# Democracy, Globalization and the Skill-Bias in Trade Policy in Developing Countries

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**Abstract**: Existing research suggests that democracy fosters economic globalization by promoting trade liberalization in the developing world. We argue that democracy in developing countries generates a "skill bias" in trade protection where democratic incumbents have incentives to increase tariffs on high skilled goods but reduce trade barriers on low skilled goods. Our model analyzes how electoral competition *and* interest group politics in the Heckscher-Ohlin economy of a democratic developing country affects trade protection on low and high skilled goods. It predicts that electoral competition induces the government to reduce trade barriers for low skilled goods to appeal to the abundant factor, namely the low skilled median voter, who optimally prefers a reduction in tariffs for low skilled goods. Yet electoral politics *also* engenders lobbying pressure and campaign contributions from the scarce factor in the polity –the owners of skill-intensive industries (the interest group)—who prefers more trade protection for high skilled goods. The government rationally responds to these contributions by protecting skill-intensive industries from import competition. Empirical tests conducted on a disaggregated industry-level dataset of trade protection supports our theoretical predictions.

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What is the impact of democracy on trade policy? Scholars of international political economy continue to debate this fundamental question. Some suggest that democracy indeed promotes free trade and is thus compatible with globalization (Bliss and Russett 1998; Eichengreen and Leblang 2008; Mansfield *et al* 2000, 2002; Giavazzi and Tabellini 2005; Milner and Mukherjee 2009). Others contest this claim (Yu 2005; Kono 2006, 2008)[1], while some scholars suggest that the relationship between democracy and trade openness is more nuanced (Rudra 2005; Tavares 2008; Gawande *et al* 2009). More recent studies on democracy and trade that focus on just developing countries, however, suggest unequivocally that democracy and *economic* (specifically trade) globalization goes "hand in hand" since democratization fosters trade reforms in developing states (Milner and Kubota 2005; Guisinger 2008).

The findings in extant studies on democracy and trade summarized above are both insightful and important. Yet it might be plausible that researchers may be painting the link between democracy and trade globalization with a broad brush. One reason for this is because scholars often tend to analyze the relationship between democracy and trade protection (specifically, tariffs) in developing (and developed) countries by either employing an average measure of import duties across several industries or Sachs and Warner's (1995) dichotomous trade liberalization measure (e.g., Eichengreen and Leblang 2008; Henisz and Mansfield 2006; Milner and Kubota 2005; Ozden and Reinhardt 2005). A key limitation of these two measures is that they do not account for variation in trade barriers between different industries in developing countries (Nunn and Trefler 2006, 2010; Liu, Scheve and Slaughter 2008, 2012; Lee 2012). This in turn prevents us from understanding more deeply the relationship between democracy and trade policy in developing countries. Such a highly aggregated measure also masks the politics involved in setting trade policy for different industries and sectors. Indeed, if we for instance distinguish between trade protection

[1] Kono (2006) finds that democratic governments employ non-traditional means such as non-tariff barriers to protect their economies.

on high skilled goods produced by skill intensive industries (e.g. computer hardware) and low skilled goods (mining, fisheries) – as increasingly done by scholars (see Nunn and trefler 2006, 2010; Harrigan and Reshef 2011; Lee 2012)[2] – we find that the relationship between democracy and trade protection across developing states is more complex than suggested in the recent literature.

To see why consider Figure 1 which illustrates the moving-average of output-weighted tariffs for several high skilled goods and low skilled goods at the 3-digit International Standard of Industrial Classification[3] (hereafter ISIC) level between 1978 and 2004 for (i) our entire sample of 92 developing countries and (ii) more specifically, for democratic country-years that is drawn from our entire sample.[4] Figure 1 reveals that there exists a "skill-bias" in trade protection in developing democracies where the level of trade barriers on high skilled goods has remained at the status quo or steadily *increased* since 1978. In contrast, trade restrictions on low skilled goods have decreased significantly. This skill-bias in trade protection, as shown in Figure 1, is *not* common to all developing countries in our sample (which includes several autocracies), but is prevalent in democratic developing countries. In fact, as an example figures 2 and 3 show that skill bias in trade protection is particularly visible across time in three key democratic developing countries: Brazil, India and South Africa.

<<Insert Figures 1, 2 and 3 about here>>

These figures suggest that democracy's impact on disaggregated measures of trade protection in developing countries is quite nuanced and requires further research to understand the relationship between democracy and trade policy. The intriguing possibility that democratic politics may generate a skill bias in trade protection in developing countries, as suggested by the figures, raises two related

[2] Also see Goldberg and Pavcnik (2004).
[3] The list of low and high skilled goods for which we collected output-weighted industry-level tariff data at the 3-digit ISIC level, and which are included in figure 1 are listed in Table 2 (see appendix).
[4] The criterion that we employ to classify produced goods into either the low or high skilled category is drawn from economists such as Freeman and Ostendorp (2003), Nunn and Trefler (2006, 2010) and Wood (1997) and is described in detail in section 4 of this paper. The size of our sample is based on data availability output-weighted industry-level tariff data at the 3-digit ISIC level.

puzzles addressed here: What effect does democracy have on trade policy for low and high skilled goods in developing countries? Do democratic incumbents in the developing world have incentives to increase trade barriers on high skilled goods but decrease trade protection on low skilled goods?

We build a simple model of eledctoral competition to answer these questions. Our model analyzes how elections and interest group politics influence strategic interaction between four set of players and subsequently affects tariffs on low and high skilled goods in a developing democracy: the government, the opposition political party, voters whose trade policy preferences are determined by their endowed skill level, and an interest group composed of owners of skill-intensive industries that provide campaign contributions to influence trade barriers for high skilled goods. The main theoretical insight from our model is that electoral competition acts as a double-edged sword: it induces the government to reduce tariffs on low skilled goods, but to also increase trade barriers for high skilled goods.

The causal intuition that explains this insight is two-fold. First, given that democratic developing countries are skill-scarce and labor-abundant, we argue that low skilled voters not only constitute an electoral majority but are also the abundant factor employed in labor-intensive (and typically export-oriented) industries that produce low skilled goods; this claim is supported by extant studies (e.g. Baker 2005; Milner and Kubota 2005; Rogowski 1989). Following the Heckscher-Ohlin and Stolper-Samuelson theorems, our model suggests that low-skilled voters prefer a reduction in trade barriers for low skilled goods as this increases their income and maximizes their utility. Since the government is interested in winning the election and is aware ex ante that the electoral majority – low skilled voters –prefer lowering trade barriers on low skilled goods, it has, according to our model, political incentives to reduce trade barriers for low skilled goods. Doing so maximizes its likelihood of winning the election.

Electoral competition, however, also drives the government to extract campaign contributions from the owners of skill-intensive industries –these industries produce high skilled

goods – as contributions are an important source of rent. In a skill-scare developing democracy, both skilled voters and the owners of skill-intensive industries are the scare factor. Skill-intensive industries also belong to the import-competing sector in developing economies. Hence, based on the Heckscher-Ohlin and Stolper-Samuelson theorems, our model suggests that skilled voters and the owners prefer more trade barriers for high skilled goods; the owners, in turn, lobby and offer contributions to the government to obtain more trade protection for high skilled goods. Campaign contributions and electoral dividends generated from raising trade barriers on high skilled goods provide incentives for the incumbent to increase tariffs on high skilled goods.

An appropriate test of our model's predictions must address two challenges. First, to avoid the problem of selection bias, we must account for the non-randomness of political regimes such as democracy when estimating its impact on tariffs. Second, our analysis must control for the possibility that international diffusion mechanisms – operating either through emulation or market pressures associated with globalization— influence the trade policy choice of developing countries including democracies. To overcome these hurdles, we estimate a novel Spatial Autoregressive Error selection model on data from 92 developing countries between 1978 and 2004. Results from this statistical model support our main theoretical predictions.

This paper proceeds as follows. We first describe our formal model and discuss the testable hypotheses derived from the model. We then present the statistical model, the data, and the results. We conclude by discussing the contributions of our paper and the substantive implications of the findings presented here.

## 2. The Model

The model presented below formally examines how electoral competition between political parties *and* interest group politics in a democratic developing country affects tariffs on low and high skilled goods. Since our objective is to understand how electoral politics affects trade protection in developing democracies, we do not formally analyze here whether trade barriers for low and high

skilled goods differ between democracies and non-democracies. Instead, our model –which builds on Mayer (1984) and Grossman and Helpman's (1994) work –studies how strategic interaction between four sets of players in a Heckscher-Ohlin economy of a democratic developing country affects tariffs for low and high skilled goods: the government, the opposition party, voters who differ according to their endowed skill level, and the owners of skill-intensive industries (i.e., the interest group) which produce high skilled goods.

We begin by specifying the nature of the underlying economy. Because we focus on a developing economy, which by definition is skill-scarce, we assume from the Heckscher-Ohlin and Stolper-Samuelson theorems as well as extant studies[5] that low skilled voters are the abundant factor, while the owners of skill-intensive industries are the scarce factor. This allows us to derive the voters' and the interest group's (the owners') trade policy preferences. We then explicitly model the structure of the democratic polity, the players' utility function and the politics of electoral competition. After doing so, we present the model's results.

**2.1. The Economy, the Polity and Utility functions**

We analyze a small, open Heckscher-Ohlin economy of a developing country that produces goods $g_j$ where $j \in \{l, s\}$. $g_l$ denotes low skilled goods such as agricultural or wood products, while $g_s$ denotes high skilled goods that includes for example computer hardware. The domestic demand for these goods is labeled as $g_j^d$. The domestic price of the goods is given by $p_j = \theta_j(1+t_j)$ where $\theta_j$ is the world price and $t_j$ is the level of trade barriers, modeled here as an ad valorem tariff. Since $j \in \{l, s\}$, $p_l$ and $\theta_l$ denote the domestic and world price of low skilled goods respectively, while the domestic and world price of high skilled goods is labeled as $p_s$ and $\theta_s$. From $t_j$, the tariff level for low skilled

[5] Economists such as Krueger *et al* (1981) and Freeman and Oostendorp (2003) have shown that in skill-scarce developing countries, low skilled workers are employed in labor-intensive industries such as fisheries and agriculture, while skilled workers are employed in skill-intensive industries that includes, for e.g., the pharmaceutical industry. Freeman and Oostendorp (2003) and Milner and Kubota (2005) also suggest that in developing countries, low skilled workers –who are well endowed with labor but not capital—are the abundant factor, while skilled workers are the scarce factor.

goods is defined as $t_l$, and the tariff level for high skilled goods is $t_s$. Two factors of production, labor (*L*) and capital (*K*), are employed to produce low and high skilled goods.[6] The developing country obtains tariff revenue labeled as $T$ where $T = t_j \theta_j M_j$ and $M_j$ is the volume of imported goods.

The main feature of the democratic polity in our model is the presence of electoral competition where the political parties $P \in \{A, B\}$ -- which includes the ruling party (i.e. the government) and the opposition – optimally choose tariffs on low and high skilled goods to maximize their likelihood of winning elections.[7] There also exists in the polity a continuum of voters $i \in \{1,...n\}$ in the [0, 1] unit interval who differ according to their endowed skill level. Each voter's skill level is given by $\sigma^i$ and the voters' skill level in the unit interval is normally distributed.[8] We focus in our model on how the trade policy preferences of three types of voters, which are determined by their endowment/skill level, affects their voting behavior and the government's optimal tariff policy choice. These three voter types include low skilled voters (with skill level $\sigma^{lv}$), the median voter ($\sigma^{mv}$) and skilled voters ($\sigma^{sv}$).

Existing studies by economists suggest that low skilled citizens in skill-scarce developing countries are characterized by low levels of education[9] and are "relatively well endowed with the abundant factor—labor—but not capital" (Rama 2003: 9). Low skilled voters in developing countries are also largely employed in "export-competing industries which tend to be significantly more labor intensive than import-competing sectors"[10]and which "produce and export low skilled goods such as

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[6] The production functions for goods $g_l$ and $g_s$ are assumed to be homogenous of degree one.

[7] While the political parties in our model are interested in winning the elections, the results from our model remain robust if we assume a case of partisan political parties that cater to their specific ideological constituencies. That is, the results from our model hold even if the parties' trade policy positions do *not* converge to the median voter's trade policy preference.

[8] The results from our model remain robust if $\sigma^i$ has a uniform or log-normal distribution.

[9] Barro and Lee (2001) find that citizens with low levels of education in developing countries have less than 12 years of schooling; citizens with higher levels of education have 12 years or more of schooling.

[10] Edwards (1995: 118). Krueger *et al* (1981) also show that exporting-competing sectors in developing countries are less skill-intensive than import-competing sectors and employ low skilled workers.

leather products".[11] In contrast, skilled voters in developing countries have higher levels of education and are "well endowed with the relatively scarce factor, capital" (Milner and Kubota 2005: 116). Skilled voters are also primarily employed in "import-competing sectors that tend to be capital-intensive"[12] *and* skill-intensive in that these sectors produce high skilled goods such as computer hardware (Wood 1998, Rudra 2002). Thus, following the studies mentioned above as well as the Heckscher-Ohlin and Stolper-Samuelson theorems, low skilled voters in our model are the abundant factor employed in labor intensive, export-competing industries that produce low skilled goods, while skilled voters are the scare factor employed in skill-intensive import-competing industries that produce high skilled goods. This is the opposite of the composition of factor endowments and trade flows in developed countries.

Voters are interested in maximizing their utility, which depends on domestic prices and tariffs. Specifically, each voter owns a unit of labor $L^i$ and a certain fraction ($K^i = \sigma^i k$) of the total capital stock in the economy which is determined by their skill level. The unit of labor owned by the voter earns a wage rate *w*, while a unit of capital earns the rate of return *a*. Hence, each voter earns total factor income equal to $w + aK^i$, which implies that each voter's *share* of national factor income is $\lambda^i = w + aK^i / wL + aK$ (see Mayer 1984).[13] Voters also receive a part of national tariff revenue since tariff revenue is distributed lump-sum to voters by the government. Because each voter earns $\lambda^i$ of total factor income, we follow Mayer (1984) and assume that the amount of tariff revenue received by voter *i* is $\lambda^i T$. Voter *i's* total income $y^i$ can thus be expressed as a fraction of the total national income *Y* since $y^i = \lambda^i (wL + aK + T) = \lambda^i Y$.

[11] Perry and Olarreaga (2006: 14)
[12] Milner and Kubota (2005: 116)
[13] Low skilled voters earn lower wages than high skilled voters and also have lower level of capital stock. Hence $\lambda^{lv} < \lambda^{sv}$ which implies that $w + aK^{lv} / wL + aK < w + aK^{sv} / wL + aK$ .

In the model, voter *i's* optimal tariff policy is given by the tariff level that maximizes his income (as described above) and hence utility. Thus, following Mayer (1984), the optimization problem of each voter *i* is expressed in terms of his indirect utility function as:

$$u^i = \max_{t_j^P} \; u^i(p_j(\theta_j, t_j^P), y^i) \quad j \in \{l, s\} \tag{1}$$

The voters' trade policy preference in our model is influenced by their skill level because as mentioned earlier this determines the industry –low skilled or skill-intensive—in which they work and earn their wages. As such, voters will prefer that the government set tariff policy for the goods produced by the industry in which they are employed such that it maximizes their income and hence utility. Since tariffs on the goods produced by the industry in which voters are employed directly affect their income and utility, they have an interest to either re-elect or vote the incumbent out of office based on their evaluation of the effect that the government's proposed tariff policy has on their utility. To this end, the voters follow a simple retrospective voting rule in which each voter *i* optimally chooses to reappoint the government if *i's* realized utility is maximized from the tariff policy $t_j^P$ proposed by the government during elections. More formally, the *ex ante* probability that voter *i*, which includes the median voter, recommends reappointment of the government if voter *i's* realized utility reaches a maximum from the proposed tariff policy is defined as ??

While voters can exert some control over the trade policy choice of elected officials, interest groups also attempt to influence trade policy in developing countries by lobbying political parties (see Amelung 1989; Calderon and Chong 2005, 2006).[14] Research on trade politics in developing democracies as diverse as Brazil, India, and South Africa reveals that in these countries owners of skill-intensive industries that produce high skilled goods are a key interest group that offer contributions to political parties to obtain more protection of high skilled goods from import competition (e.g Cadot *et al* 2004; Ferreira and Facchini 2005; Smith 1998). For example, owners of

[14] Various studies have also examined how lobbying by interest groups affects financial policy in developing countries that potentially increases the likelihood of a financial crisis (Frieden 1991; Keefer 2004).

the skill-intensive pharmaceutical and electrical industries in India have organized into lobbying groups such as the Indian Drug Manufacturer's Association (IDMA) and the Electronic Industries Association of India (ELCINA) to lobby the government for more trade protection of their respective industries (Lanjouw 1998; Bate 2008). In Brazil, lobbying groups from skill-intensive industries, such as the Associação Brasileira das Empresas de Rádio e Televisão and Associação Brasileira da Indústria Eletro-Eletrônica, use the national association, Federação das Indústrias do Estado de São Paulo, as a platform for providing campaign contributions and lobbying for trade protection (Hudson 1997; Ferreira and Facchini 2005).

The aforementioned examples are not surprising. This is because we know from the Stolper-Samuelson theorem that owners of skill-intensive industries have incentives to seek more trade protection for goods produced by their industries as they are the scarce factor that "belong to the import-competing sector in developing countries" (Hoekman and Winters 2005). Hence, based on the Stolper-Samuelson theorem, the owners in our model (labeled as *r*) lobby the political parties $P \in \{A, B\}$ to raise tariffs on high skilled goods, which is labeled as $t_s^P$. They do so by providing campaign contributions which are defined by the function $c(t_s^P)$. Without loss of generality, we adopt a convex contribution function. That is, the cost of campaign contributions is defined by the convex function $c(t_s^P) = \frac{1}{2}\phi(t_s^P)^2$ where $\phi > 0$ is the degree of lobbying pressure that the owners exert on political parties to obtain more trade restrictions for high skilled goods.

The owners of skill intensive industries obtain economic benefits given by the function $b(t_s^P)$ from tariffs on high skilled goods, $t_s^P$. The function $b(t_s^P)$ in the model is taken from Goldberg and Maggi (1999) and is defined as $b(t_s^P) = [\alpha \prod(t_s^P)] + S(t_s^P) + t_s^P M_s(t_s^P)$. $\prod(t_s^P)$ is the rent that owners extract from $t_s^P$, $\alpha \in [0,1]$ is their share of this rent while $(1-\alpha)$ is the share of the rent extracted by the parties, $t_s^P M_s(t_s^P)$ is the tariff revenue generated from imports of high skilled goods

and $S(t_s^P)$ is the owners' surplus from producing $g_s$. From the above information, the utility function of owners of skill- intensive industries is defined as

$$u^r = b(t_s^P) - c(t_s^P) \tag{2}$$

We now turn to define the government and the opposition party's utility function.

In the model, the political parties $P \in \{A, B\}$ that compete for office propose tariff rates on low skilled ($t_l^P$) and high skilled goods ($t_s^P$) during elections, which for notational convenience is labeled as $t_j^P$. The parties know the distribution of the voters' skill level and the voters' trade policy preferences. They also know that voters vote according to the retrospective voting rule after observing each parties' proposed tariff policy, $t_l^P$ and $t_s^P$. Moreover, the parties receive contributions from the owners of skill-intensive industries who attempt to influence trade policy for high skilled goods. Hence, when setting tariff policy on low and high skilled goods, each party weighs the tariff policy preferences of voters to maximize their likelihood of winning the election *and* of gaining contributions from protection for owners of skill-intensive industries. Each party thus has a weighted objective function given by

$$u^P = \beta u^i + (1 - \beta)\,[b(t_s^P) + c(t_s^P)] \tag{3}$$

where $\beta \in [0,1]$ denotes the weight, $u^i$ is the voters' utility function, $b(t_s^P)$ is the benefit that the owners get from protection of high skilled goods and $c(t_s^P)$ is the contribution that they provide.

Suppose, without loss of generality, that the government is from party *A*. Suppose further that the probability with which the government gets reelected after proposing tariff policy $t_j^A$ for goods $g_j$ ($j \in \{l, s\}$) in response to the opposition's choice of $t_j^B$ is $\pi(t_j^A, t_j^B)$. Then the government will optimally choose tariff policy $t_j^A$ to solve

$$\max_{t_j^A} \; \pi(t_j^A, t_j^B) u^A(t_j^A) + [1 - \pi(t_j^A, t_j^B)] u^A(t_j^B) \qquad j \in \{l, s\} \tag{4}$$

Party *B* will optimally choose tariff policy $t_j^B$ to solve

$$\max_{t_j^B} \ \pi(t_j^A, t_j^B)u^B(t_j^A) + [1 - \pi(t_j^A, t_j^B)]u^B(t_j^B) \tag{5}$$

The expected utility functions in (4) and (5) indicate that the objective of each political party is to choose their respective tariff policy to maximize their probability of winning the election. More specifically, the sequence of moves in the model is as follows. First, the owners of skill-intensive industries offer contributions to the political parties influence trade barriers on high skilled goods. The government then proposes the tariff policy $t_j^A$ for low and high skilled goods after taking into account the contributions provided by the owners of skill-intensive industries, the opposition's proposed tariff policy choice of $t_j^B$, and the trade policy preferences of voters. The government and the opposition's proposed tariff policy is observed by the voters. Domestic prices and incomes are established, and consumption occurs, which affect the voters' utility, including the median voter. Each voter, including the median voter, examines their realized utility $u^i$ from the proposed trade policy. If the voters' realized utility is maximized from the government's proposed tariff policy, then they vote to re-elect. We formally state below the subgame-perfect Nash equilibrium solution derived from our model.[15]

## 3. Results

We formally describe in the following lemma the model's equilibrium solution:

**Lemma 1**: *There exists a subgame-perfect Nash equilibrium of the trade policy game in a democratic developing country where for* $P \in \{A, B\}$ *, the*

*(i)* *tariff level for high skilled goods is* $t_s^{B*} = t_s^{A*} = \dfrac{(1-\beta)(1-\alpha)g^d(t_s^A)}{M_s'(t_s^A) + \phi}$

*(ii)* *tariff level for low skilled goods is* $t_l^{B*} = t_l^{A*} = t_l^{mv} \equiv \beta[-Y / M_l'(t_l^P)]\left(\dfrac{d\lambda^{mv} / dt_l^P}{\lambda^{mv}}\right)$

*(iii)* *contribution offered by the owners of skill-intensive industries is characterized by* $(\alpha - 1)g^d(t_s^P) + t_s^P M_s'(t_s^P) - \phi t_s^P$

**Proof**: See Appendix

[15] We formally characterize the solution in Lemma 1 from the government's – that belongs to party *P=A*— utility function because in equilibrium Party *B*'s optimal tariff policy is similar.

Lemma 1 shows that the government and opposition's optimal tariff choice for high skilled goods in a developing democracy in equilibrium, i.e. $t_s^{B*} = t_s^{A*}$, is (i) weighted by $(1-\beta)$ toward the tariff policy preference for high skilled goods held by the owners of skill-intensive industries and (ii) influenced by the rent $(1-\alpha)$ that they extract from $t_s^P$. Further, as discussed below, the equilibrium contribution offered by the owners in Lemma 1 increases when they lobby political parties for more trade protection of high skilled goods. These two results are complementary: in equilibrium the owners provide contribution to influence each party's choice of tariffs for high skilled goods. The parties rationally respond to these contributions by ensuring that $t_s^{B*} = t_s^{A*}$ is weighted toward the owners' tariff policy preference.

Second, the result for $t_l^{B*} = t_l^{A*} = t_l^{mv}$ in Lemma 1 suggests that in a developing democracy, the government and the opposition optimally sets tariffs on low skilled goods in equilibrium at the median voter's preferred tariff rate for low skilled goods. The intuition that explains this result is as follows: in a skill-scarce democratic developing country, "the abundant factor, low skilled workers demographically outnumber skilled workers" (Wood 1998) and thus constitute an electoral majority. Consequently, the distribution of the voters' skill level, as noted by Baker (2005: 933), becomes "left-skewed" toward low skilled individuals and the skill level of the median voter falls lower than the mean voter's skill level ($\sigma^{mv} < \sigma^{\mu}$) in the model. The condition $\sigma^{mv} < \sigma^{\mu}$ and the skew of the voters skill distribution toward low skilled citizens implies that the median voter in a democratic developing country is by definition low skilled. Since the low skilled median voter is employed in labor-intensive, export-competing industries that produce low skilled goods, he will be concerned, with respect to his trade policy policy preference, about tariffs on low skilled goods as this directly affects his income (Freeman and Oostendorp 2003; Edwards 1995). His voting decision will also be influenced by the parties' proposed equilibrium tariff level for low skilled goods.

The political parties in the model know that the median voter is low skilled and that his utility and voting decision is determined after observing their proposed tariff policy for low skilled goods. Because the government and the opposition are interested in winning the election and are completely informed about the median voter's trade policy preference, they have political incentives in equilibrium to set trade barriers on low skilled goods at the median voter's preferred tariff rate for low skilled goods; doing so maximizes their likelihood of winning office. The government's decision to set tariffs on low skilled goods in equilibrium at the median voter's preferred tariff rate for low skilled goods has critical implications, which are summarized as

**Proposition 1**: *In a democratic developing country*

*(i)* *the government puts increasing weight* $\beta$ *on the low skilled median voter's utility(*$u^{mv}$*) when setting trade barriers for low skilled goods decreases. The tariff level for low skilled goods committed to by the government decreases with respect to* $\beta$*, that is,* $\partial t_l^{A^*} / \partial \beta < 0$

*(ii)* $\lambda^{mv}$ *and* $\lambda^{lv}$ *increases when* $t_l^{A*}$ *decreases*

*(iii)* *Trade barriers on low skilled goods decrease, that is,* $t_l^{A*}$ *strictly decreases. Further, the probability with which the government gets reelected increases when* $t_l^{A*}$ *decreases*

**Proof**: See Appendix

The central prediction in Proposition 1 is that the equilibrium tariff level on low skilled goods decreases in democracies in the developing world. This results partly from the government's political rationale to place more weight $\beta$ on the trade policy preferences of the low skilled median voter when setting tariff policy for low skilled goods. The proposition also shows that the reduction in trade barriers for low skilled goods increases (i) the share in national income from factor ownership for low skilled median voter ($\lambda^{mv}$) as well as low skilled voters ($\lambda^{lv}$) and (ii) the government's probability of reelection.

Two reasons explain why democracy has a negative effect on tariffs for low skilled goods. First, as suggested earlier, the low skilled median voter in a developing democracy is the abundant factor employed in export-competing industries that produces low skilled goods (e.g., Freeman and Oostendorp 2003). Hence, following the Heckscher-Ohlin and Stolper-Samuelson theorems, our

model shows that decreasing tariffs on low skilled goods increases the income and maximizes the utility of the low skilled median voter and low skilled voters.[16] As Richard Freeman (2000: 347) notes, a reduction in tariffs on low skilled goods "increases the production of goods made by…less-skilled labor in developing countries and thus raises their wages."

Since liberalization of trade restrictions on low skilled goods results in more income for the low skilled median voter, the median voter in our model optimally prefers a reduction of trade restrictions on low skilled goods. The aforementioned claim is supported by cross-national evidence from survey data which reveals that low-skilled citizens in skill-scarce developing countries favor trade liberalization (Mayda *et al* 2007; O' Rourke and Sinnott 2001; Mayda and Rodrik 2005). For instance, in their study of trade policy preferences from pooled survey data, Mayda *et al* (2007: 4) report that, "in skill-scarce countries, it is the less educated who are the stronger promoters of free trade." Similarly, O' Rourke and Sinnott (2001: 24) find that[17]

> "skill matters for policy preferences, and the effect that skill has on those preferences varies across countries in ways which are consistent with Heckscher-Ohlin theory. Roughly speaking, in countries with per capita incomes *below* $11492 the lowest skilled tend to be more in favor of free trade"

The government in the model knows that the low skilled median voter prefers a reduction of trade barriers for low skilled goods as it maximizes his utility. It also knows that if the median voter's realized utility is maximized from the proposed tariff policy on low skilled goods, the median voter will follow its retrospective voting rule and vote to re-elect the incumbent.[18] Since the government is interested in winning the election and is aware *ex ante* that the median voter prefers a reduction in trade barriers for low skilled goods, it will rationally decrease tariffs for low skilled goods in

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[16] We prove this claim more formally under "part (i) of Proposition 1" in the appendix

[17] In his article, Baker (2005: 935) suggests that "heavy consumers of exportables (the poor in skill-scarce countries and the wealthy in skill abundant ones) tend to be more protectionist…" Yet, he concludes that "despite the use of different data, measures and methods", his empirical results, "lends strong support to the H-O inspired model, (which) replicates that of several other scholars" (Baker 2005: 932).

[18] We prove formally in the proof of Proposition 1 in the appendix that when $t_l^{A*}$ decreases.

equilibrium such that it maximizes the median voter's utility.[19] Maximizing the median voter's utility from decreasing $t_l^{A*}$ will induce the median voter to re-elect the incumbent and this increases the government's probability of reelection as predicted in Proposition 1. Hence, the government's *ex post* expectation that it will be reelected with a higher probability if it decreases $t_l^{A*}$ provides it with political incentives *ex ante* to reduce tariffs on low skilled goods.

Second, our model also suggests that electoral competition induces the government in a developing democracy to not extract rent from tariffs on low skilled goods. Instead, electoral politics encourages the government to place greater weight $\beta$ toward increasing the welfare of the low skilled median voter and low skilled voters in the electorate by increasing their share in national income from factor ownership $\lambda^i$. The government knows that the share in national income from factor ownership for the low skilled median voter ($\lambda^{mv}$) and low skilled voters ($\lambda^{lv}$) increases only when trade barriers on low skilled goods decrease. Because electoral accountability influences the government to enhance the welfare of low skilled citizens by increasing their income share from factor ownership, it will reduce tariffs on low skilled goods in equilibrium –that is, $\partial t_l^{A^*} / \partial \beta < 0$ -- to increase $\lambda^{mv}$ and $\lambda^{lv}$. The government has incentives to *not* deviate from its strategy of reducing $t_l^A$ since it risks losing the election from doing so.

Although electoral constraints induces the government to not extract rent from tariffs on low skilled goods, our model shows that elections also at the same time paradoxically drive parties in a developing democracy to extract campaign contribution and rent from trade policy on high skilled goods. This has important implications which are summarized in,

**Proposition 2**: *In a democratic developing country*

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[19] The extent to which the government reduces $t_l^{A*}$ depends on the degree to which it wants to increase the median voter's income from factor ownership; if in the limit $\lambda^{mv} \to \infty$, then $t_l^{A*} \to 0$.

*(i)* *the owners of skill-intensive industries increase their lobbying pressure and campaign contributions in the context of electoral competition, that is,* $\phi$ *and* $c(t_s^P)$ *strictly increase*

*(ii)* *tariffs on high skilled goods committed to by the government increase with respect to* $(1-\beta)$, $\phi$ *(that is,* $\partial t_s^{A^*} / \partial \phi > 0$*) and* $c(t_s^P)$ *(i.e.* $\partial t_s^{A^*} / \partial c(t_s^P) > 0$*).*

*(iii)* *tariffs on high skilled goods* $t_s^{A*}$ *strictly increases. Tariff revenue* $T_s$ *and redistribution of this revenue as well as the government's reelection probability increases when* $t_s^{A*}$ *increases.*

**Proof**: See Appendix

The key prediction in Proposition 2 is that the equilibrium tariff level on high skilled goods ($t_s^{A*}$) increases in democracies in the developing world. As such, the proposition shows that elections generate more lobbying pressure and contributions by capital owners. This encourages the government to place more weight $(1-\beta)$ on the owners' trade policy preference and increase $t_s^{A*}$. Proposition 2 also shows that revenue from tariffs on high skilled goods, redistribution of this revenue and the government's reelection probability increases when $t_s^{A*}$ increases.

Our model suggests that both campaign contributions provided by the owners *and* electoral factors explain why the government in a developing democracy rationally increases the level of trade barriers for high skilled goods. First, observe that electoral competition between the two parties pushes them to extract campaign contributions from the owners as contributions generate both rent and resources to sustain an election campaign. Anticipating this demand for contributions, the owners offer contributions in equilibrium (see Lemma 1). However, given that the owners are uncertain *ex ante* about each party's electoral prospects, they have incentives to "supply" both parties with contributions to influence tariff policy for high skilled goods. To this end, the owners –i.e., the scarce factor who from the Heckscher-Ohlin and Stolper-Samuelson theorems prefer more trade protection of high skilled goods—optimally increase the contributions $c(t_s^P)$ that they provide to obtain higher trade barriers for high skilled goods.

They also increase their lobbying pressure during elections to influence trade policy for high skilled goods (technically, this implies that $\phi$ increases in the model). More lobbying pressure ($\phi$)

and campaign contributions ($c(t_s^P)$) induce the government to weigh more heavily via $(1-\beta)$ the trade policy preferences of the owners when setting tariffs for high skilled goods. As a result, the tariff level on high skilled goods that it commits to will be biased toward the owners' preferences. This bias leads to an increase in tariffs for high skilled goods – technically $t_s^{A^*}$ increases with respect to $(1-\beta)$, $\phi$ and $c(t_s^P)$-- since the owners prefer more tariffs for high skilled goods and because the government extracts rent from contributions invested by the owners in exchange for more trade barriers on high skilled goods. That said, the degree to which the government increases the tariff level on high skilled goods is determined by the extent of the share $(1-\alpha)$ of the rent that it hopes to extract from contributions offered by the owners.[20]

Apart from campaign contributions, two factors related to electoral politics also explain the main prediction in proposition 2. First, observe that like the owners, skilled voters in the democratic polity of a skill-scarce developing country are the scarce factor employed in import-competing, skill-intensive industries where high skilled goods are produced. Given that skilled voters are the scarce factor, our model suggests from the Heckscher-Ohlin and Stolper-Samuelson theorems skilled voters prefer an increase in tariffs for high skilled goods as it increases their income and maximizes their utility.[21] The claim posited above is, in fact, supported by evidence from cross-national survey data. As Mayda *et al* (2007: 16) note:

> "…the cut-off point for per capita GDP below which the high-skilled are protectionist is approximately $9,500. In addition, the coefficient estimates in equation (7) imply that an extra four years of schooling increases the probability of an extremely protectionist trade response by 2.2 percentage points in Indonesia (whose per capita GDP is approximately $3,900)."

O' Rourke and Sinnott (2001: 24) also find that in developing countries in their sample "high skills are associated with a preference for protection." The government in the model is completely

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[20] The tariff level on high-skilled goods increases to a maximum when $\lim_{\alpha \to 0}(1-\alpha) \to 1$ ; i.e. when the government wants to acquire the entire share of the rent from tariffs levied on high skilled goods.

[21] We prove this claim more formally under "part (iv) of Proposition 2" in the appendix

informed about the trade policy preferences of the skilled voters. It is also aware that skilled citizens will follow the retrospective voting rule and vote for the government if the tariff level for high skilled goods is increased as increasing $t_s^{A*}$ maximizes their utility. To bolster its vote-share and likelihood or retaining office, the government thus has incentives to raise trade barriers on high skilled goods as this induces skilled voters to vote for the ruling party.

Second, in the model, the government behaves strategically in equilibrium by redistributing tariff revenue flows generated from increasing tariffs on high skilled goods to low skilled (and skilled) voters, while *simultaneously* decreasing trade barriers for low skilled goods (as shown in Proposition 1). Redistribution of tariff revenue extracted from $t_s^A$ to low skilled voters and at the same time lowering tariffs on low skilled goods increase the income and maximize the utility of low skilled voters. Consequently, low skilled voters, which include the median voter, follow the retrospective voting rule and vote for the government. Thus in equilibrium the government maximizes its vote share among low skilled as well as skilled voters (as described above) when increasing $t_s^A$, which increases its probability of reelection. Rational expectation of higher reelection probability in this case and more campaign contributions from the owners influence the government *ex ante* to raise the tariff level on high skilled good. This, in turn, generates a skill bias in trade protection in democratic developing countries.

Propositions 1 and 2 respectively lead to the following two hypotheses tested below:

<u>Hypothesis 1</u>: *Democracy has a negative effect on tariffs of low skilled goods in developing countries.*

<u>Hypothesis 2</u>: *Democracy has a positive effect on tariffs of high skilled goods in developing countries.*

**2. Statistical Methodology**

Estimating the effect of political regimes such as democracy on trade protection poses an econometric challenge since democracy emerges from a non-random selection process. If we do not statistically account for the non-randomness of democratic regimes when testing their effect on

trade barriers of low and high skilled goods, then the estimated results may suffer from selection bias.[22] A typical strategy for controlling for selection bias is to use a Heckman selection model. However, in addition to selection bias, we face two econometric challenges.

First, scholars suggest that trade policy is characterized by international diffusion and thus *spatial* dependence because governments in the developing world often choose tariff rates based on the trade policy choices of geographically neighboring countries (e.g. Milner and Kubota 2005). Tests reveal the presence of spatial dependence in tariffs on high and low skilled goods (our two dependent variables) in our sample which is described below.[23] Hence, to avoid bias, we should statistically account for spatial dependence in the outcome equation of our econometric model where the tariff level is the dependent variable. Second, scholars find that international diffusion, i.e. spatial effects, influences democratic regimes in that democracy is more likely to emerge and survive in developing states if their neighboring states are democratic (e.g., Gleditsch and Ward 2006). Tests conducted on our data indicate that the occurrence of democratic regimes is indeed characterized by spatial dependence.[24] Thus to avoid bias, we must also account for spatial effects in the statistical model's selection equation where the probability that democracy may occur is the dependent variable.

To account for selection bias and spatial dependence, we estimate a Spatial Autoregressive Errors sample selection model (SAE selection model) that specifies spatially autocorrelated disturbances in the selection *and* outcome equations. This model, developed by Flores-Lagunes and Schneier (2006), is defined (after dropping subscript *t* for time for notational convenience) as:

$$y_{1i}^{*} = \alpha_0 + x_{1i}'\alpha_1 + u_{1i}, \quad u_{1i} = \delta \sum_{j \neq i} c_{ij} u_{1j} + \varepsilon_{1i} \tag{6}$$

[22] For details of this selection bias problem see, for e.g., Przeworski *et al* (2000).
[23] Baltagi *et al's* (2007) Lagrange multiplier test for spatial autocorrelation rejects the null of *no* spatial autocorrelation for import- and output-weighted tariffs and unweighted tariffs on low and high skilled goods.
[24] Kelejian and Prucha's (2001) modified Moran-I test for spatial autocorrelation in discrete choice models rejects the null of no spatial autocorrelation for *Democracy-ACLP* in our dataset.

$$y_{1i} = \begin{cases} 1 & if\ y_{1i}^* > 0 \\ 0 & otherwise \end{cases}$$

$$y_{2i}^* = \beta_0 + x_{2i}'\beta_1 + u_{2i}, \quad u_{2i} = \gamma \sum_{j \neq i} c_{ij} u_{2j} + \varepsilon_{2i} \tag{7}$$

In the selection equation (6), the dichotomous dependent variable is $y_{1i} = 1$ for a democratic regime and zero otherwise. The outcome equation (7) estimates the impact of covariates on the tariff level denoted as $y_{2i}^*$ .Equations (6) and (7) exhibit spatial dependence in their error terms because $u_{1i}$ and $u_{2i}$ depend on $u_{1j}$ and $u_{2j}$ through their location in space, as given by the spatial weights $c_{ij} \in C$ ( $C$ is the spatial weights matrix ), and the spatial autoregressive parameters $\delta$ and $\gamma$ . Since $u_{1i}$ incorporates $\varepsilon_{1i}$ , while $u_{2i}$ includes $\varepsilon_{2i}$ , the model is defined in reduced form as:[25]

$$y_{1i}^* = \alpha_0 + x_{1i}'\alpha_1 + \sum_j w_{ij}^1 \varepsilon_{1j} \tag{8}$$

$$y_{2i}^* = \alpha_0 + x_{2i}'\alpha_1 + \sum_j w_{ij}^2 \varepsilon_{2j} \tag{9}$$

where $w_{ij}^1$ and $w_{ij}^2$ are the elements of the inverse matrices $(1-\delta C)^{-1}$ and $(1-\gamma C)^{-1}$.

Researchers suggest that a key component of diffusion mechanisms operates via geographic proximity (see Franzese and Hays 2006). We thus use a measure of spatial contiguity by operationalizing elements of the spatial weights matrix ($c_{ij}$) as the inverse distance between states *i* and *j* in the sample, where $c_{ij} = 1/d_{ij}$ . When the distance between *i* and *j* increases (decreases), $c_{ij}$ decreases (increases), giving less (more) spatial weight to the state pair when $i \neq j$ . We use a "minimum distance database" of the shortest distance between the two closest physical locations for every pair of independent polities in the world.[26] The results remain robust when using alternative measures of spatial contiguity that are described below.

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[25] $\varepsilon_{1i}$ , $\varepsilon_{2i}$ are *iid* $N(\mathbf{0}, \Sigma)$ . Klaauw & Koning's (2006) likelihood ratio test for the distributional assumption of bivariate normality *fails* to reject the null of bivariate normality between the selection and outcome equations.

[26] Gleditsch and Ward (2006). The database records the shortest distance in kilometers between points on the outer boundaries for two polities. We update their database for the countries in our sample.

Following Flores-Lagunes and Schneier (2006), we adopt the two-step Heckman procedure within a generalized method of moments (GMM) framework to estimate the SAE selection model, which is described briefly in the appendix. Specifically, we first estimate equation (6), which predicts the likelihood of democratic regimes via a spatial probit model. Using the estimates from (6) we compute and include the spatial-adjusted Inverse Mills ratio (IMR), $\hat{\lambda}_i$ in the outcome equation to account for selection bias that results; this allows us to estimate the "selection-corrected" effect of democracy on tariffs.[27] We also include in the outcome equation country fixed-effects as well as fixed effects for each of the 19 goods produced in different industries at the 3-digit ISIC level from which we gathered tariff data to operationalize our measure of tariffs for low and high skilled goods. [28] We report Newey-West standard errors that are robust to heteroskedastic and serially correlated residuals.

**3. Sample and Dependent Variable**

We compile a time-series cross-sectional (TSCS) dataset of 92 developing countries –listed in Table 1—observed between 1978 and 2004 to test hypotheses 1 and 2. The size of our sample is determined by the availability of tariff data at the 3-digit ISIC industry level for each country-year.

<<Insert Table 1 about here>>

We operationalize the dependent variable for the outcome equation in the statistical model—which includes the tariff level for high skilled goods (the dependent variable in hypothesis 1), and low skilled goods (the dependent variable in hypothesis 2)—in three steps. First, for each country-year, we collected ad-valorem tariff data for 19 different industries that are disaggregated and classified at the 3-digit ISIC level (Revision 2); the sources employed to compile this data are briefly described below. The goods that are produced by each of these 19 industries are listed in Table 2.

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[27] The spatial-adjusted IMR $\hat{\lambda}_i$ accounts for the non-random occurrence of democracy *and* spatial effects observed with the likelihood of democracy. It is included in the outcome equation to correct for selection.
[28] We also estimated the outcome equation with fixed effects for time. Doing so did not alter the results we obtain and report below; hence the time dummies are dropped from the specification.

Note that the goods listed in Table 2 range from low skilled goods such as wood and agricultural products to relatively high skilled goods that include, for instance, computer hardware. Given the limited availability of tariff data at the disaggregated 3-digit ISIC level for developing countries, we could at most comprehensively code tariffs for goods produced by 19 different industries for each country-year.

<<Insert Table 2 about here>>

Second, after collecting country-year tariff data for the 19 different industries in Table 2, we classified these industries and therefore the goods that they produce into two categories: low and high skilled goods. This is done as follows: specifically, following existing studies, we first calculated the $S/L$ ratio, that is, the ratio of skilled workers $S$ (workers with greater than or equal to12 years of schooling) to low-skilled workers $L$ (workers with less than 12 years of schooling) employed in each industry to rank-order the goods produced in every industry according to their skill-intensity of production (see Nunn and Trefler 2006; Freeman and Oostendorp 2002; UNCTAD 2002; ISCO 2003).[29] If the ratio of skilled to low skilled workers that are employed in a particular industry listed in Table 2 is $S/L \geq 0.39$, then the good produced by the industry is classified as high-skilled; If $S/L < 0.39$ for an industry, then the good produced by the industry is classified as low skilled (Nunn and Trefler 2006; Freeman and Oostendorp 2002).

When we use the $S/L$ ratio of 0.39 as a threshold to classify the 19 industries and the goods that they produce into low or high skilled, we obtain 12 low skilled goods that are produced in low skilled industries (e.g.) and 7 high skilled goods produced in skill-intensive industries (see Table 2). Our empirical results do not change when we use (i) any value in the $S/L \in [0.36, 0.45]$ range as the threshold for the $S/L$ ratio to categorize the goods produced in the 19 industries as low or high

[29] Data to calculate the $S/L$ ratio for each industry in our sample is taken from

skilled[30] and (ii) data on median wages within each industry (Lu *et al* 2008) or occupation-related aspects of formal education (Baker 2005) to classify the produced goods into the low or high-skilled category.

Third, following extant studies on trade protection at the 3-digit ISIC industry-level,[31] we used our country-year tariff data for each low and high skilled good to compute the output-weighted average tariff for the 12 low skilled and 7 high skilled goods for every country-year in our sample.[32] The output-weighted average tariff level for the 12 low skilled goods produced in skill-intensive industries is labeled as *Low Skilled tariff* ; this measure serves as the dependent variable in the outcome equation to test hypothesis 1. The output-weighted average tariff for the 7 high skilled goods, labeled as *Skilled tariff*, is the dependent variable in the outcome equation for testing hypothesis 2. As reported below, our results remain robust when we use unweighted and import-weighted average measures of *Skilled tariff* and *Low Skilled tariff* to test hypotheses 1 and 2.

We employed several primary and secondary sources to compile country-year data on tariffs at the 30digit ISIC level for each of the 19 industries in Table 2. These sources are not fully listed here to conserve space but are described in the appendix. Stated briefly, the main secondary sources include the World Bank's (2006) *Trade, Production and Protection* (1976-2004) database, *GTAP* (2007), *International Customs Tariff Bureau* (various years), UNCTAD's (1999) *Directory of Import Regimes* and the World Bank's (2005) WITS database. The data from the secondary sources is supplemented with 3-digit level tariff data reported in primary sources, particularly national economic statistics databases. For example, we supplemented 3-digit level tariff data for (i) South Africa from Annual Reports of South Africa's Department of Trade and Industry and (ii) Brazil from *Fundacao Instituto Brasileiro de*

[30] The skill-intensity of production of the list of goods in Table 2 remains invariant across time. For e.g., leather goods remain low skilled across time while computer hardware is always high-skilled.
[31] See, for e.g., Nunn and Trefler (2006).
[32] Data on output to calculate output-weights (ratio of output produced by each industry to total domestic output) for each good at the 3-digit ISIC level listed in Table 2 for every country-year is drawn from UNIDO INDSTAT3 (2006), UNIDO INDSTAT4 (2008), Nicita and Olareagga (2001); Kee *et al* (2008) and GTAP version 6 (2005).

*Geografa e Estatstica*; the remaining primary sources that we employed are listed in detail in the appendix.

We require a dichotomous measure to code democratic regimes since this measure will serve as the dependent variable in the selection equation of the SAE selection model. Following Przeworski *et al* (2000), countries in the sample during the 1978-2004 period are coded as *Democracy-ACLP* =1 (0 otherwise) if the chief executive is elected, the legislature is elected, there is more than one party and there has been alternation in power. Data for *Democracy-ACLP* is from Przeworski *et al* (2000) and Cheibub and Gandhi (2004).

**2.1 Independent and Control Variables**

We need to estimate the effect of democracy (our independent variable) on *Skilled tariff* and *Low Skilled tariff* to test hypotheses 1 and 2. To this end, we employ the Przeworski *et al* (2000) democracy measure, *Democracy-ACLP*, as the independent variable of interest in the outcome equation. For robustness tests, we also employ as our independent variable the Polity democracy measure that ranges from -10 for a highly autocratic state to +10 for a highly democratic one; this variable is labeled as *Democracy-Polity*. From hypotheses 1 and 2, we anticipate that *Democracy-ACLP* and *Democracy-Polity* will have a positive impact on *Skilled tariff*, but a negative effect on *Low Skilled tariff*.

Based on the literature that identifies various factors that influence the likelihood of democracy,[33] we incorporate the following variables in the selection equation where *Democracy-ACLP* is the dependent variable: *Log GDP per capita*, *Religious fractionalization*, the percentage of *Catholics*, *Protestants* and *Muslims* in the population for each country-year, a dummy for former colonies (*Former Colony*), the lag of the *Democracy-ACLP* dummy, the number of democratic breakdowns suffered by each country in previous years (*Dem breakdown)*, and the total number of democracies in the world each year (*Total Dem*). Data for *Log GDP per capita* is from the IMF (2006), while data for the

[33] For this, see Przeworski *et al* (2000) and Boix (2003).

remaining variables are from Przeworski *et al* (2000), Norris (2008), Cheibub and Gandhi (2004) and the World Bank's (2008) *Database of Political Institutions* (DPI).

In the outcome equation, we control for political and economic variables identified by the literature as important determinants of trade protection. With respect to political controls, we include Taagepera and Shugart's (1989) measure of effective number of legislative parties (*ENLP*) since Nielson (2003: 475) claims that greater party fragmentation in the legislature leads to increased trade protection. Milner and Judkins (2004) claim that left-leaning governments and federal systems are more protectionist. We thus include from the World Bank (2008) a measure of government *Partisanship* that is coded on a 0 (right government) to 2 (left government) scale and the dummy variable *Federal* for countries with a federal system. We incorporate a dummy for membership in the *GATT/WTO* because its plausible that membership in this institution may have induced developing country governments to reduce trade barriers although some scholars contest this claim (Milner and Kubota 2005; Tomz, Goldstein and Rivers 2007). With respect to economic variables, we include the following controls which have been identified by scholars as important determinants of trade policy: *Log GDP per capita*, *Log population*, a dummy for participation in *IMF programs*, and Chinn and Ito's (2006) *Capital Account Openness* index (e.g., Milner and Kubota 2005; Ozden and Reinhardt 2005; Henisz and Mansfield 2006).[34] Additionally, following Milner and Kubota (2005: 123), we include a dummy variable for balance of payments crisis (*BP Crisis)* and economic crisis (*Econ Crisis*) since these variables may influence trade barriers in developing countries.[35]

Scholars have suggested that intra-industry affects tariffs (Kono 2007; Gilligan 1997; Cadot *et al* 1997). We thus calculated and then included a country-year weighted measure of Grubel and

[34] Data for *log GDP per capita*, *log Population* and *IMF Program* are from the IMF (2006) and World Bank (2006). Data for *GATT/WTO* is from Milner and Kubota (2005), which has been updated by the authors.
[35] Following Milner and Kubota (2005:123), we code *BP crisis* coded as 1 if "a country's level of international reserves falls to less than the equivalent of three months' worth of imports." *Econ Crisis* is coded as 1 if "the country's inflation rate is 40 percent or more and it increases by 25 percent or more from the year before, or per capita GDP falls by 15 percent or more from the previous year."

Lloyd's (1975) Intra-Industry Trade Index in the outcome equation, which is labeled as *IIT Index*.[36] The *IIT Index* variable lies between 0 and 1, with values close to unity indicating a high level of intra-industry trade. We control for the lag of the import penetration ratio of high skilled goods (i.e. goods with $S/L \geq 0.39$) – labeled as *Import ratio-Skilled*—in the outcome equation when *Skilled tariff* is the dependent variable since economists suggest that higher import penetration ratio leads to more trade restrictions (Grossman and Helpman 1994). Likewise, we control for lag of the import penetration ratio of low skilled goods (goods with $S/L < 0.39$), labeled as *Import ratio-Low Skilled*, in the outcome equation when *Low Skilled tariff* is the dependent variable.[37] A linear *Time Trend* is added to the outcome equation since it is possible to obtain spurious correlations between data series that are trended. Furthermore we include the lag of the relevant dependent variable in the outcome equation to account for temporal dynamics.

**4. Results**

We first conduct a preliminary empirical assessment of our hypotheses based on a figure (see figure 3) derived from our sample before reporting the results from the statistical model. Figure 4 illustrates the mean level of *Skilled Tariff* and *Low Skilled Tariff* with 95% confidence intervals in the subsample of democratic and non-democratic country-years. The figure reveals that in developing countries the mean *Skilled Tariff* level in democracies is statistically higher than non-democracies, while the mean level of *Low Skilled Tariff* in democracies is statistically lower than non-democracies. Interestingly, the mean *Skilled Tariff* level is also substantially and statistically higher than the mean in *Low Skilled Tariff* within the set of democratic country-years from the developing world.[38] Figure 4

[36] We operationalize *IIT Index* by first calculating for every country-year the Grubel and Lloyd index for each product in table 2 for which we have tariff data. We then aggregate the GL index across the product categories by obtaining its weighted average, using the shares of each product in total trade as the weights.
[37] *Import ratio-Skilled* (*Import ratio-Low Skilled*) is operationalized as the total imports of high skilled (low skilled) goods divided by the sum of the total output and total imports of high skilled (low skilled) goods.
[38] The difference-of-means test confirms that the mean (i) *Skilled* (*Low Skilled*) *tariff* level in the subsample of democratic country-years is statistically higher (lower) than non-democracies (p=0.000 for both variables) and (ii)*Skilled tariff* level is statistically higher than the mean of *Low Skilled tariff* in democracies.

thus provides preliminary support for our prediction that democracies in the developing world are associated with higher (lower) trade barriers in high (low) skilled goods. We turn to present the results from the SAE selection model below.

<<Insert Figure 4 about here>>

Column A in table 3 reports the selection equation result in which the dependent variable is the *Democracy-ACLP* measure. The specification for the selection equation performs well, correctly predicting above 89% of all observations in the sample. In the selection equation, the lag of the *Democracy-ACLP* dummy, *log GDP per capita*, *Dem Breakdown* and *Total Dem* are each statistically significant. However, *Religious fractionalization*, *Former Colony*, *Catholics*, *Protestants* and *Muslims* are statistically insignificant. The estimate of the spatial autoregressive error parameter $\hat{\delta}$ in each selection equation is positive and highly significant, therein indicating spatial dependence in the occurrence of democratic regimes.

Model 1 in Table 4 reports the results from the outcome equation where the dependent variable is *Low Skilled tariff*. The selection-corrected effect of *Democracy -ACLP* is negative and significant at the 1% level in model 1, which includes country and industry-level fixed effects. This statistically corroborates the claim in hypothesis 1 that democracy has a negative effect on trade barriers for low skilled goods in developing countries. The selection-corrected effect of *Democracy-ACLP* on *Skilled tariff* is positive and significant at the 1% level in the outcome equation in model 2, which also includes country and industry-level fixed effects. This statistically supports hypothesis 2 which predicts that democracy has a positive effect on trade barriers of high skilled goods in developing countries. In the outcome equation in model 3, the effect of *Democracy-Polity* on *Low Skilled Tariff* is negative and highly significant. In model 4 the impact of *Democracy –Polity* on *Skilled Tariff* is positive and significant at the 1% level. Thus our results are robust when we employ the Polity democracy measure as the independent variable.

<<Insert Tables 3 and 4 about here>>

We also derived the substantive effect of *Democracy –ACLP* and *Democracy-Polity* on *Low Skilled tariff* and *Skilled tariff* by using the results from models 1-4. First, from model 1, we find that increasing *Democracy –ACLP* from 0 to 1 while holding other variables in the model at their respective means in the sample decreases *Low Skilled tariff* by 9 percent, which is substantial. Increasing the continuous *Democracy-Polity* measure from an absolute autocracy (-10) to a perfect democracy (+10) in model 3, while holding other variables at their respective mean, also decreases *Low Skilled tariff* by almost 10 percent.[39] Figure 5 shows that the substantive effects reported above are significant at the 95 percent confidence level. The estimates from model 2 reveal that increasing *Democracy –ACLP* from 0 to 1 while holding other variables at their mean increases *Skilled tariff* by 7.2 percent. The estimates from model 4 indicate that increasing *Democracy-Polity* from -10 to +10, while holding other variables at their respective mean, increases *Skilled tariff* by substantively large 8 percent.[40] Figure 6 indicates that this substantive effect is significant at the 95 percent confidence level. Thus we find strong statistical and substantive support for hypotheses 1 and 2.

<<Insert Figures 5 and 6 about here>>

We also check if our main results hold when the cell entries in the spatial weights matrix operationalize whether or not states *i* and *j* share a border instead of measuring the inverse distance between all states *i* and *j*. The results from this exercise are reported in models 5 and 6 respectively. In model 5, the selection-corrected effect of *Democracy -ACLP* on *Low Skilled Tariff* is negative and highly significant, while in model 6 the impact of *Democracy -ACLP* on *Skilled Tariff* is positive and significant at the 1% level.

[39] Increasing *Democracy-Polity* by one standard deviation above its mean, while holding other variables at their mean decreases *Low Skilled tariff* by about  percent.
[40] Increasing the *Democracy-Polity* variable by one standard deviation above its mean and holding other variables at their mean increases *Low Skilled tariff* by 2.5 percent.

We obtain mixed results for the remaining control variables in the outcome equation. For example, *Log Population*, *IMF program*, *IIT index*, *Econ Crisis*, *GATT/WTO* and the *Federal* dummy are consistently insignificant. *BP crisis* and *Capital Account Openness* are significant in some of the models, but are statistically insignificant in most models. *Log GDP per capita*, *ENLP* and *Partisanship* are statistically significant in some but not all the models in Table 4. The lag of *Import ratio-skilled* and *Import ratio-low skilled* are each in the predicted direction and are highly significant in the outcome equations. The spatial autoregressive parameter $\hat{\gamma}$ is consistently negative and significant in the outcome equations. This suggests that trade protection in developing countries is partly influenced by international diffusion. The IMR parameter is significant in each outcome equation, which suggests that we need to account for selection bias when estimating the effect of democracy on trade barriers.

**5. Robustness Tests and Diagnostic Checks**

We conducted several robustness tests. First, we include the following additional controls in the outcome equation: *Terms of trade*, *Party Strength* which is based on Carey and Shugart's (1995) measure, *US hegemony*,[41] the normalized 0-1 Hirschman-Herfindahl index (HHI) of industrial concentration,[42] and an estimated country-year measure of average *import demand elasticity* across the 19 products from which we gathered tariff data.[43] We add these variables to the outcome equation as scholars suggest that they may influence trade barriers (e.g. Milner and Kubota 2005; Ozden and Reinhardt 2005; Hankla 2006; Kee *et al* 2008). We also include additional controls in the selection equation such as *GDP growth rate* and the *turnover rate* of chief executives.

The results in the expanded selection equation, which are reported in column B of Table 4, are similar to the selection equation results reported in Column A of the same table. The selection-corrected effect of *Democracy -ACLP* on (i) *Low Skilled tariff* is negative and significant at the 1% level

[41] Following, Milner and Kubota (2005) *US hegemony* is operationalized as the sum of United States exports and imports as percentage of world trade (see Milner and Kubota 2005).
[42] The normalized 0-1 HHI measure is given by (complete cite).
[43] The *import demand elasticity* measure has been developed by Kee *et al* (2008) and is drawn from the World Bank's (2006) *Trade and Production* database.

in the outcome equation with the additional controls in model 7 (table 5), and, (ii) *Skilled tariff* is positive and highly significant in the augmented outcome equation in model 8. Statistical support for our hypotheses thus remains robust when we include additional controls. As shown in models 9 and 10 respectively, we also obtain strong statistical support for hypotheses 1 and 2 when we include the Polity democracy measure instead of *Democracy-ACLP* in the augmented outcome equation. Second, we estimated additional models after adding more controls in the outcome equation such as *FDI inflows* (% GDP) and *Veto players*. We do not report the results from the models with these additional controls to save space, but our main results were unchanged. The results also remain robust if we use unweighted average measures of *Skilled tariff* and *Low Skilled tariff* for the dependent variable.[44]

Third, we re-estimated the SAE selection model with *Skilled tariff* as the dependent variable in the outcome equation after excluding the outlier, India. We did so since India is a developing democracy that maintained high tariffs on high skilled goods for much of the 1978 to 2004 period. The effect of *Democracy-ACLP* on *Skilled tariff* remains positive and significant at the 1% level after excluding India from the sample (see model 11, Table 5). Fourth, as an additional empirical exercise, we checked the effect of dictatorial regimes on *Skilled tariff* and *Low Skilled tariff* in the outcome equation of the SAE selection model.[45] We do not report the results from this empirical exercise because of space constraints. We found that in sharp contrast to democracies, the selection-corrected Dictatorship variable has a statistically negative effect on *Skilled Tariff*, but positive effect on *Low Skilled tariff* . This further confirms our claim that it is primarily in democracies in the developing world where tariffs on low (high) skilled goods decrease (increase).

<<Insert Table 5 about here>>

[44] Results available on request.

[45] Following Przeworski *et al* (2000), countries in our sample are coded as *Dictatorship* =1 (0 otherwise) if the chief executive is *not* elected, the legislature is *not* elected, there is no more than one party or there has been no alternation in power. The variables in the selection equation – where the *Dictatorship* dummy is the dependent variable –are drawn from Boix and Stokes (2003) who identify variables that influence the likelihood of dictatorships.

Diagnostic tests reveal that none of the models suffer from severe multicollinearity, serial correlation, or omitted variable bias, and that the residuals are normally distributed.[46] Out of an abundance of caution, we implemented Hurlin and Venet's (2003) Granger causality test for TSCS data to assess if there exists an endogenous relationship between each of the two dependent variables in the outcome equation, *Low Skilled tariff* and *Skilled tariff*, and each of the two independent variables, *Democracy-ACLP* variable and *Democracy-Polity*. F-statistics from this test indicates that *Low Skilled tariff* and *Skilled tariff* do *not* statistically influence *Democracy-ACLP* and *Democracy-Polity,* thus mitigating concerns about endogeneity.

We further address the possibility of endogeneity between each of the two dependent variables, *Low Skilled tariff* and *Skilled tariff*, and the continuous *Democracy-Polity* measure by estimating each outcome equation via the Generalized Method of Moments (GMM) suggested by Blundell and Bond (1998). This approach corrects for potential endogeneity in the outcome equation by using moment conditions to derive a set of valid instruments for our potentially endogenous explanatory variables. We follow Blundell and Bond's (1998) advice and estimate the outcome equation by a "system GMM" procedure that combines a regression in first-differences and a regression in levels; estimating the two equations (levels and differences) in a single system leads to consistent and efficient estimates. Results from this procedure (not reported to save space) confirm our main findings. Second, we check for endogeneity between the variables of interest by estimating some spatial probit models in which the dependent variable is *Democracy-ACLP*. The independent variables in the spatial probit models include *Low Skilled tariff* and *Skilled tariff* and the litany of variables mentioned earlier that are included in the selection equation of the statistical model. Results from the spatial probit

[46] The largest and mean VIF value in the models is less than 10 and greater than 1 respectively; thus multicollinearity is not a problem. The Breusch-Godfrey LM test and Gourieroux *et al* (1982) score test failed to reject the null of no serial correlation in the outcome and selection equations respectively. The RESET test shows that there is no omitted variable bias problem; the Jarque-Bera test shows that the residuals are distributed normally. Bivariate correlation tests indicate that the selection-corrected democracy measure in each outcome equation is *not* statistically correlated with the remaining controls in the model.

models that are not reported to save space suggest that endogeneity is not a problem since the effect of *Low Skilled tariff* and *Skilled tariff* on *Democracy-ACLP* is statistically insignificant.

**6. Conclusion**

We suggest in this paper that electoral competition has two distinct effects that cross cut one another. On the one hand, it induces the government to reduce trade barriers for low skilled goods to maximize the utility of the abundant factor, namely the low skilled median voter, who prefers a reduction in tariffs for low skilled goods. On the other hand, electoral politics engenders more lobbying pressure and campaign contributions from the scarce factor in the polity –the owners of skill-intensive industries—who prefer more trade protection for high skilled goods. Such ampaign contributions provide incentives for the incumbent to increase tariffs for high skilled goods. The statistical results support our main theoretical predictions.

The findings presented here contribute both theoretically and empirically to the literature on democracy and trade policy. First, our study suggests that the link between democracy and economic globalization is indeed more nuanced and complex than suggested in existing studies in this issue-area. Electoral competition in developing democracies provided incentives for governments in these states to reduce trade restrictions on low skilled goods which clearly fosters trade globalization and trade flows associated with low-skilled goods. But at the same time, democracy in the developing world generates a "skill-bias" in trade protection where incumbents have incentives to increase trade barriers for high skilled goods. This simple insight is also substantively important in that it indicates that democratic governments in the developing world do not merely employ *latent* policy instruments such as NTBs to impede free trade (see Kono 2006, 2008). Rather, democratic incumbents in developing states also obstruct free trade by using *observable* policy instruments such as tariffs on high skilled goods. As such, in developing countries, the net effect of democracy on economic welfare via trade policy is unclear because even though democratic incumbents arguably enhance welfare by reducing tariffs on low skilled goods, they have incentives to increase tariffs for

high skilled which generates deadweight losses. In addition, the impact of trade policy on the distribution of wealth may be complicated. Such a skill biased trade policy may help generate rising inequality in developing countries, as the rich, skilled owners of capital grow ever richer as a result of heightened protectionism.[47]

Second, we add substantially to our knowledge about trade politics in developing countries. There have been many studies of trade policy in the developed world, but only recently have we developed the data necessary to study such politics in the developing world. We show that politics around trade look very different than in the developed world. In the developed world, the greatest protection covers low skill products which are faced with strong import pressures, largely from the developing countries. Skilled goods are often less protected and are the source of developed country exports. The politics of protection then differs in the two sets of countries, in particular with high skilled groups lobbying for protection in developing countries and being the main support for freer trade in developed ones. Disaggregating the data helps us to uncover the politics of trade. Our study is among the first to systematically test on a novel dataset how democratic politics in the developing world accounts for variation in trade barriers *between* industries that manufacture high skilled goods and those that produce low skilled goods. This is in sharp contrast to extant studies on democracy and trade protection in the developed and developing world that employ broad aggregate measures of trade protection such as import duties or Sachs and Warner's (1995) dichotomous trade liberalization measure. By examining disaggregated data, we can see more effectively how domestic politic shapes trade policy in developing countries and make the contrast to developed ones more clearly.

Third, researchers have made substantial progress in empirically evaluating the effect of democracy on trade protection (Milner and Kubota 2005; Kono 2006, 2008; Eichengreen and Leblang 2008). However, prior scholarship underestimates the possibility that the occurrence of democracy in

[47] There is some evidence that trade in developing countries is associated with increased inequality; see for instance, Ravallion 2001, Easterly 2005, Milanovic and Squire 2005. These scholars show that in their data international trade is associated with an increase in income inequality.

the developing world displays clustering – a condition that needs to be accounted for when estimating the impact of democracy on trade protection. We use a novel statistical estimator, the spatial autoregressive error sample selection model, which accounts for these spatial effects as well as selection bias and the influence of diffusion on trade policy in developing countries. More appropriate statistical methods can help to reveal more persuasively the domestic politics of trade policy.

Two main policy implications emerge from our study. For one, our study implies that the relationship between democracy and economic globalization with respect to trade openness is complex. Democratic governments in developing countries embrace globalization by reducing tariffs on low skilled goods. But they also resist economic openness by protecting skill-intensive industries from import-competition. While democratization may push developing countries toward greater openness, domestic political pressures may complicate the attempt by such countries to fully join the global trading system. Second, our study shows that in developing countries interest groups can influence the trade policy choice of democratic incumbents for at least some (specifically skill-intensive) industries. In fact, our research suggests that prominent developing democracies including Brazil and India have recently blocked reduction in tariffs for high skilled goods, such as pharmaceutical products, at the WTO arguably because interest groups in these countries successfully lobbied their government to not provide trade concessions in international negotiations. Thus if democratic incumbents in developing countries want to reduce protection of high skilled goods to increase economic welfare, they may benefit from designing institutions or rules that discourages lobbying by owners of skilled-intensive industries.

This paper can be extended in two main directions. First, it may be useful to extend our model to study how democratic politics in developing countries may affect their non-tariff barriers. Second, if possible, it may be worthwhile to increase the size of our sample to extend the generality of the empirical results. Whatever direction this project takes, we hope that this study has provided some theoretical and empirical insights that deserve further research.

## Appendix

**Proof of Lemma 1**: We first characterize $t_l^{A^*}$ from the government's expected utility function since in equilibrium Party *B*'s optimal tariff policy is similar. Substituting (3) into (4) to solve for $t_l^A$ leads to

$$\max_{t_l^A} \ \pi(t_l^A,t_l^B)[\beta u^i(p_l(\theta_l,t_l^A)y^i+(1-\beta)(b(t_s^A)-c(t_s^A)]+ \\ [1-\pi(t_l^A,t_l^B)][\beta u^i(p_l(\theta_l,t_l^B)y^i+(1-\beta)(b(t_s^B)-c(t_s^B)] \tag{A.1}$$

To win the election, the government in equilibrium will choose $t_l^A$, in response to $t_l^B$, such that $\partial\pi(t_l^A,t_l^B)/\partial t_l^A=\partial(1-\pi)(t_l^A,t_l^B)/\partial t_l^B$ ; this holds if $\pi(t_l^{A^*},t_l^{B^*})=1/2$. Because $\sigma^i$ is normally distributed, $\pi(t_l^{A^*},t_l^{B^*})=1/2$ when $t_l^{A*}=t_l^{mv}$. The government is completely informed about the median voter's skill level and tariff policy preference. We can thus use backward induction to solve for $t_l^{A*}=t_l^{mv}$. To do so, we need to first derive the median voter's optimal tariff preference on low skilled goods from $u^{mv}$ in (1). Using Roy's identity and homotheticity of the median voter's utility function –which is strictly concave— and given that the government weighs voters' utility via $\beta$, we find from (A.1) and $\partial u^{mv}/\partial t_l^A$:

$$\frac{\partial\pi(t_l^A,t_l^B)}{\partial t_l^A}=\beta\left(\frac{\partial u^{mv}}{\partial y^{mv}}(\lambda^{mv}t_l^A\theta_l M_l'(t_l^A))+Y(d\lambda^{mv}/dt_l^A)\right) \tag{A.2}$$

Without loss of generality, let $\theta_l$ be normalized to 1. If $\theta_l=1$, then from (A.2) we obtain

$$t_l^{A*}=t_l^{mv}=\beta[-Y/M_l'(t_l^A)]\left(\frac{d\lambda^{mv}/dt_l^A}{\lambda^{mv}}\right) \tag{A.3}$$

where $t_l^{A*}=t_l^{B^*}$. Since $u^{mv}$ is continuous and strictly concave $t_l^{A*}=t_l^{mv}$ is the unique maximum. Thus from the retrospective voting rule $\rho(t_l^{mv},u^{mv})=1$ and hence $\pi(t_l^{A^*},t_l^B)=1$ when $t_l^{A*}=t_l^{mv}$ which $\Rightarrow$ the government maximizes its reelection probability when $t_l^{A*}=t_l^{mv}$; the same holds for Party *B* if $t_l^{A*}=t_l^{B^*}$. In equilibrium, the government chooses $t_s^A$ in response to $t_s^B$ such that $\partial\pi(t_s^A,t_s^B)/\partial t_s^A=\partial(1-\pi)(t_s^A,t_s^B)/\partial t_s^B$. Since the owners' utility is weighted via $(1-\beta)$ and $b(t_s^A)+c(t_s^A)=[\alpha\prod(t_s^A)]+S(t_s^A)+t_s^A M_s(t_s^A)+1/2\phi(t_s^A)^2$, differentiating (A.1) with respect to $t_s^A$ leads to

$$\frac{\partial\pi(t_s^A,t_s^B)}{\partial t_s^A}=(1-\beta)\left(\frac{d[\alpha\prod(t_s^A)]}{dt_s^A}+\frac{d(S(t_s^A))}{dt_s^A}+\frac{dt_s^A M_s(t_s^A)}{dt_s^A}+\frac{dc(t_s^A)}{dt_s^A}\right) \tag{A.4}$$

$dt_s^A M_s(t_s^A)/dt_s^A=M_s(t_s^A)+t_s^A M_s'(t_s^A)$ and $dc(t_s^A)/dt_s^A=\phi t_s^A$. Market clearing requires $g^d(t_s^A)=g^d(t_s^A)+M(t_s^A)$ which $\Rightarrow d(S(t_s^A))/dt_s^A=-g^d(t_s^A)-M(t_s^A)$. Note that $d[\alpha\prod(t_s^A)]/dt_s^A=\alpha(g^d(t_s^A))$. Hence

$$\frac{\partial[b(t_s^A)+c(t_s^a)]}{\partial t_s^A}=[\alpha(g^d(t_s^A))-g^d(t_s^A)+t_s^A M_s'(t_s^A)+\phi\, t_s^A] \tag{A.5}$$

Because the government weighs the owner's utility via $(1-\beta)$, we get from (A.4) and (A.5)

$$t_s^{A*}=\frac{(1-\beta)(1-\alpha)g^d(t_s^A)}{M_s'(t_s^A)+\phi} \tag{A.6}$$

where $t_s^{A*}=t_s^{B^*}$. Using backward induction, the owners' optimal contribution –who know that $t_s^{A*}$ is given by (A.6) – must from Grossman and Helpman (1994) satisfy $\partial b(t_s^A)/\partial t_s^A-\partial c(t_s^A)/\partial t_s^A=0$. From (A.5),

$\partial b(t_s^A)/\partial t_s^A = \alpha(g^d(t_s^A)) - g^d(t_s^A) + t_s^A M_s'(t_s^A)$; further $\partial c(t_s^A)/\partial t_s^A = \phi t_s^A$. The optimal contribution is thus characterized by $(\alpha-1)g^d(t_s^{A^*}) + t_s^{A^*} M_s'(t_s^{A^*}) - \phi\, t_s^{A^*}$ **QED.**

**Proof of Proposition 1**: (i) We need to derive the sign of $d\lambda^{mv}/dt_l^A$ to find the sign of $\partial t_l^{A^*}/\partial\beta$.
From $\lambda^{mv} = w + aK^{mv}/wL + aK$ and Jones' hat algebra, we obtain

$$\frac{d\lambda^{mv}}{dt_l^A} = \left(\frac{wL}{(wL+aK)^2(1+t_l^A)}\right)\left(\frac{a(\sigma^\mu k - \sigma^{mv}k)(\hat{w}_l - \hat{a}_l)}{\hat{p}_l}\right) \tag{A.7}$$

$\sigma^\mu k$ is the mean voter's capital stock. $[wL/(wL+aK)^2(1+t_l^A)] > 0$ and $(\sigma^\mu k - \sigma^{mv}k) > 0$ since $\sigma^i$ is left-skewed. From the Heckscher-Ohlin theorem, in a skill scarce labor-abundant country, an increase in $\hat{p}_l$ -- this results from increasing $t_l^A$ (i.e. $dt_l^A$) –leads to $(\hat{w}_l - \hat{a}_l)/\hat{p}_l < 0$. Hence $d\lambda^{mv}/dt_l^A < 0$. The government knows that $\rho(t_l^{mv}, u^{mv}) = 1$ and $\pi(t_l^{A^*}, t_l^B) = 1$ when $t_l^{A*} = t_l^{mv}$. It thus has incentives to increase $\beta$ to account for the low skilled median voters' tariff preference on low skilled goods when adjusting $t_l^A$.
$\partial t_l^{A^*}/\partial\beta = [-Y/M_l'(t_l^A)][(d\lambda^{mv}/dt_l^A)/\lambda^{mv}]$. As shown above, $(d\lambda^{mv}/dt_l^A)/\lambda^{mv} < 0$;
further, $\beta[-Y/M_l'(t_l^A)] > 0$ for $\beta > 0$ since $M_l'(t_l^A) < 0$. Thus $\partial t_l^{A^*}/\partial\beta < 0$ .
(ii)When $t_l^{A^*}$ decreases, $\hat{p}_l$ decreases. From the Heckscher-Ohlin theorem, in a labor-abundant country, decreasing $\hat{p}_l$ leads to $(\hat{w}_l - \hat{a}_l)/\hat{p}_l > 0$ which $\Rightarrow w > 0$ and $K^{mv} > 0$. $\partial\lambda^{mv}/\partial w > 0$ and $\partial\lambda^{mv}/\partial K^{mv} > 0$ which $\Rightarrow \lambda^{mv}$ strictly increases when $t_l^{A^*}$ decreases. Likewise, $\lambda^{lv}$ strictly increases when $t_l^{A^*}$ decreases.
(iii) Since $(d\lambda^{mv}/dt_l^A)/\lambda^{mv} < 0$ and $\beta[-Y/M_l'(t_l^A)] > 0$, $t_l^{A*} = t_l^{mv}$ in (A.3) strictly decreases. $\lambda^{mv}$ and $\lambda^{lv}$ increase when $t_l^{A^*}$ decreases. Since $u^{mv}$ and $u^{lv}$ are continuous and concave, $u^{mv}$ ($u^{lv}$) increases and is maximized when $\lambda^{mv}$ ($\lambda^{lv}$) increases which $\Rightarrow \rho(t_l^{mv}, u^{mv}) = 1$ and $\rho(t_l^{lv}, u^{lv}) = 1$ when $t_l^{A^*}$ decreases. This increases the incumbent's reelection probability as low skilled voters constitute an electoral majority

**Proof of Proposition 2**: (i) The owners' equilibrium contribution is $c(t_s^A) = (1/2)[\phi(t_s^{A*})^2]$.
Thus $dc(t_s^A)/dt_s^{A^*} = \phi\left(\frac{(1-\beta)(1-\alpha)g^d(t_s^A)}{M_s'(t_s^A)+\phi}\right) > 0 \quad \forall\beta,\alpha \in [0,1]$ which $\Rightarrow c(t_s^A)$ increases.

(ii) $\partial t_s^{A^*}/\partial\phi = -[\overbrace{\underbrace{(1-\alpha)(1-\beta)g(t_s^A)}_{+}\overbrace{M''(t_s^A)}^{-}}^{-}] > 0$. When $c(t_s^A)$ increases, the government's rent share increases,i.e. $\lim_{\alpha\to 0}(1-\alpha) \to 1$. $\lim_{\alpha\to 0} t_s^{A*} > t_s^{A*}$ since $\lim_{\alpha\to 0}\frac{(1-\beta)g^d(t_s^A)}{M_s'(t_s^A)+\phi} > \frac{(1-\beta)(1-\alpha)g^d(t_s^A)}{M_s'(t_s^A)+\phi}$ $\forall\alpha \in [0,1]$. This $\Rightarrow \partial t_s^{A^*}/\partial(1-\alpha) > 0$ and $\partial t_s^{A^*}/\partial c(t_s^A) > 0$. When $\lim\beta \to 0, (1-\beta) \to 1$.
$\lim_{\beta\to 0} t_s^{A*} > t_s^{A*}$ since $\lim_{\beta\to 0}\frac{(1-\alpha)g^d(t_s^A)}{M_s'(t_s^A)+\phi} > \frac{(1-\beta)(1-\alpha)g^d(t_s^A)}{M_s'(t_s^A)+\phi}$ $\forall\beta \in [0,1]$; thus $\partial t_s^{A^*}/\partial(1-\beta) > 0$.
(iv) Since $\partial t_s^{A^*}/\partial(1-\alpha) > 0$, $\partial t_s^{A^*}/\partial c(t_s^A) > 0$ and $\partial t_s^{A^*}/\partial(1-\beta) > 0$, $t_s^{A*}$ strictly increases. In equilibrium, $T_s = t_s^{A*}\theta_s M_s$ . $\partial T_s/\partial t_s^{A^*} > 0$ because $M_s > 0$ and $\theta_s$ is normalized to 1. To show that

increasing $t_s^{A*}$ increases the government's reelection probability, we first prove that skilled voters prefer an increase in tariffs for high skilled goods. Using Roy's identity and homotheticity and concavity of $u^{sv} = \max_{t_s} \; u^i(p_s(\theta_s, t_s), y^{sv})$ to solve for $t_s^{sv}$ we get $t_s^{sv} = [-Y / M_s'(t_s^A)]\left(d\lambda^{sv} / dt_s^A / \lambda^{sv}\right)$. $[-Y / M_l'(t_s^A)] > 0$ since $M_l'(t_s^A) < 0$. Further, from the Heckscher-Ohlin theorem, in a skill-scarce developing country $d\lambda^{sv} / dt_s^A > 0$ for skilled voters if $t_s^A$ (and thus $\hat{p}_s$) increases, which $\Rightarrow w > 0$ and $K^{mv} > 0$ when $t_s^A$ increases. Hence $t_s^{sv} > 0$. From continuity and strict concavity of $u^{sv}$, increasing $t_s^A$ increases and maximizes $u^{sv}$. Hence $\rho(t_s^{sv}, u^{sv}) = 1$ when $t_s^A$ increases. Suppose that $\delta \in [0,1]$ is the marginal increase in the government's reelection probability when it obtains the skilled voters' votes by increasing $t_s^{A*}$. If $T_s$ is redistributed to low skilled voters and $t_l^{A*}$ is simultaneously decreased (while increasing $t_s^{A*}$), then from the proofs of Lemma 1 and Proposition 1, the government gets reelected with *at least* probability 0.5. Since decreasing $t_l^{A*}$ ensures a reelection probability of at least 0.5, increasing $t_s^{A*}$ -- while simultaneously decreasing $t_l^{A*}$ -- increases the government's reelection probability to $0.5 + \delta$.

**Estimation of SAE sample selection model**: We follow Flores-Lagunes and Schnier (2006) and estimate the selection and outcome equation of the SAE selection model simultaneously by stacking the corresponding moment conditions and minimizing a GMM criterion function with respect to the model's parameters. Because of space constraints, we provide a brief description of the estimation procedure (interested readers may refer to Flores-Lagunes and Schnier (2006) for more details), which is as follows. First, the selection equation is estimated via spatial probit which accounts for heteroskedasticity. Let $\theta_1 = \{\alpha_{0,} \alpha_1', \delta\}$ be the parameters in the spatial probit model and let $\psi_i(\theta_1) = \alpha_0 + x_{1i}'\alpha_1 \Big/ \sqrt{\mathrm{var}(u_{1i})}$ be the index function. The GMM estimates for $\theta_1$ is: $\hat{\theta}_{1,GMM} = \arg\min_{\theta_1 \in \Theta_1} S_N(\theta_1)' M_N S_N(\theta_1)$ where $S_N(\theta_1) = \frac{1}{N} z_N' u_{1N}(\hat{\theta}_1), z_N$ is a data matrix of regressors plus one instrument to identify $\delta$, $\tilde{u}_{1N}(\theta_1)$ is the vector of generalized residuals and $M_N$ is a positive definite matrix. Since the conditional regression function for the outcome equation is $= \beta_0 + x_{2i}'\beta_1 + \frac{\sigma_{12}}{\sigma_1} \cdot \frac{\sum_j w_{ij}^1 w_{ij}^2}{\sqrt{\sum_j \left(w_{ij}^1\right)^2}} \cdot \frac{\phi\left[-\psi_i(\theta_1)\right]}{\left\{1 - \Phi\left[-\psi_i(\theta_1)\right]\right\}}$, the selectivity correction implies the adjusted IMR: $\lambda_i \equiv \frac{\sum_j w_{ij}^1 w_{ij}^2}{\sqrt{\sum_j \left(w_{ij}^1\right)^2}} \cdot \frac{\phi\left[-\psi_i(\theta_1)\right]}{\left\{1 - \Phi\left[-\psi_i(\theta_1)\right]\right\}}$, which is included as an additional variable in the outcome equation to correct for selection bias. Since $\hat{\lambda}$ depends on $\gamma$, which is included in $w_{ij}^2$, we obtain its VCV matrix by stacking the corresponding moment conditions and employing GMM to estimate simultaneously all parameters of the SAE selection model.

**Table 1:** Developing Countries in Sample, 1978-2004

| | | | | | |
|---|---|---|---|---|---|
| Algeria | Chad | Ghana | Korea | Nigeria | Syria |
| Antigua | Chile | Grenada | Kuwait | Pakistan | Taiwan |
| Argentina | China | Guatemala | Latvia | Paraguay | Tanzania |
| Bahamas | Colombia | Guinea | Lithuania | Peru | Thailand |
| Bangladesh | Congo | Guyana | Libya | Philippines | Togo |
| Barbados | Costa Rica | Haiti | Madagascar | Poland | Trinidad & tobago |
| Belarus | Cote d'Ivoire | Honduras | Malawi | Romania | Tunisia |
| Belize | Cyprus | Hong Kong | Malaysia | Russia | Turkey |
| Bolivia | Czech republic | Hungary | Mali | Rwanda | Uganda |
| Brazil | Dominican republic | India | Mauritius | Saudi Arabia | Ukraine |
| Brunei | Ecuador | Indonesia | Mexico | Senegal | Uruguay |
| Burundi | Egypt | Iran | Mongolia | Sierra Leone | Venezuela |
| Cameroon | El Salvador | Jamaica | Morocco | Singapore | Vietnam |
| Central Africa | Estonia | Kenya | Mozambique | South Africa | Yugoslavia |
| | Ethiopia | | Nepal | Sri Lanka | Zambia |
| | Gabon | | Niger | Sudan | Zimbabwe |

**Table 2:** Skill Intensity of Production

| 3-digit ISIC level code | Description | $S/L$ Ratio |
|---|---|---|
| 331 | Wood Products | 0.109 |
| 323 | Leather Products | 0.091 |
| 311 | Food | |
| 111 | Agriculture & agricultural raw materials | 0.047 |
| 332 | Furniture | 0.125 |
| 324 | Footwear | 0.216 |
| 312 | Textiles | 0.112 |
| 371 | Iron and Steel | 0.283 |
| 369 | Non-metallic products | 0.205 |
| 372 | Nonferrous metals | 0.176 |
| 341 | Paper Products | 0.391 |
| 355 | Rubber Products | 0.352 |
| 383 | Non-electrical machinery | 0.426 |
| 384 | Electrical machinery | 0.611 |
| 390 | Other manufactured products | 0.587 |
| 359 | Petroleum | 0.630 |
| 351 | Industrial Chemicals | |
| 327 | Transport Equipment | 0.465 |
| 349 | Professional Goods | 0.726 |

**Notes**: $S/L$ is the ratio of skilled workers (equal to or more than 12 years of schooling) to low-skilled workers (with less than 12 years of schooling).

**Table 3:** Main Selection Equation Results

| | **Column A** | **Column B** |
|---|---|---|
| | Dependent variable: *Democracy-ACLP* | Dependent variable: *Democracy-ACLP* |
| | *Selection Equation for Models 1-6 in Table 4* | *Selection Equation for Models 7-11 in Table 5* |
| Log GDP per capita | .037*** | .033*** |
| | (.010) | (.006) |
| Lag Democracy | .165*** | .137*** |
| | (.041) | (.055) |
| Former Colony | .023 | .035 |
| | (.084) | (.041) |
| Religious fractionalization | .009 | .020 |
| | (.012) | (.029) |
| Total dem | .026*** | .015** |
| | (.009) | (.005) |
| Dem breakdown | -.051*** | -.032*** |
| | (.020) | (.014) |
| Protestants | .019 | .014 |
| | (.077) | (.093) |
| Catholics | .017 | .018 |
| | (.048) | (.032) |
| Muslims | -.029 | -.011 |
| | (.062) | (.077) |
| GDP Growth rate | | .047 |
| | | (.059) |
| Turnover | | -.039 |
| | | (.030) |
| Constant | -.316*** | -.190*** |
| | (.078) | (.035) |
| $\hat{\delta}$ | .080*** | .068*** |
| | (.029) | (.020) |
| % correctly predicted | 89.2% | 90.8% |
| Prob > $\chi^2$ | 0.000 | 0.000 |

**Notes:** ***, **, *: 1%, 5% and 10% levels of significance.

**Table 4:** Outcome Equation Results of SAE selection model

| | $c_{ij} = 1/d_{ij}$ | | | | $c_{ij} = 1$ if *ij* share border; 0 otherwise | |
|---|---|---|---|---|---|---|
| | *low skilled tariff* | *skilled tariff* | *low skilled tariff* | *skilled tariff* | *low skilled tariff* | *skilled tariff* |
| | **Model 1** | **Model 2** | **Model 3** | **Model 4** | **Model 5** | **Model 6** |
| Lag Skilled tariff | | .224*** | | .161*** | | .217*** |
| | | (.064) | | (.049) | | (.065) |
| Lag low skilled tariff | .178*** | | .109*** | | .303** | |
| | (.049) | | (.042) | | (.078) | |
| Log GDP per capita | -.022** | .045 | -.036** | .039 | -.047** | .065 |
| | (.011) | (.050) | (.017) | (.054) | (.024) | (.052) |
| Log Population | .153 | .127 | .165 | .141 | .425 | .504 |
| | (.125) | (.148) | (.152) | (.140) | (.919) | (.871) |
| IIT Index | -.045 | -.063 | -.053 | -.065 | -.050 | .092 |
| | (.096) | (.092) | (.064) | (.092) | (.063) | (.123) |
| *Democracy-ACLP* | -.112*** | .184*** | | | -.097*** | .114*** |
| | (.031) | (.047) | | | (.014) | (.021) |
| *Democracy –Polity* | | | -.129*** | .145*** | | |
| | | | (.037) | (.056) | | |
| BP crisis | -.022* | .031 | -.034 | .033 | -.064* | -.037 |
| | (.011) | (.038) | (.029) | (.030) | (.045 ) | (.082) |
| Econ Crisis | -.039 | .028 | -.023 | .073 | -.038 | .046 |
| | (.054) | (.051) | (.040) | (.082) | (.042) | (.033) |
| IMF program | .021 | .018 | .025 | .023 | .021 | .027 |
| | (.015) | (.056) | (.086) | (.084) | (.020) | (.048) |
| Capital acct openness | .075** | .092 | .044** | .063 | .060* | -.093 |
| | (.039) | (.123) | (.023) | (.088) | (.039) | (.108) |
| GATT/WTO | -.060 | -.035 | -.053 | -.030 | -.042 | -.024 |
| | (.110) | (.041) | (.043) | (.036) | (.035) | (.090) |
| ENLP | .095 | .023** | .069 | .045 | .097* | .041** |
| | (.080) | (.010) | (.090) | (.063) | (.055) | (.023) |
| Federal | .011 | -.015 | .008 | .019 | .028 | -.017 |
| | (.020) | (.049) | (.041) | (.032) | (.039) | (.034) |
| import ratio-skilled | | .125*** | | .158*** | | .317*** |
| | | (.040) | | (.044) | | (.091) |
| import Ratio-low skilled | .142*** | | .139*** | | .116*** | |
| | (.043) | | (.037) | | (.034 | |
| Time trend | -.044* | -.050 | -.031* | -.024 | -.086* | -.059** |
| | (.026) | (.073) | (.019) | (.018) | (.049) | (.020) |
| $\hat{\lambda}_i$ | .034** | .025** | .050** | .046** | .029** | .032** |
| | (.017) | (.013) | (.026) | (.023) | (.015) | (.017) |
| Constant | -1.455*** | -1.394*** | -1.057*** | -1.216*** | -1.394*** | -1.721*** |
| | (.323) | (.269) | (.285) | (.178) | (.369) | (.506) |
| $\hat{\gamma}$ | -.041** | -.034** | -.025** | -.022** | -.036** | -.050** |
| | (.014) | (.017) | (.012) | (.010) | (.017) | (.026) |
| Log Likelihood | -3214.36 | -3575.4 | -4182.78 | -3736.74 | -4291.93 | -5451.22 |
| wald $\chi^2$:whole model | 83.41 | 76.52 | 91.73 | 87.44 | 97.34 | 93.22 |
| *N* | 980 | 1083 | 891 | 1019 | 976 | 1027 |

**Notes:** ***, **, *: 1%, 5% and 10% levels of significance. Numbers in parentheses are Newey-west std errors. The models are estimated with country and industry-level fixed effects that are not reported to save space.

**Table 5:** Robustness tests: Outcome Equation Results ($c_{ij} = 1/d_{ij}$)

| | *low skilled tariff* | *skilled tariff* | *low skilled Tariff* | *skilled tariff* | *skilled tariff* |
|---|---|---|---|---|---|
| | **Model 8** | **Model 9** | **Model 9** | **Model 10** | **Model 11** [a] |
| Lag Skilled tariff | | .114*** | | .139*** | .317*** |
| | | (.036) | | (.042) | (.082) |
| Lag low skilled tariff | .197*** | | .252** | | |
| | (.055) | | (.061) | | |
| Log GDP per capita | -.025** | .034 | -.065** | .059 | -.042** |
| | (.012) | (.027) | (.034) | (.038) | (.020) |
| Log Population | .116 | .108 | .334 | .119 | .412 |
| | (.102) | (.107) | (.827) | (.103) | (.615) |
| *Democracy-ACLP* | -.103*** | .160*** | | | .121*** |
| | (.027) | (.035) | | | (.038) |
| *Democracy-Polity* | | | -.119*** | .114*** | |
| | | | (.033) | (.021) | |
| BP crisis | -.057 | .051 | -.039 | .041 | -.085 |
| | (.044) | (.043) | (.065) | (.040) | (.090) |
| Econ Crisis | .032 | .033 | .053 | .035 | .062 |
| | (.046) | (.042) | (.040) | (.041) | (.061) |
| IMF program | .031 | .018 | .047 | .033 | .025 |
| | (.040) | (.020) | (.036) | (.028) | (.042) |
| Capital acct openness | .051* | .040 | .057 | .039 | .071 |
| | (.030) | (.032) | (.040) | (.067) | (.083) |
| GATT/WTO | -.038 | -.047 | -.050* | -.039 | -.041* |
| | (.042) | (.033) | (.033) | (.075) | (.022) |
| ENLP | .040 | .045** | .048 | .072* | .036* |
| | (.089) | (.023) | (.071) | (.039) | (.019) |
| Partisanship | -.055** | .091 | -.022** | .059 | .077 |
| | (.026) | (.093) | (.010) | (.085) | (.090) |
| Party Strength | .087 | .066 | .075 | .094 | .059 |
| | (.095) | (.090) | (.064) | (.103) | (.075) |
| import ratio-skilled | | .188*** | | .171*** | .232*** |
| | | (.055) | | (.042) | (.078) |
| import ratio-low skilled | .126*** | | .055*** | | |
| | (.027) | | (.014) | | |
| US hegemony | -.053 | .028 | .053 | .036 | -.065 |
| | (.043) | (.031) | (.040) | (.040) | (.052) |
| IIT Index | -.065 | -.138 | -.145 | -.123 | -.157 |
| | (.092) | (.144) | (.129) | (.184) | (.152) |
| HHI | .078 | .051 | .081 | .045 | .036 |
| | (.049) | (.077) | (.059) | (.087) | (.058) |
| import demand elasticity | .077 | .082 | .063 | .091 | .095 |
| | (.096) | (.089) | (.085) | (.090) | (.108) |
| terms of trade | -.105 | -.118 | -.127 | -.093 | -.149 |
| | (.150) | (.177) | (.154) | (.298) | (.116) |
| time trend | -.040* | -.021* | -.059* | -.032* | -.036* |
| | (.026) | (.013) | (.038) | (.018) | (.021) |
| $\hat{\lambda}_i$ | .023** | .038** | .057*** | .037** | .037** |
| | (.011) | (.019) | (.022) | (.019) | (.020) |
| $\hat{\gamma}$ | -.043** | -.029** | -.024** | -.036** | -.020** |
| | (.021) | (.014) | (.012) | (.019) | (.011) |

| | | | | | |
|---|---|---|---|---|---|
| Constant | -1.146*** | -1.231*** | -.892*** | -1.714*** | -1.014*** |
| | (.344) | (.488) | (.185) | (.254) | (.233) |
| Log Likelihood | -2077.01 | -2429.6 | -3953.61 | -3152.23 | -4955.23 |
| Wald $\chi^2$:whole model | 49.40 | 61.34 | 79.20 | 56.09 | 96.21 |
| *N* | 802 | 893 | 825 | 857 | 773 |

**Notes:** ***, **, *: 1%, 5% ,10% significance levels. Numbers in parentheses are Newey-west std errors. The models are estimated with country and product-level fixed effects that are not reported to save space. [a] India excluded from sample.

**Figure 1**: Output-Weighted tariffs for High and Low Skilled Goods (3-digit ISIC level)

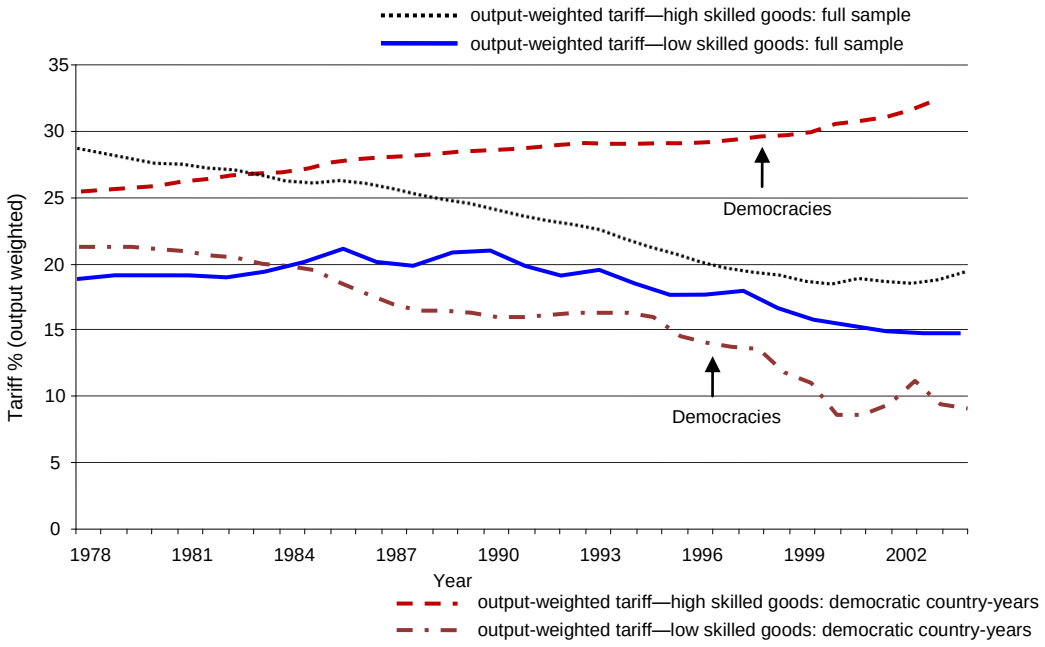



**Figure 2**: Output-Weighted tariffs for High Skilled goods in Brazil, India and South Africa

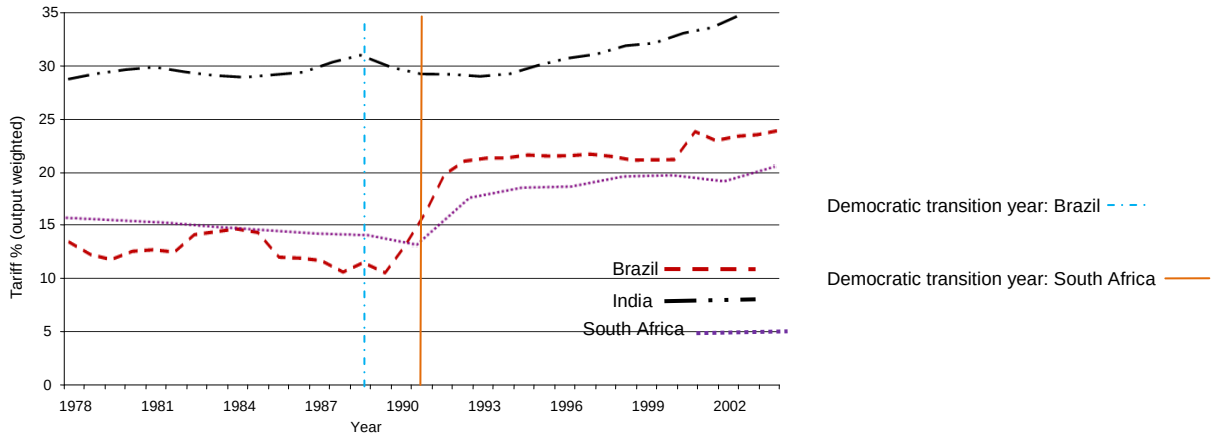


**Figure 3**: Output-Weighted tariffs for Low Skilled goods in Brazil, India and South Africa

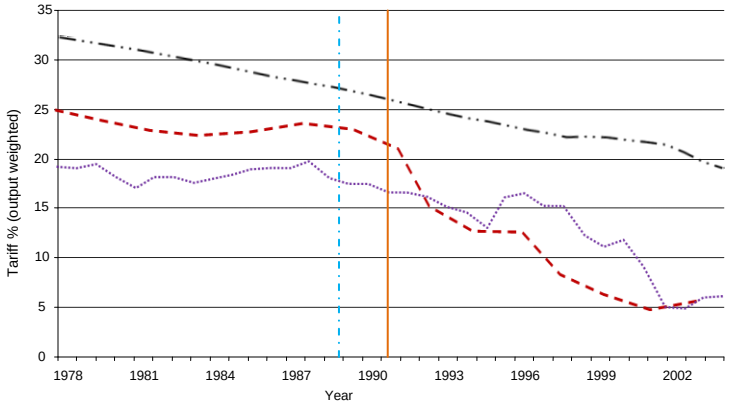



**Figure 4**: Output-Weighted tariffs for High and Low Skilled Goods in Democracies and Non-democracies

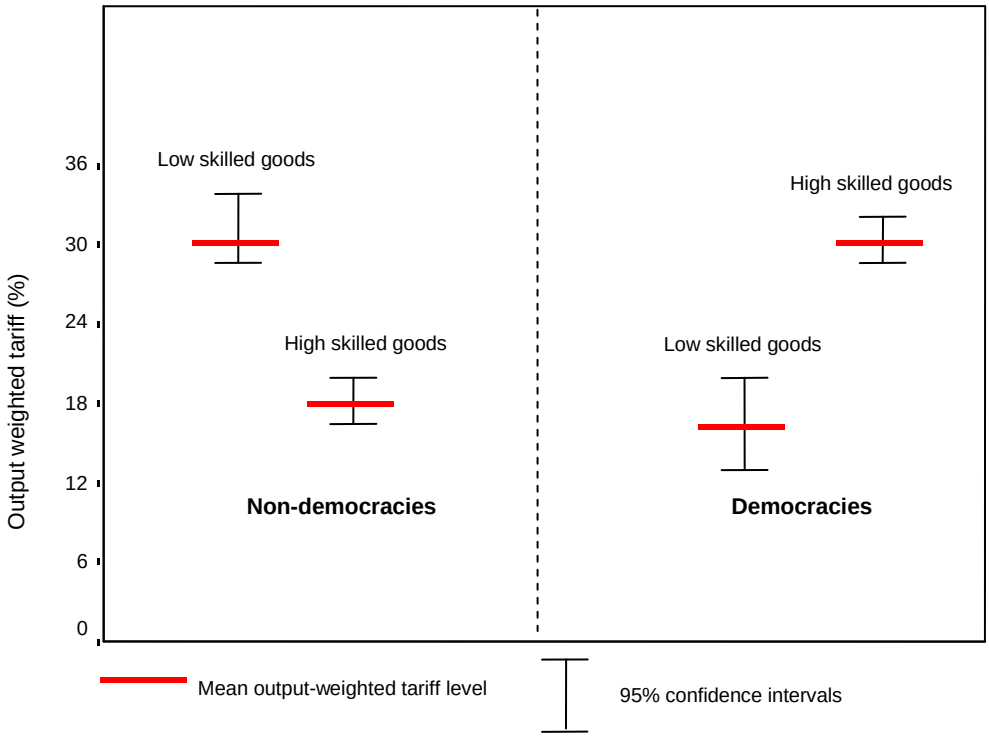


**Figure 5:** Substantive Effect of Democracy on *Low Skilled Tariff* in Developing Countries

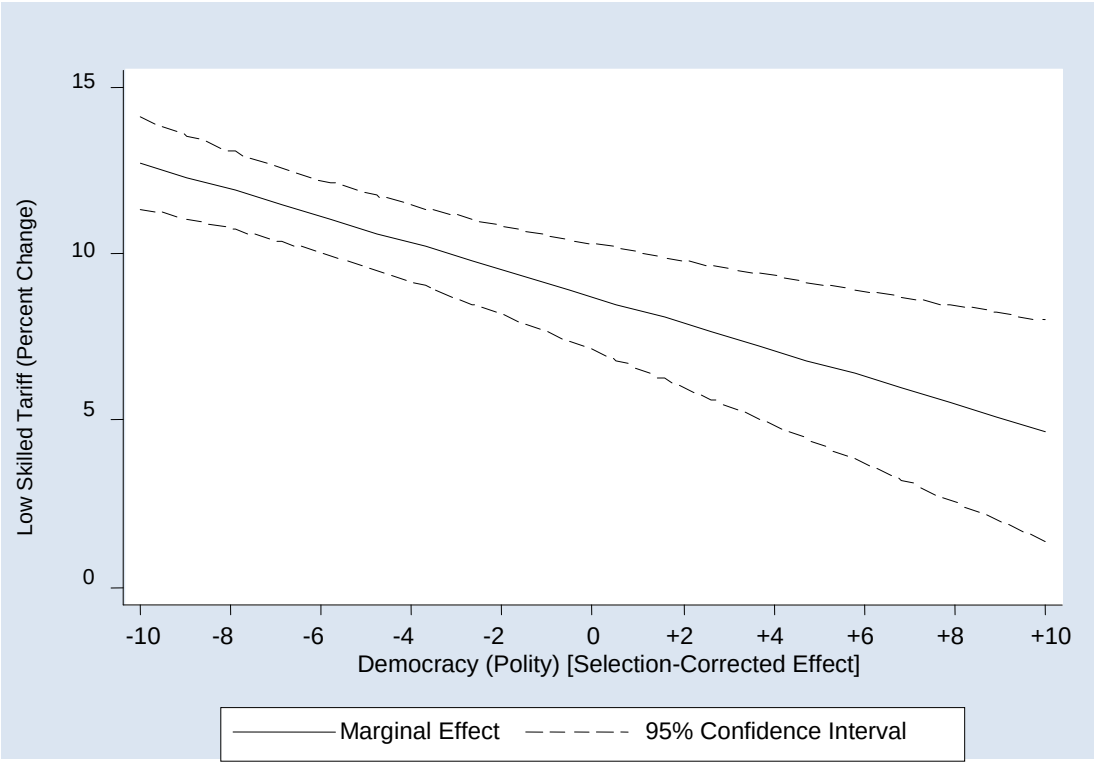
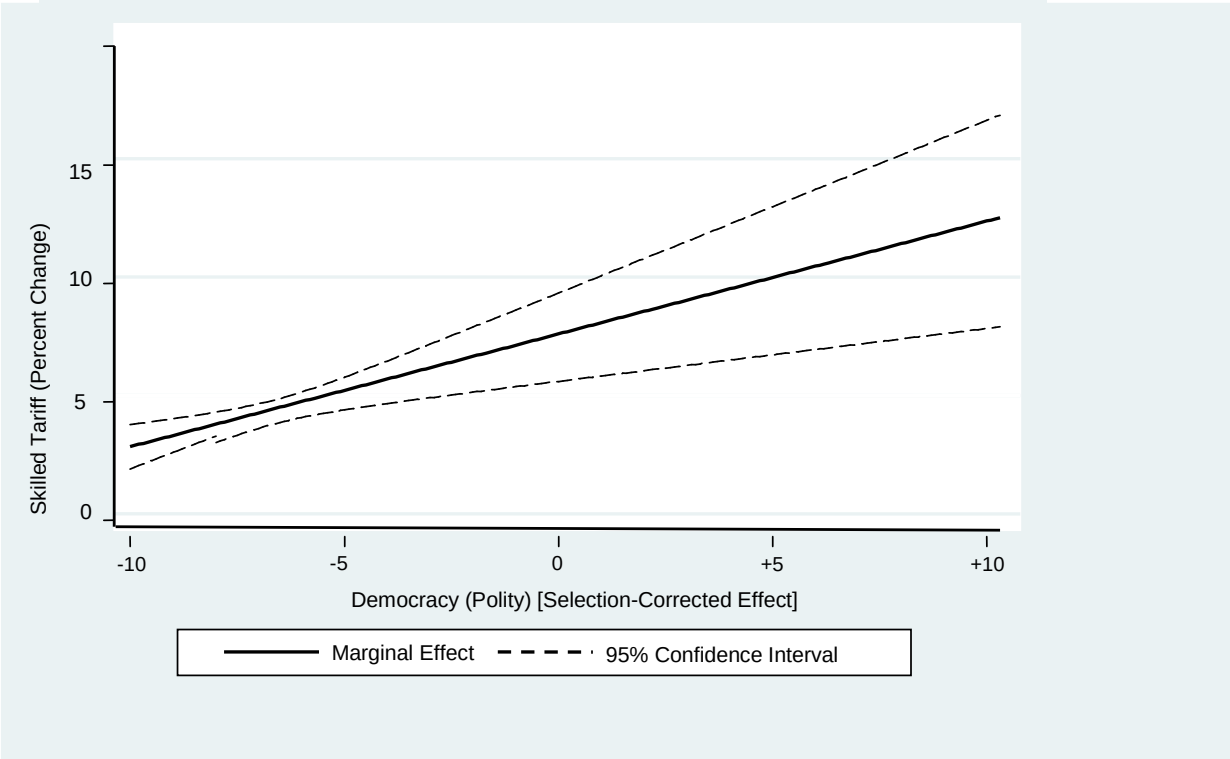



**Figure 6:** Substantive Effect of Democracy on *Skilled Tariff* in Developing Countries



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