Trade Agreements and Credibility Gains[*]

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Abstract

The recent theoretical literature on the determinants of trade agreements has stressed the importance of political gains, such as credibility, as a rationale for trade agreements. The empirical literature, however, has lagged behind in the estimation of the economic gains or losses associated with these politically motivated trade agreements. This paper fills that gap by providing estimates of the economic impact of politically and economically motivated trade agreements. We find that credibility gains play a role in increasing the probability of two countries signing an agreement. Moreover, we find that agreements with a strong political motivation are less trade creating than agreements that are signed for pure market access / economic reasons.
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"Economists have always been aware that the determinants of trade policy are deep down political." Dani Rodrik, Handbook of International Economics, vol.3

1 Introduction

The standard theory of trade agreements (TAs) explains their existence as a way of solving terms-of-trade externalities among large countries (Bagwell and Staiger, 1999). By given each other reciprocal concessions countries can internalize the terms-of-trade externalities and achieve a more efficient outcome. Thus, even if economists recognize that trade policy at the national level is mainly explained by politics as the quote to Rodrik (1995) suggests, standard trade models explain TAs exclusively through the internalization of terms-of-trade externalities.

More recently trade theory has incorporated new rationales for TAs where internal politics are an important determinant. In a very influential paper, Maggi and Rodriguez-Clare (1998) explain how government that face time-inconsistency problems in their interactions with domestic lobbies could use the external enforcement provided by TAs to achieve a more efficient outcome for the government. Their idea is simple. In a world where capital is immobile across sectors in the short-run, the government gets compensated by lobbies in the domestic political game for the static distortion induced by trade protection (the consumption and the mobile factor induced production inefficiencies), but not for the capital allocation inefficiencies associated with over-investment in the protected sector. If these allocation inefficiencies are large to the potential static gains from the political game for the government, TAs can be used as an external enforcement to credibly commit to trade reform and avoid the long run misallocation of resources.

Maggi and Rodriguez-Clare (1998) argue that incentives to pre-commit through TAs will be stronger the smaller is the government's weight in the bargaining game with domestic lobbies. Indeed, if governments can extract most of the lobbying rent from the bargaining game, then there will be little overinvestment by producers as they get very little of the net rent. They also show that pre-commitment will be used by governments which are neither

too sensitive or too unaffected by domestic lobbying, as in the former case they will rather extract the lobbying rents and in the second they do not really need external enforcement.

Mitra (2002) shows that Maggi and Rodriguez-Clare (1998) result does no depend on the capital mobility, but it is much more general. Any model where there is a resource cost incurred prior to lobbying through actions taken in the expectation of successful lobbying in the next stage will lead to this result. Mitra (2002) obtains similar results to the ones in Maggi and Rodriguez-Clare (1998) in a model with perfect capital mobility, but where there are fixed costs associated with lobby formation.

More recently Limão and Tovar (2009) explain why commitment to a tariff-bound in TAs[1] can be justified if contributions have a diminishing marginal utility for the government.[2] The reason is again simple. A higher tariff may yield a higher joint surplus in the bargaining game between the government and domestic lobbies. But in the presence of diminishing marginal utility from contributions for the government, this higher tariff that results in higher contributions may actually reduce the share of the government in the total pie. A tariff bound can credibly improve the government's bargaining position and compensate for the fall in the joint surplus. The diminishing marginal utility from lobbies contributions for the government could be justified for example by the long-run misallocation of capital in the setup of Maggi and Rodriguez-Clare (1998).

Maggi and Rodriguez-Clare (2007) found that tariff ceilings will actually be preferred to exact tariff commitments because the former allow for the lobbying game to continue, and therefore for the government to collect contributions after the TA is signed. This in turn reduces the net return to capital in the "wrong" sector which mitigates the overinvestment problem.[3]

In this paper we provide empirical evidence regarding the importance of credibility considerations when signing TAs based on the theoretical predictions of Maggi and Rodriguez-Clare (1998, 2007) and Limão and Tovar (2009). We then explore the potential heterogeneity of

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[1]This is easily linked to WTO's multilateral negotiations, but as we will argue later, it also encompasses bilateral TAs even when what's negotiated involves internal free trade.

[2]See also Drazen and Limão (2008) for a similar result in a more general context.

[3]This is done in a model which allows for both commitment motivated TAs and terms of trade externalities.

the impact on trade flows of credibility-motivated TAs, i.e., are agreements signed for credibility reasons less trade-creating? Theoretically one could expect both results. On the one hand credibility may increase (and the long run misallocation reduced) only in the presence of sufficiently trade-creating TAs, and therefore this will be the type of agreements that governments willing to increase their credibility will sign. On the other-hand, too much trade creation may limit the extent to which the government can extract rents from lobbies in the lobbying game as in Limão and Tovar (2009) or Maggi and Rodriguez-Clare (2007) setting where tariff bounds are preferred to exact tariff commitments.

Results suggest that credibility considerations are an important determinant of preferential TAs. Credibility driven TAs tend to be signed by governments with low bargaining power vis-à-vis domestic lobbies, and there is a u-shape relationship between government's sensitivity to domestic lobby and the probability of signing a TA. This u-shape relationship is particularly present when governments have low bargaining power vis-à-vis domestic lobbies and when small countries sign TAs with larger countries. We also found that credibility motivated TAs tend to lead to less trade creation.

The rest of this article is organized as follows. Section 2 provides a theoretical framework to examine credibility motives for TAs and their impact on trade flows. Section 3 describes the econometric strategy and section 4 discusses the empirical results. Section 5 provides some concluding remarks.

2   Credibility Driven Trade Agreements

In this section we review the empirical predictions in Maggi and Rodriguez-Clare (1988) regarding determinants of credibility motivated TAs and within their setup provide new predictions regarding the extent of trade creation that one might expect in this type of agreements. We start with the determinants of credibility motivated TAs.

Assume a 2 sector 2 factor small open economy that cannot influence world prices. On the demand side, let's assume for simplicity that utility is linear and additive on the numéraire

good to freeze any income effect or substitution effects. On the supply side, let's assume that the numéraire sector produces using capital and land which are both in fixed supply (and both normalized to 1) and a constant returns to scale technology. The returns to capital in the numéraire sector are subject to diminishing returns, which implies that the marginal productivity of capital in the numéraire sector increases with the amount of capital allocated to the manufacturing sector (s_k^m). The manufacturing sector produces using capital only with a one to one technology. Thus, the marginal productivity of capital in the numéraire sector is given by the domestic price of the manufacturing good.

Capital is sector specific in the short run, but not in the long run. We assume that only owners of capital in the manufacturing sector get politically organized to lobby the government for trade protection.[4] They offer the government political contributions in exchange of higher levels of protection. They have mass zero and therefore their share of domestic consumption or lump-sum redistributed tariff revenue is zero. Thus their objective function is simply given by the returns to capital in the manufacturing sector net of the contributions (per unit of capital, c) they offer the government: $L = (p - c)s_k^m$.

The government's objective function is a weighted sum of social welfare and lobbies contributions where social welfare enters the objective function with a weight equal to a, i.e., $V = (1 - a)C + aW$. Thus, the larger is a the less sensitive is the government to lobbies' contributions and the more he cares about social welfare when making trade policy decisions.

The timing of the game is as follows. In the first stage, depending on expected returns to capital in the two sectors, owners of capital decide in which sector to invest. In the second stage the government and the manufacturing lobby engage in Nash-bargaining over trade policy, in which the government bargaining power is given by σ and the lobby bargaining power by $1 - \sigma$.

In such a setup there will be overinvestment in the manufacturing sector in the first stage if capital owners expect the government to be sensitive to lobbies contributions ($a < 1$) in the second stage, and their share of the lobbying game to be sufficiently large (σ not too large).

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[4]Note that we do not allow owners of capital to get organized, and therefore only "short-run" lobbies are part of the political game.

Indeed in such a case they will allocate a larger share of capital to the manufacturing sector than under free-trade, and this will create a production distortion for which the government will not get compensated in the second stage. The only compensation the government will get in the second stage is the one associated with the protection-induced consumption distortion. This uncompensated distortion may create incentives for the government to try to pre-commit to free trade in the first stage even if this implies forgoing the lobby's contributions in the second stage. This will certainly be the case if the bargaining weight of the government is zero ($\sigma = 0$) which implies that lobby's contributions will only just compensate for the consumption distortion, and leave the government worse-off than if it had pre-committed to free trade in the first stage.

On the other hand, if the government enjoys a sufficiently large share of the joint surplus, then this may compensate for the long-run production distortion and the government will prefer not to commit to free-trade and benefit from the large lobby contributions. Actually, if $\sigma = 1$, then there is no overinvestment as all of the joint surplus will be captured by the government, and owners of capital in the manufacturing sector will be left indifferent between their lobbying game returns and the free trade returns ($c = p - p^*$ and therefore $L = p^* s_k^m$). Thus, there are no incentives for owners of capital to invest in the manufacturing sector beyond the level observed at free trade prices.

This yields the first empirical prediction (based on Proposition 2 of Maggi and Rodriguez-Clare (1988): Weak Governments (small σ) have stronger incentives to use TAs as a commitment device.

The second empirical prediction has to do with the relationship between the weight the government grants to social welfare in its objective function, and the value for the government of using a TA as a commitment device, i.e., $G = V^* - V = aW^* - (1-a)C - aW = a(W^* - W) - (1-a)C$. Take the derivative of G with respect to a:

$$G_a = \frac{\partial G}{\partial a} = (W^* - W) - a\frac{\partial W}{\partial a} + C - (1-a)\frac{\partial C}{\partial a} \tag{1}$$

To describe $G(a)$ we proceed in two steps. First, we evaluate G_a at $a = 1$, to obtain $G_a < 0$.

To see this note that if $a = 1$ the last term on the right-hand-side of (1) drops. Also $C = 0$ as the government only cares about social welfare and therefore there is no point in lobbying. This also implies that the welfare level in the lobbying game will be identical to the welfare level under free-trade, i.e., $(W^* - W)$. This implies that when the government puts already a very high weight on social welfare an increase in a will make commitment through a TA less valuable and therefore less likely. The intuition is simple: if the government cares already a lot (exclusively) about social welfare, then there is no need to use TAs as a commitment device.

Second, we evaluate G_a at $a = 0$, to obtain $G_a > 0$ at least for low values of σ. To see this note that if $a = 0$ the right-hand-side in (1) becomes: $(W^* - W) + C - \partial C/\partial a$. The first two terms are positive, and the last term is negative as contributions will increase with a. However, the increase in contributions will be sufficiently small if the bargaining weight of the government in the lobbying game is sufficiently small. Indeed, the increase in contributions will be sufficiently small if σ is small. This implies that $G_a > 0$ when the government puts a very low weight on social welfare and it has a relatively low bargaining weight an increase in a will make commitment through a TA more valuable and therefore more likely.

Thus putting these two results on G_a together we have that when σ is small there is an inverted u-shape relationship between a and the gains from using a TA as a commitment device. Trade agreements are therefore more likely to be used as a commitment device in countries with intermediary values of a when governments are weak. This is proposition 3 in Maggi and Rodriguez-Clare (1988).

We have assumed so far that TAs are perfectly enforceable, but they may not be so. Governments may be tempted to deviate from their commitments in a previously signed TA if the short-run political gains offered by lobbies outweigh the gains associated with respecting the agreement. In other words, for the TA to be enforceable there need to be high costs of exit. The damage to the international reputation of the country will be one example. Others countries will be reluctant to sign agreements with governments which have not respected their TAs obligations in the past. Another is the potential response of the trading partner

which will punish the deviation by its partner by withdrawing market access concessions. In this case, lobbies contributions may compensate for the short-run inefficiencies associated with higher levels of protection, but will not be sufficiently large to compensate for the losses suffered by the partner's trade policy response. These losses will tend to be larger the larger is the size of the partner's market relative to the home market.

Thus our third prediction in terms of determinants of credibility-driven TAs is that a trade agreement is more likely to be used as a commitment device when countries sign agreements with relatively larger partners. This increases the enforceability of the agreement. The reason being that agreements with large members offer substantial market access gains and therefore reduce the incentives to deviate from what was originally agreed.

We finally turn to the impact of credibility-driven TAs on trade flows: are they likely to lead to more or less trade creation? Or put otherwise, are countries seeking to use TAs as a commitment device more likely to sign agreements with partners that will lead to more trade creation? So far we have assumed that the small country was committing to free trade through the TA. In this case the TA will definitely be trade-creating. But other types of TAs that are less trade-creating or even trade-diverting are possible.

In order to illustrate this assume that there are two potential partners with which the domestic government could sign a TA: if signed with partner A then the agreement is fully trade-creating and will lead to the same level of investment in the manufacturing sector as under free trade. If the agreement is signed with with partner B there will be some trade-diversion and therefore some overinvestment in the manufacturing sector.

The trade off for the domestic government is then quite simple. The TA with partner A will result in the socially optimal level of investment in the manufacturing sector, but there will be no contributions from lobbies left, as there will be nothing to bargain over. The TA with partner B, on the other hand, will allow for over-investment in the manufacturing sector, although not as large as under no commitment. Thus the long-run misallocation of resources for which the government is not compensated will be smaller than under no commitment, but larger than if the TA is signed with country A. On the other hand, the agreement with B will

allow the government to receive contributions in the second stage making it more attractive than the agreement with A. In other words a less trade-creating agreement will reduce the size of the pie, but may increase the government's share of this pie and therefore may be more attractive than a pure trade-creating agreement where government's lobbying rents are forgone.

Thus, it seems that whether credibility-driven TAs are more or less trade creating is an empirical question. However, we can expect credibility-driven agreements to be more trade diverting when governments are relatively strong, as they can extract a larger share of the joint surplus from lobbies. This is our fourth and last prediction.

3   Empirical framework

We proceed in two steps. We first estimate the first three predictions of the previous section regarding the determinants of credibility driven TAs and build a measure of credibility motives behind the signing of each agreement. In the second step we test whether the impact of TAs on imports varies depending on whether or not credibility motives are important.

3.1   Testing the credibility motivation

We want to investigate whether, controlling for market access reasons and the political affinity between the two countries, the credibility motivation influences the probability of two countries signing an agreement.

Building on the specification used by Baier and Bergstrand (2004 and 2007) or Egger et al. (2009) to explain trade agreements we add the credibility determinants suggested in the first three propositions above. The basic reduced-form equation to be estimated is then:

$$\begin{aligned}
\text{PTA}_{ijt} \;=\; & \beta_0 + \beta_1 a_{it} + \beta_2 a_{it}^2 + \beta_3(1-\sigma_i)*a_{it} + \\
& \beta_4(1-\sigma_{it})*a_{it}^2 + \beta_5(1-\sigma_{it}) + \beta_6 \text{RS}_{ijt} + \beta_7 \text{RS}_{ijt}*(1-\sigma_{it})*a_{it} \\
& +\beta_8 \text{RS}_{ijt}*(1-\sigma_{it})*a_{it}^2 + \beta_9 \text{MS}_{jt} + \beta_{10}\text{DMS}_{ijt} + \beta_{11}\text{AI}_{ijt} + \beta_{ij} + \beta_t + e_{ijt} \quad (2)
\end{aligned}$$

where PTA_{ijt} is a binary variable indicating whether countries i and j have a trade agreement at time t; βs are parameters to be estimated, where β_{ij} are country-pair fixed effects to control for anything that is country-pair specific such as distance, colonial links, border, etc; β_t are year dummies, which control for global trends (i.e., a new wave of regionalism); a is the weight governments grants to aggregate welfare in country i, and $1-\sigma$ is a measure of government's relative weakenss in the bargaining game with lobbies. Below we describe below how these two important determinants of credibility-driven TAs are measured. Note that a is entered in a quadratic formed as suggested by prediction 2, and interacted with σ as suggested by prediction 3, as well as interacted with RS which captures the relative size of i's market with respect to j's market. MS is the market size of country j as in Meyer (2003),[5] DMS is the absolute value of the difference in market size between countries i and j and AI is the Affinity Index between countries i and j at time t, as in Gartzke (2006) or Baier and Bergstrand (2007); e is the error term.

Because our dependent variable is a binary variable, we use the conditional ML estimation, appropriate for the panel logit model with fixed effects. Fixed effects estimation is possible for the panel logit model, but not for other binary panel models such as probit due to the incidental parameters problem (Cameron e Trivedi, 2005).[6]

Regarding the two important determinants of credibility-driven TAs (government's weakness and welfare mindedness) this is how we measure them. We proxy for the government's bargaining weight relative weakness using two proxies. First a measure of whether the system

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[5]We also use GDP as a robustness check.

[6]The bias if we were to use a probit will be relatively important when t is small relative to ij, which is the case here as t is around 10 and ij around 10,000. This is not the case in other setups such as Egger et al (2009).

is parliamentary or not. We use the World Bank's Political Institutions Database (Beck et al. 2001, 2008) to identify systems other than pure parliamentary systems (the omitted dummy), reasoning that (following the argument of Maggi and Rodrguez-Clare 1998) parliamentary systems are the weakest in terms of executive decision-making. Because coalitions are typically less stable in parliamentary regimes, governments are likely to have less bargaining power and to be more sensitive to political pressure. Tabellini et al have tested this empirically. Second, we also consider as a proxy of government's weakness the margin of opposition in the parliament: a higher margin implies a lower bargaining weight for the government. Additionally, we consider the HH index of sectoral concentration in a country as a proxy for the government's bargaining weight (higher concentration leading to a weaker government), creating a dummy variable for indexes above a certain threshold and interacting it with the a variable.

Regarding the government's welfare mindness (a) we estimate them using the methodology in Gawande, Krishna and Olarreaga (2009). They use information on MFN tariffs and the Grossman-Helpman (1994) "Protection for Sale" to estimate this parameter. The first order condition of government's maximization in the second stage of our game can be written as follows if we were to assume that all s sectors which are import-competing are politically organized:

$$\frac{t_{its}}{1 + t_{its}} = \frac{1 - a_{it}}{a_{it}} \frac{y_{its}}{m_{its}\varepsilon_{is}} \tag{3}$$

where t_{itg} is the MFN tariff in country i at time t in sector s, y is domestic production, m are imports, and ε is the absolute value of the import demand elasticity. One could estimate the country and time varying parameter a_{it} using the cross-sector variation and equation (3). The problem is that many of the right-hand-side variables suffer from endogeneity bias of measurement error (elasticities are estimates provided in Kee, Nicita and Olarreaga (2009) which have an error associated to the point estimates. One solution is to rewrite (3) as

$$\frac{t_{its}}{1 + t_{its}} \frac{\varepsilon_{is}m_{its}}{y_{its}} = \frac{1 - a_{it}}{a_{it}} = \beta_{it} \tag{4}$$

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We use a stochastic version of this equation to estimate $\beta_{it} = (1-a_{it})/a_{it}$.[7] Using this estimate we can then retrieve a which will vary by country and year; it is given by $a_{it} = 1/(1 + \beta_{it})$.

Regarding our first empirical prediction one would expect $\beta_5 > 0$, i.e., weaker governments will sign more trade agreements (for credibility reasons). The second prediction implies $\beta_3 > 0$ and $\beta_4 < 0$. The third prediction implies $\beta_7 > 0$ and $\beta_8 < 0$ These predictions will be tested below.

3.1.1 How important are credibility motivations?

Using the estimates from the conditional ML as in (2) we can then predict the likelihood of observing a trade agreement between two partners at time t:

$$P_{ijt} = \frac{\exp^{\mathbf{x}'\beta}}{\sum_l \exp^{\mathbf{x}'\beta}} \tag{5}$$

where the denominator indicates that the country-pair groups l are being taken into account: the probability modeled by *clogit* is not the unconditional probability $P(Y = 1|X's)$, but the probability of a positive outcome conditional on one positive outcome in the country-pair group. As such, the underlying model has a different intercept for each group (and this intercept is not estimated).

To differentiate between credibility and market-access driven TAs, we calculate the predicted probability of a positive outcome considering only explanatory variables associated with the credibility argument(the $a's$, for example) and denoted $\mathbf{x^c}$:

$$P^c_{ijt} = \frac{\exp^{\mathbf{x^c}'\beta}}{\sum_l \exp^{\mathbf{x^c}'\beta}} \tag{6}$$

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[7]Note that the estimates of a are not only based on the level of tariffs, but also on the import-penetration ratio (m/y) and import demand elasticities, their covariance with tariffs and with each other. As Gawande et al (2009) note the incidence of tariffs in industries with high import demand elasticities (e) reveals the willingness of governments to trade aggregate welfare for contributions (low a). The incidence of tariffs in industries with high import-penetration ratios reveals the same, since distorting prices in those sectors creates large deadweight losses. As such, it is not surprising that the correlation between the estimates of a and average tariff is relatively low (0.3). The estimates indicate that governments of richer countries place a greater weight on a dollar of welfare relative to a dollar of contributions. Their estimates suggest that countries with low as are also those ranked as most corrupt in the Transparency International Corruption Index.

Our indicator of the relative importance of credibility motives behind our overall explanation for trade agreementsis then measured as:

$$\Delta p^c = P^c_{ijt} - P_{ijt} \qquad \text{or} \qquad \hat{p}^c = \frac{P^c_{ijt}}{P_{ijt}} \tag{7}$$

Table 2 present summary statistics and histograms for Δp^c and $\hat{p}^c$.They suggest that South-South agreements tend to be more credibility-driven than North-North agreements.

3.2 Do credibility-driven TAs affect trade differently?

In order to disentangle whether there is some heterogeneity in the way credibility-motivated trade agreements affect imports we will turn to the workhorse of the trade literature: the gravity equation. In order to control for the same variables as in the most recent work on the impact of TAs on bilateral trade flows, we introduce country-pair specific fixed effects. This will control for bilateral distance, colonial linkages, common border or any other geography or time-invariant institutional determinant of bilateral flows (see Carrere, 2006 or Baier and Bergstrand (2007 or 2009). Then we use to alternatives gravity specifications. In the first one we control for the size of the two partners measured by their GDP. In the second specification we use time*importer and time*exporter specific effects which control for any country and year specific effect in the importing and exporting country. This controls for general equilibrium effects such as those affecting trade flows through importer and exporter-country price indices (see Baier and Bergstrand, 2007 or Egger et al., 2009).

We estimated the following two specifications:

$$\ln(m)_{ijt} = \alpha_0 + \alpha_1 (TA)_{ijt} + \alpha_2 \text{TA}_{ijt} \Delta p^c_{ijt} + \alpha_3 \Delta p^c_{ijt} + \alpha_4 \ln\text{GDP}_{it} + \alpha_5 \ln\text{GDP}_{jt}$$
$$+ \alpha_{ij} + \alpha_t + u_{ijt} \tag{8}$$
$$\ln(m)_{ijt} = \alpha_0 + \alpha_1 (TA)_{ijt} + \alpha_2 \text{TA}_{ijt} \Delta p^c_{ijt} + \alpha_3 \Delta p^c_{ijt} + \alpha_{ij} + \alpha_{it} + \alpha_{jt} + u_{ijt} \tag{9}$$

where the αs are parameters to be estimated, m_{ijt} are imports of i from country j at time t,

TA_{ijt} is a dummy indicating whether countries i and j have a trade agreement at time t, α_{ij} are country-pair dummies, α_t are time dummies, α_{it} are importer-year specific effects and α_{jt} are exporter-year specific effects, whereas u_{ijt} is an error term.

The sign of α_3 determines whether credibility-driven trade agreements are more or less trade-creation. If $\alpha_3 > 0$ then creditability driven trade agreements are more trade-creating, and if $\alpha_3 < 0$, then credibility driven trade agreements are less trade-creating.

In order to test our fourth prediction: stronger governments are more likely to sign trade-diverting TAs when signing for credibility reasons, we test for differences in α_3 in North-North, South-South and North-South trade agreements. Assuming governments in developed countries have a stronger bargaining power, we should expect less trade-creation when the importer is a country from the North. We also introduced an interaction term between TA_{ijt}, Δp_{ijt}^c and $(1 - \sigma_{it})$, and expect a negative coefficient on this interaction term.

An important problem with the estimation of (8) and (9 that is emphasized in the work of Baier and Bergstrand (2007 and 2009) and Egger et al. (2009) are the ones of omitted variable bias and selection. Indeed, there may be many unobserved characteristics that are correlated with the decision to form a PTA and this will lead to omitted variable bias in our estimates. Moreover the decision to form a TA may depend on the outcome based on unobserved characteristics for the econometrician but known by governments signing these trade agreements. In this case we will also have selection bias.

We start assuming that there is no selection bias and estimate the impact of TAs and credibility-driven TAs using instrumental variables. We use the three-step estimator in Baier and Bergstrand (2007). In the first stage we estimate the predicted probabilities using the estimates reported in Table 1. In the second stage we run a linear regression of the TA variable on a constant, the predicted probabilities, and all the variables used in the TA and gravity regressions. The third step The third stage involves the estimation of the gravity equation substituting the predicted values from the second-stage regression for TA. According to Wooldridge (2002) this three stage IV estimator is consistent and asymptotically efficient.

In the presence of selection these IV estimates however will be biased. To correct for this

we use Heckman's (1997) procedure for the estimation of treatment effects which are subject to selection and omitted variable bias.

3.3   Robustness checks

To do list:

- other measures of government weakness

- check for zeroes (PPML and Heckman selection) in the gravity

- IV estimates that correct for selection also...

- trade diversion?

- the value of commitment?

- test of essential heterogeneity and LIV estimates...

4   Results

Table 1 presents the results regarding the effect of credibility motivations on the formation of TAs between two countries. More specifically, we test our three predictions resulting from the extended Maggi-Rodriguez Clare model of section 2 and find results that seem to confirm two of them.

The first empirical prediction (weaker governments will sign more trade agreements) is confirmed in columns 4 and 5 using the margin of opposition (fraction of seats held by the opposition parties) as proxy for weak bargaining power by the government vis a vis domestic lobbies - β_5 is positive and statistically significant. Note that the alternative proxy for weak governments (Parliamentary systems) is not a good test of this first prediction since the corresponding dummy variable is necessarily dropped from our estimated results: for all countries, there is no variation in the election system.

Although the second prediction - trade agreements are more likely to be used as a commitment device in countries with intermediary values of a when governments are weak - can not be confirmed by our estimates of β_3 and β_4, which are both statistically insignificant, the third prediction is found to be valid. Indeed, the signs of the coefficients for the interactions $\text{RS}_{ijt} * (1 - \sigma_{it}) * a_{it}$ and $\text{RS}_{ijt} * (1 - \sigma_{it}) * a_{it}^2$ in columns 3 and 5 confirm the expected inverted u-shaped relationship between government's sensitivity to domestic lobby and the probability of signing a TA. Thus, a trade agreement is more likely to be used as a commitment device when countries sign agreements with relatively larger partners.

We revert to Table 2 to examine the impact of credibility-driven TAs on the trade flow between pairs of countries. In both gravity specifications (with country-pair and time fixed effects; and exporter-year, importer-year and country-pair fixed effects), the negative and statistically significant coefficient of rta*ΔP^c suggest that agreements whose formation is driven by credibility reasoning cause less trade creation between two countries than agreements that are driven for economic reasons mostly. This result is specially strong for North-North agreements, which are overall trade creating, but less so once we control for the share of credibility motivations behind their signature (columns 3 and 5).

Finally, Table 3 presents the results of the test of our fourth prediction i.e that credibility-driven agreements are more trade diverting when governments are relatively strong. In our estimations, we consider relatively strong governments to be those where the margin of majority (the fraction of seats held by the government)is greater, and those that are ruled by a Presidentialist system. Even though the later definition (columns 1 and 3) does not allow for a conclusion, the margin of majority proxy (columns 2 and 4) suggest that indeed credibility-driven agreements signed by a strong government are more trade-diverting than those signed by weak governments (the coefficient of the triple interaction majority*ΔP^c*rta is negative and statistically significant).

5   Concluding remarks

In this paper we provided empirical evidence regarding the importance of credibility consider-ations when signing TAs based on the theoretical predictions of Maggi and Rodriguez-Clare (1998, 2007) and Limão and Tovar (2009). Results suggest that credibility-driven TAs tend to be signed by governments with low bargaining power vis-à-vis domestic lobbies, and that there is a u-shape relationship between government's sensitivity to domestic lobby and the probability of signing a TA. We also found that credibility motivated TAs tend to lead to less trade creation.

Those results seem to suggest that there might be more gains from trade agreements than those predicted by standard theory of trade agreements centered in the terms-of-trade motif. As such, even if tariffs levels are already greatly reduced at the multilateral level (and thus terms of trade externalities reduced), there might be additional (political) gains from signing a TA, especially for weak governments of small countries that are constrained by pressure groups at home. Nevertheless, those gains must be compared to a potential reduced trade'creation in order to be considered a truly net gain.

References

[1] Baier, Scott L., and J.H. Bergstrand (2004). "Economic Determinants of Free Trade Agreements". Journal of International Economics, vol. 64, pp. 29-63.

[2] Baier, Scott L. and Jeffrey H. Bergstrand (2007), "Do free trade agreeements actually increase members's international trade?" Journal of International Economics 71(1), 72-95.

[3] Baier, Scott L. and Jeffrey H. Bergstrand (2009), "Estimating the effects of free trade agreements on international trade flows using matching econometrics" Journal of International Economics 77(1), 63-76.

[4] Baldwin, Richard and D.Jaimovich (2009). "Are Free Trade Agreements contagious?"

[5] Cadot, Olivier; J. de Melo and M. Olarreaga, 1999, "Regional Integration and Lobbying for Tariffs Against Nonmembers." International Economic Review 40: 635-658.

[6] Beck, T., G. Clarke, A. Groff, P. Keefer, and P. Walsh (2001), "New Tools in Comparative Political Economy: The Database of Political Institutions", World Bank Economic Review 15(1), 165-176.

[7] Beck, T., P.E. Keefer and G.R. Clarke (2008), Database of Political Institutions, accessible at http://go.worldbank.org/2EAGGLRZ40

[8] Cameron, Colin, and Trivedi, Pradin (2005), Microeconometrics - methods and applications. Cambridge University Press.

[9] Drazen, Allan and Nuno Limã0 (2008). "A bargaining theory of inefficient redistribution", International Economic Review 49(2), 621-657.

[10] Fernandez, Raquel and Portes, Jonathan, (1998). "Returns to Regionalism: An Analysis of Nontraditional Gains from Regional Trade Agreements," World Bank Economic Review, Oxford University Press, vol. 12(2), pages 197-220, May.

[11] Freund, Caroline (2000), "Multilateralism and the Endogenous Formation of Preferential Trade Agreements", Journal of International Economics 52: 359-376.

[12] Gawande, Kishore, Krishna, Pravin, and Olarreaga, Marcelo (2009)."What Governments Maximize and Why: The View from Trade". International Organization 63(3), 491-532.

[13] Grossman, Gene and Elhanan Helpman (1994), "Protection for Sale", American EconomicReview, 84: 833-850.

[14] Grossman, Gene, and E. Helpman (1995), "The Politics of Free-Trade Agreements", American Economic Review 85: 667-690.

[15] Heckman, James J. (1997), "Instrumental Variables: A Study of Implicit Behavioral Assumptions Used in Making Program Evaluations", Journal of Human Resources 32(3), 441-462.

[16] Mansfield, E.D. and E. Reinhardt (2003). "Multilateral Determinants of Regionalism: The Effects of GATT/WTO on the Formation of Preferential Trade Agreements". International Organization, vol. 57, pp. 829-862.

[17] Limão, Nuno and Patricia Tovar (2009). "Policy choice: theory and evidence from commitment via international trade agreements", NBER #14655.

[18] Maggi, Giovanni and Andres Rodriguez-Clare (1998), "The value of trade agreements in the presence of political pressures", Journal of Political Economy 106(3): 574-601.

[19] Maggi, Giovanni and Andres Rodriguez-Clare (2007), "A political economy theory of trade agreements", American Economic Review 97(4), 1374-1405.

[20] Mayer, Thierry (2009), Market Potential and Development.CEPII Working Paper, N2009-24, October 2009

[21] Mitra, Devashish (2002), "Endogenous political organizations and the value of trade agreements", Journal of International Economics 57, 473-485.

[22] Ornelas, Emmanuel (2005), "Trade-Creating Free Trade Areas and the Undermining of Multilateralism"; European Economic Review 49: 1717-1735

[23] Rodrik, Dani (1995)....

[24] Staiger, Robert (1995), "International Rules and Institutions for Cooperative Trade Policy"; in G. Grossman and K. Rogff, eds., Handbook of International Economics, vol. 3, North Holland.

[25] Staiger, Robert and Guido Tabellini (1987), "Discretionary Trade Policy and Excessive Protection"; American Economic Review 77: 823-837

[26] Whalley, John, 1996, "Why do countries seek regional trade agreements?", NBER working paper 5552, Boston.

[27] Wooldridge, Jeffrey M. (2002), Econometric Analysis of Cross-Section and Panel Data. Cambridge, MA: MIT Press.

Data Appendix

We use the Preferential Trade Agreements Database from the Peterson Institute for International Economics and the World Trade Institute (WTI), constructed using the notifications of the date the agreements entered into force. The database contains 570 agreements in the period 1948 - 2007; of these, 329 agreements were still in force in 2007. We limit the period of investigation to 1988-2000 due to the availability of data on the explanatory variable a. A total of 1319 country-pair trade deals are registered up to 2000, but just 1134 are still in force or signed for later implementation. That means that around 11% of the pairs of countries are covered by some sort of trade agreement in the year 2000. Among these agreements, 65% are classified as pure Free Trade Agreements (FTAs), and the others are partial scope agreements, currency unions and others.For our analysis we will use all types of registered agreements. In Appendix 1 we present the total number of FTAs signed by each country in the sample. We have 6026 country-pairs in the final sample (where a is not missing value in at least 1 year)

All political-related data (whether the system is Parliamentary or Presidentialist, the margin of majority of the government in Congress etc) come from the World Bank database of Political Institutions (Beck, 2008). Data on the Real Market Potential of countries, which we use to proxy for market size, is from Mayer (2007). Appendix 1 contains a summary of statistics for all variables used. The Affinity of Nations Index (1946-2002) measures the interest similarity among pairs of countries, based on the votes in the United Nations General Assembly (Gartzke, 2006).

	(1)	(2)	(3)	(4)	(5)
Welfare mindedness	-0.000830	0.000257	0.000279	-0.000748	0.000369
(a)	(0.000804)	(0.00373)	(0.00382)	(0.00196)	(0.00178)
Welfare mindedness-squared	2.44e-10	-7.60e-11	-8.24e-11	2.20e-10	-1.09e-10
(a^2)	(2.83e-07)	(3.54e-06)	(6.25e-06)	(6.08e-07)	(4.16e-07)
a*Parliament		0.00151	0.00293		
		(0.00416)	(0.00416)		
a^2*Parliament		-8.47e-07	-1.59e-06		
		(3.60e-06)	(6.25e-06)		
Relative size (j/i)			-0.879*		-1.419**
(RS)			(0.520)		(0.00152)
a*Parliament*RS			0.00170***		
			(0.000619)		
a^2*Parliament*RS			-8.67e-07***		
			(3.25e-07)		
Market size of partner	4.69e-08**	5.07e-08***	5.81e-08*	4.33e-08**	5.75e-08***
(MS_j)	(1.85e-08)	(1.48e-08)	(3.12e-08)	(2.19e-08)	(2.12e-08)
Abs. value of size difference	0.219	0.226	0.215	0.194	0.165
(DMS)	(0.210)	(0.185)	(0.264)	(0.185)	(0.197)
UN Affinity Index	2.414*	2.471**	3.231**	1.548	2.639*
(AI)	(1.361)	(1.201)	(1.487)	(1.560)	(1.581)
Margin of opposition				4.134**	3.963**
				(1.651)	(1.811)
a*Margin of opposition				-0.00279	-5.03e-05
				(0.00490)	(0.00400)
a^2*Margin of opposition				6.62e-07	-1.38e-06
				(2.09e-06)	(1.29e-06)
a*Margin of opposition*RS					0.00358**
					(0.00152)
a^2*margin of opposition*RS					-1.78e-06***
					(6.36e-07)
Observations	936	936	936	921	921
Number of countrypair	138	138	138	138	138

[a]All regressions are estimated using a ML conditional logit. Bootstrapped standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 2: The impact of credibility-driven TAs on imports[a]

	(1)	(2)	(3)	(4)	(5)
	log of imports	log of imports	log of imports	log of imports	log of imports
rta	0.278***	0.278***		0.102*	
	(0.0536)	(0.0455)		(0.0576)	
ΔP^c	-0.0756	-0.0756	-0.0764	0.0305	0.0291
	(0.0632)	(0.0619)	(0.0632)	(0.0953)	(0.0954)
rta*ΔP^c	-0.269**	-0.269***		-0.323**	
	(0.132)	(0.101)		(0.143)	
log of GDP of importer	1.656***	1.656***	1.654***		
	(0.0930)	(0.140)	(0.0931)		
log of GDP of exporter	1.220***	1.220***	1.228***		
	(0.0823)	(0.155)	(0.0825)		
NSrta			0.443***		0.227*
			(0.131)		(0.137)
SNrta			0.269**		0.0288
			(0.111)		(0.119)
NNrta			0.274***		0.115
			(0.0785)		(0.0852)
SSrta			0.142		0.0334
			(0.138)		(0.143)
NNrtaΔP^c			-0.276*		-0.407**
			(0.161)		(0.186)
SSrtaΔP^c			-1.083***		0.143
			(0.407)		(0.421)
NSrtaΔP^c			0.142		-0.614
			(0.440)		(0.493)
SNrtaΔP^c			-0.0636		-0.278
			(0.256)		(0.254)
Constant	-62.30***	-62.60***	-62.44***	10.53***	7.484***
	(3.126)	(5.829)	(3.133)	(0.412)	(0.536)
Observations	16410	16410	16410	16410	16410
R-squared	0.163	0.163	0.163	0.334	0.334
Number of countrypair	3123	3123	3123	3123	3123

[a]All regressions are estimated using a OLS. Bootstrapped standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The last two columns include importer*year and exporter*year fixed effects.

Table 3: Testing the fourth prediction[a]

	(1) r log of imports	(2) r log of imports	(3) r3 log of imports	(4) r3 log of imports
log of GDP of importer	1.580***	1.611***	1.651***	1.653***
	(0.184)	(0.202)	(0.151)	(0.163)
log of GDP of exporter	1.345***	1.359***	1.218***	1.223***
	(0.147)	(0.176)	(0.172)	(0.164)
rta	0.363***	0.470***	0.269***	0.400***
	(0.0777)	(0.108)	(0.0639)	(0.101)
ΔP^c	-0.00522	-0.134*	0.0491	-0.671***
	(0.0251)	(0.0730)	(0.0712)	(0.181)
rta*ΔP^c	-0.0764*	-0.0348	-0.290***	-0.150
	(0.0393)	(0.0315)	(0.0968)	(0.110)
Presidential	0.459***		0.296***	
	(0.145)		(0.110)	
Presidential*rta	0.00702		0.0273	
	(0.175)		(0.118)	
Presidential*ΔP^c	-0.171***		-0.274*	
	(0.0459)		(0.143)	
Presidential*ΔP^c*rta	-0.0245		-0.275	
	(0.0951)		(0.320)	
margin of majority		-0.0189		0.135
		(0.164)		(0.0976)
majority*rta		-0.222		-0.226
		(0.160)		(0.171)
majority*ΔP^c		0.126		1.042***
		(0.118)		(0.284)
majority*ΔP^c*rta		-0.107**		-0.550**
		(0.0528)		(0.262)
Constant	-63.81***	-64.77***	-62.52***	-62.66***
	(5.699)	(7.330)	(6.162)	(6.562)
Observations	14543	14362	16410	16218
R-squared	0.163	0.160	0.164	0.163
Number of countrypair	3053	3050	3123	3120

[a]All regressions are estimated using a OLS. Bootstrapped standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Essential Heterogeneity test

	(1) log of imports	(2) log of imports	(3) log of imports	(4) log of imports
p	-0.106	-0.810	-0.773	-1.169
	(0.881)	(1.312)	(1.342)	(1.668)
p^2		0.529***	0.00506	1.502
		(0.204)	(0.943)	(3.293)
p^3			0.410	-2.391
			(0.691)	(5.580)
p^4				1.561
				(2.994)
F-test	chi2(1) = 0.01	chi2(2) = 6.74	chi2(3) = 8.77	chi2(4) = 10.97
	Prob > chi2 = 0.9042	Prob > chi2 = 0.0344	Prob > chi2 = 0.0326	Prob > chi2 = 0.0269
Obs	14543	14543	14543	14543
R-squared	0.159	0.160	0.160	0.160
Nr of countrypair	3053	3053	3053	3053

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1