brou and Ruta, 2012), we argue that the role of exceptions to subsidy rules in trade agreements can be rationalized as a second-best institutional arrangement in sectors with relevant market failures when governments cannot commit to a specific policy mix.\(^{31}\)

The model we presented here is based on some simplifying assumptions. First, we assumed the presence of a single lobby. Under the more realistic assumption of multiple sectors and several organized groups, however, the logic of our findings should not change. Intuitively, policy-substitution effects take place within a sector, where a lobby demands higher subsidies once a tariff binding is imposed. Second, the government is assumed to have only two policy tools at its disposal. While this is a step in the right direction, one can correctly argue that several other measures can be taken to guarantee protection. We leave this for future research, and limit ourselves to a simple observation. Trade agreements such as the WTO go indeed in the direction of imposing constraints to the use of non-tariff policies, which is consistent with the need to limit policy-substitution beyond tariffs and subsidies. How far should this process go? In the spirit of Horn, Maggi and Staiger (2010), the degree of incompleteness of the agreement will likely be the result of the trade off between the benefits of rules (here given by the credibility gain) and the transaction costs associated with an increasingly complex contract.\(^ {32}\) Third, we limited ourselves to lobbying to influence day-

\(^ {31}\)Properly identifying the sectors that deserve an explicit exception and embed such loopholes in the multilateral trade system may not be obvious. As noted by Sykes (2005), finding the line that divides a legitimate domestic subsidy from a measure that benefits the interest of an organized group at the expense of society is not always a straightforward matter.

\(^ {32}\)Within the commitment approach, there are other explanations of why various non-tariff measures receive different
to-day policy rather than to influence a trade agreement (ex-ante lobbying). This is reasonable for industries that have not organized at the commitment stage, such as newly born sectors. But what about industries that can influence a trade agreement? While a number of factors may limit ex-ante lobbying (namely, capital can be reallocated in the long-run, which limits the contributions that owners of capital are willing to pay to influence the agreement), one would expect organized industries to obtain less stringent tariff commitments and/or exceptions to subsidy rules. A formal analysis of these issues would likely provide further insights.

References


---

33 Interestingly, in a system such as the EU, where there are no internal tariffs, exceptions to subsidy rules are common. To the contrary, within the WTO system, which allows for positive tariffs, subsidy exceptions are rare (and currently do not apply). Needless to say that, in the absence of relevant market failures, both higher tariff bindings and exceptions to subsidy rules reduce social welfare.


