

# Do Autocratic States Trade Less?

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## Abstract

The paper analyzes whether the political regime of a country influences its involvement in international trade. Firstly, we develop a theoretical model that predicts that autocracies trade less than democracies. Secondly, we test the predictions of the model empirically using a panel of more than 130 countries for the years 1962 to 2000. In contrast to the existing literature, we use data on individual importing and exporting countries, rather than a dyadic set-up. In line with the model, we find that autocracies import substantially less than democracies, even after controlling for official trade policies. This finding is very stable and does not depend on a particular set-up or estimation technique.

*JEL classification:* F13; F14; O24; P45; P51

*Keywords:* international trade; democracy; autocracy; gravity model

## 1 Introduction

Is there a systematic relationship between economic and political liberalization? Does the political regime of a country systematically affect how involved that country is in international trade? The first question has received a lot of attention recently in the economic literature with studies of the determinants of democracy (e.g., Barro, 1999; Acemoglu et al., 2008) and economic freedom (e.g., Boockmann and Dreher, 2003; Bjørnskov, 2006; Dreher and Rupprecht, 2007) as well as studies of the relationship between democracy and economic freedom (e.g., Sturm and de Haan, 2003; Giavazzi and Tabellini, 2005).<sup>1</sup> The second, more specific question, is, in contrast, much less well researched and the purpose of this paper is to provide some new answers to the question.

Existing knowledge about how political regimes may influence international trade comes from the political science literature. Two seminal papers in this literature find that democracy encourages trade. Mansfield et al. (2000) stress the importance of the congruence between the political

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<sup>1</sup>Recently convergence and contagion trends of the two concepts have also been studied (Nieswiadomy and Strazicich, 2004; Gassebner et al., 2008). Furthermore, the influence of both measures on macroeconomic outcomes is attracting great interest (e.g., de Haan and Siermann, 1996; de Haan and Sturm, 2000; Sturm and de Haan, 2001; Bjørnskov, 2005; de Haan et al., 2006).

regime of pairs of trading countries. They show that pairs of democratic countries trade more than pairs consisting of a democracy and an autocracy.<sup>2</sup> Milner and Kubota (2005) test whether democratization leads to trade policy liberalizations in a sample of developing countries and show that democratic political institutions are one of the main determinants of trade policy in these countries.

We add to this literature in two related ways. First, we argue that the theoretical foundations of the previous studies (discussed in more detail in the next section) overlook the importance of regime differences in *political accountability* and in *external monitoring* and how these differences induce societies to build more or less effective incentives for officials in the customs service. The lack of political accountability makes it possible for political leaders to extract rents by imposing restrictions on international trade. Moreover, within a hierarchical government structure, the lack of effective external monitoring due, for example, to the absence of free media makes it less likely that political leaders *choose* to strengthen institutions to reduce trade-distorting red tape and other unofficial trade barriers. Our theoretical contribution, therefore, predicts that autocracies – societies with weak political accountability and external monitoring – trade less with the rest of the world than democracies – societies with strong political accountability and well-developed external monitoring – for two reasons: democracy limits the scope for rent extraction via trade restrictions *and* encourages institutional reforms that reduce bureaucratic inefficiencies.

Second, the existing empirical literature focuses on dyads of countries. For this reason, it does not cast any light on how the political regime affects the trade performance of *individual* countries. Do autocracies trade less than democracies? We answer in the affirmative. By doing so, we move the focus away from dyads of countries to individual countries. Furthermore, we use a much larger data set, with a longer time horizon and a deeper country coverage than previous studies. Finally, our empirical design allows us to demonstrate that regime differences in trade policy, while playing a role, cannot fully account for the observed differences in trade flows. Both the observation that autocracies trade less and the observation that they trade less conditional on trade policy are consistent with our theoretical model.

Some authors have argued that international trade encourages democratization (e.g., Li and Reuveny, 2003; López-Córdova and Meisner, 2005; Rigobon and Rodrik, 2005). This possibility obviously is a concern when trying to estimate the impact of regime type on trade flows: countries that are not involved in international trade could be autocracies for *that* reason. We attempt

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<sup>2</sup>Especially with their theoretical considerations and the inclusion of mixed and autocratic pairs they enhance previous work by Morrow et al. (1998) who only include pairs of democracies in their empirical analysis. Morrow et al. also find that democracies trade more with each other.

to deal with this issues partly by allowing for unobserved country and time fixed effects in our empirical specification, partly by lagging the empirical indicators used to capture institutional differences between countries and partly by using instrumental variables.

The rest of the paper is organized as follows. Section 2 presents the model, contrasts it to existing models and develops the two hypotheses that govern the empirical investigation. Next, we develop our empirical strategy. In section 4, we present our main result. After that, an extensive set of tests of robustness, including IV estimates, is presented. In section 6, we provide some concluding remarks.

## 2 A Model of Political Regimes and Trade Flows

In this section, we present a model that illuminates two new channels through which regime types can affect trade flows. One channel is the political accountability channel. It is harder for citizens in autocratic countries to hold their rulers accountable. As a consequence, rulers are relatively free to use trade taxes to extract rents. The other channel is the external monitoring channel. Lack of a free press, for example, weakens external monitoring in autocratic societies. Rulers can compensate for this by building internal control mechanisms designed to weed out red tape and other distortionary unofficial trade obstructions introduced by the customs services. Importantly, however, complementarity between external monitoring and these internal control mechanisms, which we model as an efficiency wage, implies that autocratic rulers have *less* incentive to build or strengthen such internal control mechanisms. As a consequence, the customs service in an autocracy is relatively free to introduce and maintain red tape. Both of these channels suggest that autocracies, *ceteris paribus*, trade less than democracies and that this continues to be true conditional on similar official trade policies.

The existing theoretical work on the link between political regime types and trade flows or policy have either focused on the role of international agreements or on the effect of an extension of the voting franchise, rather than on accountability and external monitoring.<sup>3</sup>

The first approach is taken by Mansfield et al. (2000). They study how the incentives to enter a trade agreement differ between pairs of countries with different political regimes. The

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<sup>3</sup>There is, of course, also a large literature on the political economy of trade protection (e.g., Hillman, 1982; Mayer, 1984; Hillman, 1989; Grossman and Helpman, 1994; Aidt, 1997). The aim of this literature is to explain trade protection within the context of competitive political systems often embodied in some form of democratic institutions rather than to explain differences between broad regimes types such as autocracy and democracy. The focus of our model is more closely related to Adresà et al. (2003). They also stress the role of political accountability with free and competitive elections and the role of the media in creating incentives for politicians to reduce rent extraction.

difference between democracy and autocracy is that the executive in a democracy is constrained by the fact that any trade agreement must be ratified by the legislature while the executive in an autocracy is free of such constraints. With the additional assumptions that the legislature is more protectionist than the executive and that trade negotiations take place sequentially as suggested by Putnam (1988), it follows that pairs of democracies agree on a more lenient trade policy than mixed pairs of autocracies and democracies. The reason is that a trade war is worse for a pair of democracies. While this prediction is robust to a range of different bargaining structures, the model is mute on how much pairs of autocracies trade relative to pairs democracies.<sup>4</sup> Our model shares the notion that the critical difference between autocracies and democracies is the lack of effective constraints on the executive in the former, but departs in three important ways. Firstly, we focus on a single country and thus on unilateral trade policy. This allows us to make predictions about how democracy/autocracy – the regime type – affects trade flows and trade policy for individual countries. Secondly, we focus explicitly on the incentives that the threat of replacement provides for rulers and politicians in different types of political regimes. Moreover, our model has the advantage that democracy and autocracy can be conceptualized along a continuum within the same analytic structure. Thirdly, we combine an explicit economic structure with a stylized political structure.

The other approach is taken by Milner and Kubota (2005). In particular, they maintain that the link between democratization and freer trade is an enlargement of the constituency of government that yields a shift of the median voter/supporter. Under autocracy the constituency of government is typically a small group of individuals who are well-endowed with capital. Under democracy with universal suffrage, the median voter is a worker with a low capital endowment. In countries with an advantage in the production of labor-intensive goods (e.g., in developing countries), the Stolper-Samuelson Theorem implies that the median voter benefits from trade liberalization both as a consumer and as a laborer. Our model is complementary to this. We ignore the effect that political transitions may have on the constituency of government and the role that special interests may play both in an autocracy and in a democracy. Instead, we highlight that the degree to which rulers/politicians can be held accountable for their actions and their incentives to invest in “good” institutions varies systematically across regime types within a specific-factors model of international trade.

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<sup>4</sup>Dai (2002) criticizes the theoretical findings of Mansfield et al. (2000) and argues that their main proposition depends on the preferences of the executives and that it is therefore not generally true that democratic pairs trade more than mixed pairs. However, as pointed out by Mansfield et al. (2002) this critique is only valid if the two-level game structure of international negotiations is replaced by a structure in which the legislature of a democracy negotiates directly with its counterpart or with the dictator if paired with an autocracy.

## 2.1 The Economy

We consider a small open economy that produces two goods and has an infinite time horizon. The stage model is similar to the specific-factors model of trade employed by Grossman and Helpman (1994) and many others. Good 0 is a numeraire good produced with constant returns to scale with labor as the only input and with an input-output coefficient of 1. Good 1 is produced by labor and sector-specific capital. The profit function is  $\pi(p)$  where  $p$  is the domestic price of the good;  $p^*$  is the international price. Domestic supply is  $\frac{\partial \pi}{\partial p} = y(p)$ . Labor can move freely between sectors and consequently the wage rate in the private sector is  $w^p = 1$ .

The economy has two types of private agents. A tiny fraction of the population owns the sector-specific capital. They spend all profit income on good 0. A continuum of workers with measure 1 earns wage income as each supplies one unit of labor inelastically to the labor market. Workers consume both goods and spend their entire income each period. Their utility function is  $x_0 + u(x_1)$ . Optimization subject to the budget constraint yields individual demands,  $x_1 = d(p)$  and  $x_0 = w^p - pd(p)$ , and the indirect utility  $v(p, w^p)$ . All utilities are discounted with the factor  $\beta \in (0, 1)$ . Good 1 is traded internationally and net imports are  $m(\cdot) = d(p) - y(p)$ .<sup>5</sup>

Trade flows are distorted by two types of policy interventions. Firstly, the ruler of the country (the government) can levy a trade tax  $\tau$  on good 1. If  $\tau > 0$  and good 1 is imported (exported) then  $\tau$  is a tariff (export subsidy) and if  $\tau < 0$  and good 1 is imported (exported) then  $\tau$  is an import subsidy (export tax). To be concrete, we shall refer to  $\tau$  as a tariff and thus assume that the country imports good 1.<sup>6</sup> Secondly, the bureaucracy in charge of regulating international trade can introduce various unofficial trade barriers. We shall refer to these as *red tape*. The per-unit cost of red tape is denoted by  $\theta$ . We can, therefore, define the effective trade distortion,  $\tau + \theta$ , as the difference between the domestic and the foreign price, i.e.,  $\tau + \theta = p - p^*$ . The revenues from the trade tax are

$$r(\tau, \theta) = \tau m(\tau, \theta) \tag{1}$$

where  $\frac{\partial m(\tau, \theta)}{\partial \tau} < 0$ , i.e., an increase in  $\tau$  pushes up the domestic price which reduces domestic demand and increases domestic production. This means that  $r(\tau, \theta)$  is a Laffer curve. Moreover, since  $\frac{\partial m(\tau, \theta)}{\partial \theta} < 0$ , red tape reduces the tax revenues raised for each value of  $\tau$ .

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<sup>5</sup>We note that individual and aggregate demand for good 1 is identical.

<sup>6</sup>It will be clear from the objective function of the ruler that imports or exports are never subsidized. If good 1 is exported, the ruler will impose an export tax and if it is imported he will protect domestic production with a tariff. From the point of view of workers either is equally bad, so it is without loss of generality that we focus on tariffs. A similar analysis can be conducted for export taxes.

## 2.2 Politics

The society is governed by a ruler. We assume that the objective of the ruler is to extract rents from the economy. These rents are spend on the numeraire good and the ruler's utility is  $u_R = r(\tau, \theta)$ .<sup>7</sup> The ruler's capacity to extract rents depends on the quality of the underlying institutions. We measure institutional quality by the variable  $Q \in [0, 1]$ . At one end of the spectrum, we have fully functional democracy with a free press and respect for civil rights ( $Q = 1$ ). At the other end, we have a dictatorship without any effective way for citizens to hold the ruler accountable and no free press to monitor events ( $Q = 0$ ). Depending on  $Q$ , the ruler can, therefore, be thought of as an unconstrained dictator, a democratically elected politician, or someone in between.<sup>8</sup>

The ruler must employ a bureaucracy to run the customs services. The task of the appointed bureaucrat is to collect tariffs, which are handed over to the ruler, but in the process he might create red tape  $\theta$ . We assume that the bureaucrat benefits from red tape, e.g., because it allows him to collect bribes or because it gives the customs service more power. Red tape can either be low (absent) or high, i.e.,  $\theta \in \{0, \bar{\theta}\}$  where  $\bar{\theta} > 0$ . The rent that the bureaucrat gets from introducing red tape is  $\theta B$ , where  $B$  is a positive constant. For simplicity, we assume that the bureaucrat only holds office for one period and that he consumes good 0 only.<sup>9</sup> Red tape is not in the interest of the ruler. It distorts trade flows and reduces tariff revenues. The ruler might, therefore, want to design a control system that provides incentives for the bureaucrat to refrain from introducing red tape. We model this as an efficiency wage. We stress that this is just one example of a costly institution that a ruler might build to discipline the bureaucracy he employs. What is important is that whether or not to pay efficiency wages is an *endogenous* choice made by the ruler, and that it is *costly* to do so.

The incentive to pay efficiency wages depends critically on the effectiveness of external monitoring. The media and the press play an important part in these activities. A free press, for example, can report on malfeasance and appropriate action can be taken by the ruler. We assume that the

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<sup>7</sup>We could extend the model to include a public good. In this case, the ruler can only keep the difference between what is spend on public goods and total tax revenues. All our results are essentially unaffected and we prefer, for simplicity, to stick to Leviathan assumption as in Brennan and Buchanan (1980). More importantly, we do not want to assume that the intrinsic objectives of "rulers" in autocracies and democracies are different. Rather we want to argue that it is the quality of institutions that forces democratically elected rulers to behave differently from dictators. There is ample evidence that rulers in particular in societies with weak institutions can extract significant rents (see, e.g., Olken, 2006). Along similar lines Moselle and Polak (2001) show how different primitive state forms can enhance or restrict the rulers' capacity to extort taxes for their own ends.

<sup>8</sup>We simply assume that political accountability is positively related to a free press. However, as shown by Anserà et al. (2003), the relationship can be endogenized by noting that a free press can provide information to the electorate. This information allow voters to reduce the rents extracted by their rulers.

<sup>9</sup>This is not important for the results. It is straight forward to extend the model to allow bureaucrats to hold office forever.

external monitoring technology discovers malfeasance with probability  $1 - z(\cdot)$ . The effectiveness of external monitoring is exogenous, but systematically related to the quality of institutions,  $Q$ . We assume that  $z'(Q) < 0$  and that  $z(1) = 0$  and  $z(0) = 1$ . That is, external monitoring is more effective in societies with high quality institutions. This reflects systematic differences in media freedom.

In case of discovery, which happens with probability  $1 - z(Q)$ , the bureaucrat is immediately fired. Consequently, he loses his wage income from the public sector, the rent from red tape, and returns to the private sector. In the private sector, he receives  $w^p$  starting from next period onwards. With probability  $z(Q)$ , he is not discovered. In this case, he keeps the public sector wage for the current period ( $w_t$ ) and any rent from creating red tape, and returns to the private sector in the subsequent period. We can write the expected utility of a bureaucrat who introduces red tape in period  $t$  as

$$z(Q)[w_t + \bar{\theta}B] + \frac{\beta w^p}{1 - \beta} \quad (2)$$

and that of a bureaucrat who refrains from doing so as  $w_t + \frac{\beta w^p}{1 - \beta}$  where  $w_t$  is the public sector wage.<sup>10</sup> To strengthen the incentives of the customs service, the ruler may, as suggested by Becker and Stigler (1974), decide to offer an efficiency wage. The cost of this is financed out of tariff revenues. The efficiency wage that ensures that no red tape is introduced is given by:

$$w^e = \frac{z(Q)}{1 - z(Q)} \bar{\theta}B. \quad (3)$$

Faced with the public sector wage  $w_t$ , the optimal choice of the bureaucrat in office in any period  $t$  can then be summarized as follows:

$$\theta_t(w_t) = \begin{cases} 0 & \text{if } w_t \geq w^e \\ \bar{\theta} & \text{if } w_t < w^e \end{cases}. \quad (4)$$

Citizens attempt to hold the ruler accountable for his actions while in office. They try to replace rulers whom are judged to extract too much rent. The extent to which they can do this also depends on the quality of institutions,  $Q$ . In a fully democratic society, elections and a free press provide accountability (Ferejohn, 1986; Persson and Tabellini, 2000; Besley and Prat, 2008), but even in autocracies and dictatorships, rulers may be constrained by the threat of a coup or a popular revolt (Acemoglu and Robinson, 2001). Formally, at the beginning of each period,

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<sup>10</sup>To ensure a positive supply of bureaucrats we assume that  $\bar{\theta}B > 1$ .

workers announce a performance standard that the ruler has to satisfy to get “reappointed” at the end of the period. Workers base their performance standard on the level of utility they get from the policies implemented by the ruler and the bureaucrat within the period. We denote the performance standard announced at the beginning of period  $t$  by  $\hat{v}_t$ . The standard requires the ruler to introduce a policy package  $(\tau_t, w_t)$  that yields at least the utility level  $\hat{v}_t$  in order to be considered for reappointment. We assume that only workers have political voice (set standards). This assumption is made for simplicity. We can think of it as a situation in which the ruler needs to please the masses; an assumption that makes sense in a democracy, but also in many cases in autocracies.<sup>11</sup>

In a well-functioning democracy with a free press (high  $Q$ ), a ruler (politician) who complies with the standard is guaranteed reappointment while a ruler (politician) who does not comply is certain of dismissal. Accountability is, however, seriously weakened in societies with dysfunctional institutions (low  $Q$ ). Absence of regular and fair elections, intimidation of the opposition, electoral fraud, suppression of the press etc. can significantly reduce the degree of accountability. We focus on a particular type of governance failure that impacts directly on the degree of accountability rulers are subjected to:

**Definition 1** (*q-failure*) *Workers can only promise to dismiss a ruler who does not satisfy  $\hat{v}_t$  in period  $t$  with probability  $1 - q(Q) \in [0, 1]$  with  $q'(Q) < 0$ ,  $q(1) = 0$  and  $q(0) = 1$ .*

A  $q$ -failure arises when citizens cannot, in all cases, dismiss under-performing rulers, and a society with  $q(Q)$  close to 1 can be interpreted as a dictatorship in which the ruler can rule unchallenged. A society with poor institutions ( $Q$  close to zero) suffers from significant  $q$ -failures and lacks an effective external control mechanism ( $z$  is close to one). In contrast, in a society with strong institutions ( $Q$  close to one)  $q$ -failures are mostly absent and external monitoring, e.g., through free media, is effective ( $z$  is close to zero).

The interaction between rulers, bureaucrats and workers can be summarized as follows. At the beginning of each period, a new bureaucrat enters office and workers announce a performance standard. Next, the ruler decides on the tariff and the public wage for the period. After that the bureaucrat decides how much red tape to introduce and the monitoring technology determines if he is fired prematurely. At the end of the period, workers observe their utility levels, judge the performance of the ruler against the utility standard and decide if they want to reappoint the

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<sup>11</sup>The model could be extended to allow the owners of specific capital to lobby (offer bribes to) the ruler. This could be done along the lines of Aidt and Dutta (2004), but a formal analysis would distract from our current purposes.

incumbent ruler or not. This together with random events, as captured by  $q$ , determines whether the incumbent is, in fact, replaced by another ruler. After this the sequence of events is repeated.

### 2.3 Analysis and Results

Given a sequence of standards  $\{\widehat{v}_t\}_{t=0}^\infty$ , the ruler faces the choice between complying and hoping to stay in power (which allows him to collect rents in the future) or not complying and collecting the maximum rent now.

If the ruler decides not to comply at time  $t$  (i.e., to deviate ( $D$ )), he sets

$$\{\tau_t^D, w_t^D\} = \arg \max_{\tau_t, w_t} r(\tau_t, \theta(w_t)) - E(w_t). \quad (5)$$

In doing so, he anticipates how the public wage affects the choices of the bureaucrat. It is costly to provide wage incentives and the expected wage bill is

$$E(w_t) = \begin{cases} zw_t & \text{if } w_t < w^e \\ w_t & \text{if } w_t \geq w^e \end{cases}. \quad (6)$$

The ruler knows that he only has to pay the wage if the bureaucrat is not discovered adding red tape. Clearly, either  $w_t^D = 0$  or  $w_t^D = w^e$  is optimal. In the former case, the optimal tariff is

$$\tau^{D1} = \arg \max_{\tau_t} r(\tau_t, \bar{\theta}) \quad (7)$$

and the rent is  $r(\tau^{D1}, \bar{\theta})$  for all  $t$ , and in the later case, it is

$$\tau^{D2} = \arg \max_{\tau_t} r(\tau_t, 0) - w^e \quad (8)$$

and the rent is  $r(\tau^{D2}, 0) - w^e$  for all  $t$ . In either case, the workers attempt to replace the ruler at time  $t + 1$  but with probability  $q(Q)$  fail to do so. The ruler's expected payoff is

$$V_t(D) = \max \{r(\tau^{D1}, \bar{\theta}), r(\tau^{D2}, 0) - w^e\} + \beta q(Q) V_{t+1}^*, \quad (9)$$

where  $V_{t+1}^*$  is the continuation value of holding office at the beginning of period  $t + 1$ . The optimal deviation policy depends on the quality of the monitoring institutions as described by Lemma 1.

**Lemma 1** (*The Optimal Deviation Policy*) Let  $Z(Q) = \frac{z(Q)}{1-z(Q)}$  with  $Z' < 0$ . Moreover,

$$\Delta R^D \equiv \frac{r(\tau^{D2}, 0) - r(\tau^{D1}, \bar{\theta})}{\bar{\theta}B} > 0.$$

Then

1. If  $Z(Q) \geq \Delta R^D$ , then  $(\tau^{D1}, 0)$  is optimal.

2. If  $Z(Q) < \Delta R^D$ , then  $(\tau^{D2}, w^e)$  is optimal.

**Proof.** The Lemma follows from a straight forward comparison of the net rents collected by the ruler in each case using equation (3) ■

We note that the quality of institutions  $Q$  effectively determines whether it is in the interest of the ruler to maintain strong wage incentives for the bureaucrat or not. If institutional quality is high ( $Q$  close to one), external monitoring is effective ( $z$  is low) and it is cheap to pay efficiency wages. In this case, it is optimal to weed out red tape even for a ruler that has decided to disregard the demands of his citizens. If, on the other hand, institutions are weak ( $Q$  close to zero) and the monitoring technology is ineffective ( $z$  is high), then the ruler has no incentive to build (costly) incentives for the bureaucrat. He simply focuses on maximizing tariff revenues subject to red tape. The intuition behind these results is that external monitoring and the efficiency wage are complements, rather than substitutes. It is simply cheaper to pay efficiency wages if the institutional framework allows for effective external monitoring.

If the ruler decides to comply ( $C$ ) in period  $t$ , he selects the policy package

$$\{\tau_t^C, w_t^C\} = \arg \max_{\tau, w} r(\tau_t, \theta(w_t)) - E(w_t) \quad (10)$$

subject to  $v(\tau_t, \theta_t) \geq \hat{v}_t$ . Again, the ruler either sets  $w_t^C = 0$  or  $w_t^C = w^e$  and we note that

$$\tau^{C1}(\hat{v}_t) = \arg \max_{\tau_t} r(\tau_t, \bar{\theta}) \quad (11)$$

subject to  $v(\tau_t, \bar{\theta}) \geq \hat{v}_t$  is optimal in the former case and that

$$\tau^{C2}(\hat{v}_t) = \arg \max_{\tau_t} r(\tau_t, 0) - w^e \quad (12)$$

subject to  $v(\tau_t, 0) \geq \hat{v}_t$  is optimal in the later. Since  $v(\tau, \theta)$  is decreasing in  $\tau$ , the ruler must

reduce the tariff below the respective rent maximizing levels to satisfy the constraints. The expected payoff is

$$V_t(C) = \max \{r(\tau^{C1}(\hat{v}_t), \bar{\theta}), r(\tau^{C2}(\hat{v}_t), 0) - w^e\} + \beta V_{t+1}^*. \quad (13)$$

As shown by the next Lemma, the quality of institutions, through its impact on external monitoring, also plays a key role for the choice between the two possible compliance strategies.

**Lemma 2** (*Within Period Optimal Compliance*). *Let  $Z(Q) = \frac{z(Q)}{1-z(Q)}$  with  $Z' < 0$ . Moreover, suppose that  $\hat{v}_t \geq \max \{v(\tau^{D1}, \bar{\theta}), v(\tau^{D2}, 0)\}$  and let*

$$\Delta R_t^C \equiv \frac{r(\tau^{C2}(\hat{v}_t), 0) - r(\tau^{C1}(\hat{v}_t), \bar{\theta})}{\bar{\theta}B} > 0.$$

Then

1. If  $Z(Q) \geq \Delta R_t^C$ , then the optimal compliance policy is  $(\tau^{C1}(\hat{v}_t), 0)$ .
2. If  $Z(Q) < \Delta R_t^C$ , then the optimal compliance policy is  $(\tau^{C2}(\hat{v}_t), w^e)$ .

**Proof.** The Lemma follows from a straight forward comparison of the net rents collected by the ruler in each case using equation (3) ■

The intuition behind this Lemma is similar to that of Lemma 1. In societies with strong institutions, the ruler has an incentive to strengthen the existing institutions and pay an efficiency wage; in a society with weak institutions this incentive is absent.

The sequence of performance standards is incentive compatible if and only if at all  $t$

$$V_t(C) \geq V_t(D). \quad (14)$$

Workers select the sequence of standards that yields the highest lifetime utility subject to incentive compatibility. The structure of the model implies that the optimal choice is stationary; that is,  $\hat{v}_t = \hat{v}^*$  for all  $t$  where  $\hat{v}^*$  is defined by

$$\begin{aligned} & \max \{r(\tau^{C1}(\hat{v}^*), \bar{\theta}), r(\tau^{C2}(\hat{v}^*), 0) - w^e\} \\ &= \frac{1 - \beta}{1 - \beta q(Q)} \max \{r(\tau^{D1}, \bar{\theta}), r(\tau^{D2}, 0) - w^e\}. \end{aligned} \quad (15)$$

Incentive compatibility requires that  $q(Q) < 1$ ; otherwise, institutions are so bad that no ruler

would ever comply with any standard other than the rent maximizing one. It is also clear from equation (15) that workers' welfare is increasing in the quality of institutions, i.e.,  $\frac{\partial \hat{w}^*}{\partial Q} > 0$ .

We are interested in why the volume of international trade is different in autocracies and democracies. To study this, we shall make a comparison between two extremes. At one end of the spectrum, we have a society with well-functioning democratic institutions and a free press:  $Q \rightarrow 1^-$ . At the other end, we have a society with seriously dysfunctional institutions:  $Q \rightarrow 0^+$ . We shall refer to the former as a “democracy” and to the later as an “autocracy” acknowledging that in the real world most societies fall somewhere in between these extremes. The following Proposition states the main implications of the model.

**Proposition 1** (*Regime Type and the Volume of Trade*).

1. *The effective trade distortion is higher in autocracies than in democracies and as a consequence, autocracies trade less with the rest of the world than democracies.*
2. *For given official trade policy ( $\tau$ ), autocracies trade less with the rest of the world than democracies because of differences in red tape and other unofficial trade distortions.*

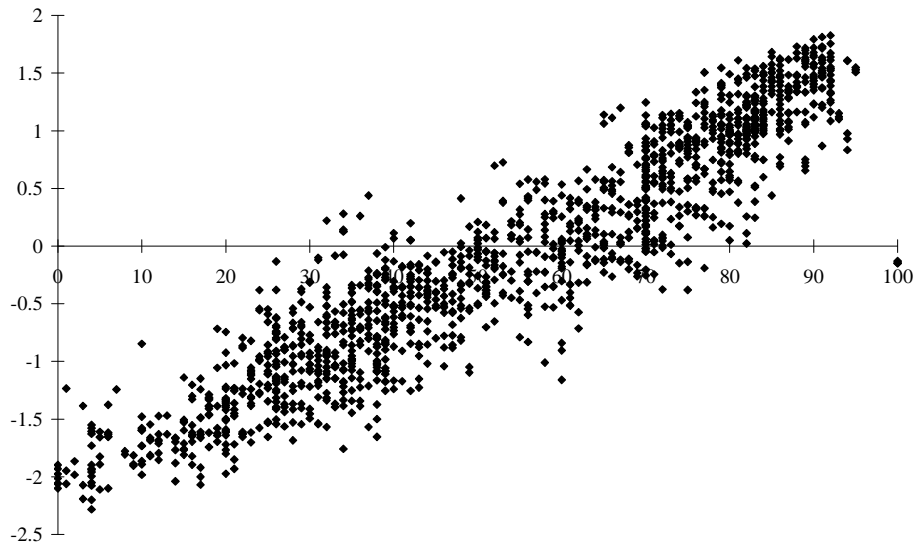
**Proof.** Part 1. Consider an autocracy with  $Q = 0$ . This implies that  $q(0) = 1$  and  $z(0) = 1$ . Lemma 1 implies that the optimal deviation entails  $w^D = 0$  and  $\tau^D = \tau^{D1}$ , while Lemma 2 implies that the optimal compliance policy is  $w^C = 0$  and  $\tau^C = \tau^{C1}$  for all  $t$ . However, since  $q(0) = 1$ , equation (15) implies that the ruler implements  $\tau = \tau^{D1} = \tau^{C1}(v(\tau^{D1}, \bar{\theta}))$  and  $w = 0$  each period until he is replaced by a new ruler who behaves likewise. Workers get  $v(\tau^{D1}, \bar{\theta})$  and the effective trade distortion is  $\tau^{D1} + \bar{\theta}$ . Consider, next, a democracy with  $Q = 1$ . This implies that  $q(1) = 0$  and  $z(1) = 0$ . Lemmas 1 and 2 imply that  $w^D = w^C = w^e$  and that  $\tau^D = \tau^{D2}$  and  $\tau^C = \tau^{C2}$  at all  $t$ . The effective trade distortion is  $\tau^{C2}$ . Let  $v^{**}$  denote equilibrium utility of a worker. Equation (15) implies that the best incentive compatible standard under democracy  $v^{**}$  entails higher utility than  $v(\tau^{D1}, \bar{\theta})$ . It follows that  $\tau^{D1} + \bar{\theta} > \tau^{C2}(v^{**})$  and thus, as stated in part 1 of the Proposition, that autocracies trade less. Part 2. Begin by observing that  $\tau^{D1}(\theta) \leq \tau^{D2}$  with  $\frac{\partial \tau^{D1}(\theta)}{\partial \theta} < 0$ . Moreover,  $\tau^{C2}(v^{**}) < \tau^{D2}$  and is independent of  $\theta$ . It follows that we can pick a  $\bar{\theta}$  such that  $\tau^{D1}(\bar{\theta}) = \tau^{C2}(v^{**})$ , i.e., such that the official tariff is the same in democracies and autocracies. It then follows from the observation that autocracies allow red tape while democracies do not that autocracies trade less than democracies conditional on having the same official trade policy ■

The first part of the Proposition shows that autocracies trade less than democracies. The source of this result is differences in the quality of institutions. These differences affect trade flows through two channels. First, autocracies have weak accountability institutions as captured by  $q(Q)$ . This allows autocratic rulers to extract more rents than politicians in a democracy. The implication is higher trade taxes under autocratic rule and consequently less imports (or exports). An improvement in accountability (better institutions) reduces trade taxes and encourages more trade. Second, autocracies also have weak external monitoring institutions (as captured by  $z(Q)$ ). As a consequence of this, autocratic rulers have little incentive to weed out red tape and other distortionary unofficial trade obstructions introduced by the bureaucrats in the customs services. In contrast, in a democracy with a free press and effective external monitoring, it is cheap to pay efficiency wages. In other words, it is optimal for rulers to enhance institutional quality *endogenously*. This reduces red tape and encourages trade flows. The second part of the Proposition shows that precisely because of differences in the incentives for rulers to pay efficiency wages in the two types of societies, autocracies trade less than democracies for a given *official trade policy*. The reason is unobserved red tape.

Before turning to the econometric analysis, we want to reassess two of the key assumptions of the model. We want to do so because we cannot directly test them in our empirical analysis (mainly due to lack of sufficient data). The cornerstone of the model is the parameter  $Q$  expressing institutional quality. We asserted that a high degree of press freedom assures high levels of accountability and that societies with a high degree of political accountability are also societies with effective external monitoring. Figure 1 shows a scatter plot of the Freedom of the Press indicator published by Freedom House (2007) and the Voice and Accountability indicator from the World Bank's "Governance Matters" data base (see, Kaufmann et al., 2007). The strong positive correlation ( $\rho=0.938$ ) visible in the Figure shows that press freedom indeed goes hand in hand with political accountability. The correlation is very robust. Adresà et al. (2003), for example, report a strong relationship between a measure of free circulation of newspapers and a number of alternative measures of political accountability.

A second key element of the model is the efficiency wage payment (or lack thereof). In a nutshell, we argue that rulers in autocratic societies (rationally) decide not to pay efficiency wages. This raises the probability that the customs officials will create red tape. The result is supported by the findings of Gorodnichenko and Sabirianova Peter (2007). Focusing on the Ukraine, they find that although public sector employees (including customs officials) receive approximately

Figure 1: Accountability and Press Freedom



Notes: The x-axis represents the Freedom of the Press indicator as published by Freedom House (2007), while the y-axis shows the Voice and Accountability Indicator taken from Kaufmann et al. (2007). Higher values indicate more press freedom and more accountability, respectively. The scatter plot shows pooled data for 193 countries for the years 1996, 1998, 2000 and 2002-2006 ( $n=1,514$ ).

30% lower wages as compared to those in the private sector their consumer expenditures and asset holdings are essentially identical. This indicates that bureaucrats receive “unofficial payments” of sizable amounts. The relationship between relative civil-service pay and corruption is also demonstrated in van Rijckeghem and Weder (2001). Finally, Adresà et al. (2003) report a strong positive relationship between the level of democracy and measures of the quality of the bureaucracy in a sample of about 100 countries for the period 1980-95. This directly supports the notion that autocratic rulers have less incentive to build incentives for their bureaucrats.

### 3 Empirical Specification

We want to estimate the relationship between the political regime of a country and its involvement in international trade thereby testing the two implications of our model listed in Proposition 1. To this end, we employ a standard gravity model of trade for a sample of up to 130 countries covering the years from 1962 to 2000. As the dependent variable, we use real import of country  $i$  from

country  $e$  in year  $t$  rather than bilateral trade flows between pairs of countries.<sup>12</sup> Through this choice, we avoid what Baldwin (2006) calls the “silver-medal of gravity mistakes”; the problem that regressions with average bilateral trade flows as the dependent variable are subject to a sizable upward bias when trade is unbalanced.<sup>13</sup> More specifically, our baseline specification is the following panel model

$$\begin{aligned} \ln(\text{real import})_{iet} = & \beta_1 \text{regime}_{it-1} + \beta_2 \text{regime}_{et-1} + \beta_3 \ln(\text{gdp}_{it}) + & (16) \\ & \beta_4 \ln(\text{gdp}_{et}) + \beta_5 \text{landlocked}_{ie} + \beta_6 \ln(\text{distance}_{ie}) + \\ & \lambda X_{ie} + \alpha_i + \gamma_e + \delta_t + \varepsilon_{iet}, \end{aligned}$$

where  $(\text{real import})_{iet}$  is real imports of country  $i$  from country  $e$  in year  $t$ ,  $\text{regime}_{it-1}$  and  $\text{regime}_{et-1}$  are lagged values of particular measures of regime type (democracy/autocracy) of the importing and exporting country, respectively (to be discussed below),  $\text{gdp}_{it}$  and  $\text{gdp}_{et}$  are real GDP, in US dollars, of the importing and exporting country, respectively,  $\text{landlocked}_{ie}$  is a dummy variable taking the value of 1 if at least one trading partner is land locked,  $\text{distance}_{ie}$  is the distance between the most populated cities of the trading pair and  $\varepsilon_{iet}$  is an error term with zero mean. The vector  $X_{ie}$  contains a number of dummy variables that proxy the bilateral relationship between the trading partners. In particular, the following variables are included: a dummy variable equal to 1 if the two trading partners share the same official language (*common language*), a dummy variable equal to 1 if the trading partners have a common border (*common border*), a dummy variable equal to 1 if the trading partners were ever in a colonial relationship (*colonial ties*), a dummy variable equal to 1 if the trading partners share a common colonizer post 1945 (*common colonizer*), a dummy variable equal to 1 if the trading partners were in a colonial relationships post 1945 (*colony post 1945*), and a dummy taking the value of 1 if the trading partners are or were in the past the same nation (*same country*). Our choice of gravity variables follows Rose (2004) and we have no interest in these variables except as control variables.<sup>14,15</sup> We list the sources and exact definitions of all the variables used in our analysis in Table 1.

<sup>12</sup>Data on nominal import flows are taken from Feenstra (2000) and are converted into real import flows using the US GDP deflator. This is possible because nominal world trade is measured in dollars. Alternatively, we have also deflated nominal trade by each countries GDP deflator separately. Other than reducing the sample size due to missing data this does not change our findings.

<sup>13</sup>This follows from the fact that the log of the average is not equal to the average of the logs if the import and export flows are not identical in magnitude (Jensens's inequality). For a formal proof, we refer to Baldwin (2006, 18-19).

<sup>14</sup>For further details on the gravity model, we refer to Anderson and van Wincoop (2003).

<sup>15</sup>However, we may note that they are all significant and have the correct sign.

Table 1: Variables – definitions and sources

Variable	Description	Source
nimp	nominal imports in dollars (for 1962-2000) (for 2001-2003)	Feenstra (2000) Comtrade (2006)
defl	US GDP deflator (2000 = 1)	IMF (2005)
log of real imports	$\ln(\text{nimp}/\text{defl})$	own calculations
Polity IV*	inverse of “polity2” indicator: 1 = most democratic, 21 = most autocratic	Gurr et al. (2003)
Freedom House*	average of “political rights” and “civil liberties” indi- cators: 1 = most democratic, 7 = most autocratic	Freedom House (2006)
Przeworski et al.*	dummy variable taking the value of 1 for autocratic states	Alvarez et al. (1996); Prze- worski et al. (2000); Cheibub and Gandhi (2004)
log GDP*	$\ln(\text{GDP})$ (constant 2000 US\$)	World Bank (2006)
landlocked	dummy for at least one trading partner being land- locked	CEPII (2006)
common language	dummy for both trading partners sharing an official language	CEPII (2006)
common border	dummy for common border	CEPII (2006)
colonial ties	dummy for pairs ever in colonial relationship	CEPII (2006)
common colonizer	dummy for common colonizer post 1945	CEPII (2006)
colony post 1945	dummy for pairs in colonial relationship post 1945	CEPII (2006)
same country	1 if countries were or are the same country	CEPII (2006)
log distance	$\ln$ of simple distance (most populated cities, km)	CEPII (2006)
restriction index*	sub-index economic restrictions of the KOF Index of Globalization; combines data on hidden import bar- riers, mean tariff rate, taxes on international trade (in percent of current revenue) and capital account restrictions	Dreher (2006)
log GDP per capita*	$\ln(\text{GDP}/\text{population})$ (constant 2000 US\$)	World Bank (2006)
log population	$\ln$ (total population)	World Bank (2006)
common currency	dummy for pairs with a common currency	Rose (2004)
generalized system of preferences	dummy for pairs with a generalized system of prefer- ences (GSP)	Rose (2004)
regional trade agreement	dummy for pairs that are a member of the same regional trade agreement	Rose (2004)
WTO membership*	dummy for WTO/GATT members	WTO (2007)

\* for these variables  $i$  and  $e$  indicate the values of an importing and exporting country, respectively.

It is important to notice that our panel model allows us to estimate the effect of regime type on trade flows separately for an importing and for an exporting country. This allows us to test the theoretical implications of our model which would not be possible within the pairwise set-up of Morrow et al. (1998) and Mansfield et al. (2000).

Given the difficulty of obtaining reliable quantitative measures of regime type, we use three different indicators as proxies. They capture different aspects of the institutional environment and all have their own flaws and advantages. The first indicator is the Polity IV index constructed by Gurr et al. (2003).<sup>16</sup> The index is measured on a scale from -10 (autocracy) to 10 (democracy). In order to make the results obtained with this indicator comparable to those obtained with the two other indicators that we use, we re-code the variable such that higher values indicate that a society is more autocratic. The second indicator is the average of two indicators called “Political Rights” and “Civil Liberties” constructed by Freedom House (2006). The resulting indicator runs from 1 to 7 with higher values indicating that a society is more autocratic. The third indicator is the regime type indicator constructed by Alvarez et al. (1996) and Przeworski et al. (2000) and updated until 2000 by Cheibub and Ghandi (2004). Democracy is essentially defined as a political system in which incumbents can lose elections and are forced to comply with the results of elections. More specifically, a country is classified as a democracy if the executive and the legislature is filled through contested elections, where more than one party has a chance of winning. The resulting dummy variable takes the value of 1 for autocracies and zero for democracies.

It is hard to say which of the indicators is the “best.” They have all drawn critique. The Polity IV index has been criticized for the way values are assigned to its various subcomponents. Freedom House sometimes draws critique because its indicators are completely survey based. Przeworski’s regime type indicator uses the most clear-cut definition of the three, but has the disadvantage of being a dummy variable without “shades of grey.” Furthermore, the three indicators focus on slightly different aspects of political institutions and can therefore perhaps best be viewed as complements rather than substitute measures of democracy/autocracy. The Polity IV index is basically a measure of political competition that ignores how widely extended the voting franchise is and other aspects of popular participation in politics.<sup>17</sup> The Freedom House index focuses more on political rights and civil liberties than on de facto political competition and participation.

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<sup>16</sup>The Polity IV index or more accurately the “polity2” index summarizes different indicators of political authority patterns to measure three key aspects of a country’s political system. The three aspects are: i) competitiveness and openness in the process of executive recruitment; ii) constraints on the chief executive and iii) competitiveness and regulation of political participation. A weighted sum of the components is used to construct two summary variables, measuring democracy on a scale from 0 to 10 and autocracy from -10 to 0. The Polity IV index is the sum of these two sub-indexes.

<sup>17</sup>See Aidt and Eterovic (2007) for a discussion of this.

Przeworski et al. (2000) focus on a combination of political participation and contestability of political power. The complementarity of the three measures is another good reason to use all three indicators in the analysis. Finally, as argued by Milner and Kubota (2005), it takes time for changes in political institutions to affect trade patterns and the effects of democratic transitions are likely to be long-lasting. For this reason, we enter the three institutional indicators either with a one year lag or as the average of the five preceding years. This also mitigates potential endogeneity problems arising if international trade encourages the development of democratic institutions.

All regressions include fixed effects for the importing and exporting country ( $\alpha_i, \gamma_e$ ) as well as year fixed effects ( $\delta_t$ ). This is a variant of the approach adopted by Feenstra (2004) who introduced the notion of country-specific effects as multilateral resistance terms. The country effects control for unobserved country characteristics that are fixed over time with the subtlety that we allow these unobservable effects to differ between importers and exporters, even if the same country is involved in import and export. The importance of correcting for these importer, exporter and time fixed effects is pointed out by Baltagi et al. (2003) as well as Baldwin (2006) who calls the omission of these effects the “gold-medal of gravity mistakes.”

The baseline model allows us to test the first implication of the model, i.e., that autocratic countries trade less. The second implication of our model is that autocratic countries trade less *conditional* on official trade policy. To test this, we need to extend the baseline model with a proxy for trade policy. Given the many different forms that trade restrictions can take and the well-known difficulties in measuring trade policy (see, e.g., Milner and Kubota, 2005), we opt to include a multidimensional index. In particular, we employ the restriction sub-index from the KOF Index of Globalization (see Dreher, 2006). This *restriction index* combines publicly available information on non-tariff import barriers, mean tariff rates, other taxes on international trade, and capital account restrictions. It ranges from 1 to 10 with higher values indicating fewer restrictions.

## 4 Main Empirical Results

The results of the estimation of equation (16) are shown in Table 2. In order to account for the particularities of trade flows, we cluster the standard errors of the regressions on the trading-pair level. We may begin by noting that all control variables have the correct sign and are highly significant with the exception of the landlockedness dummy variable. Given the numerous existing gravity studies, we shall refrain from interpreting the coefficients on these covariates.<sup>18</sup>

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<sup>18</sup>See, e.g., Rose (2004) for interpretations.

Table 2: Results OLS – dependent variable:  $\ln(\text{real imports})$ 

	Polity IV		Freedom House		Przeworski et al.	
<b>autocracy<sub>i t-1</sub></b>	-0.018*** (0.002)	–	-0.055*** (0.009)	–	-0.237*** (0.027)	–
<b>autocracy<sub>e t-1</sub></b>	-0.012*** (0.002)	–	-0.050*** (0.009)	–	-0.202*** (0.027)	–
<b>average autocracy<sub>i (t-1-t-5)</sub></b>	–	-0.023*** (0.003)	–	-0.079*** (0.013)	–	-0.286*** (0.036)
<b>average autocracy<sub>e (t-1-t-5)</sub></b>	–	-0.014*** (0.002)	–	-0.046*** (0.012)	–	-0.218*** (0.035)
<b>log GDP<sub>i</sub></b>	1.327*** (0.049)	1.299*** (0.053)	1.260*** (0.053)	1.209*** (0.062)	1.318*** (0.049)	1.272*** (0.053)
<b>log GDP<sub>e</sub></b>	1.277*** (0.049)	1.318*** (0.053)	1.230*** (0.052)	1.287*** (0.061)	1.266*** (0.049)	1.302*** (0.052)
<b>landlocked</b>	-0.069 (0.102)	0.031 (0.109)	-0.168* (0.099)	-0.066 (0.106)	-0.100 (0.104)	-0.002 (0.113)
<b>common language</b>	0.421*** (0.048)	0.390*** (0.049)	0.419*** (0.045)	0.374*** (0.047)	0.431*** (0.047)	0.399*** (0.048)
<b>common border</b>	0.468*** (0.106)	0.386*** (0.107)	0.369*** (0.103)	0.250** (0.109)	0.430*** (0.105)	0.341*** (0.107)
<b>colonial ties</b>	0.596*** (0.103)	0.551*** (0.101)	0.614*** (0.103)	0.564*** (0.099)	0.641*** (0.105)	0.599*** (0.104)
<b>common colonizer</b>	0.636*** (0.080)	0.545*** (0.087)	0.556*** (0.078)	0.448*** (0.089)	0.664*** (0.079)	0.591*** (0.087)
<b>colony post 1945</b>	1.123*** (0.133)	1.029*** (0.128)	1.003*** (0.131)	0.931*** (0.128)	1.082*** (0.132)	0.985*** (0.129)
<b>same country</b>	0.917*** (0.175)	0.809*** (0.185)	0.738*** (0.181)	0.359*** (0.214)	0.898*** (0.173)	0.783*** (0.184)
<b>log distance</b>	-1.021*** (0.024)	-0.998*** (0.025)	-1.096*** (0.023)	-1.068*** (0.024 )	-1.041*** (0.024)	-1.021*** (0.024)
<b>Observations</b>	188,163	140,393	154,975	106,446	195,507	144,585
<b>Importers</b>	126	122	133	128	133	128
<b>Exporters</b>	126	123	133	129	133	129
<b>R-squared</b>	0.7247	0.7421	0.7317	0.7541	0.7259	0.7424

Notes: *average autocracy<sub>(t-1-t-5)</sub>* represents the average of the five years prior to the observation; *i* and *e* indicate importing and exporting country, respectively. Polity IV is the Variable “poliy2” from Gurr et al. (2003), Freedom House is the average of the “civil liberties” and “political rights” indicators from Freedom House (2006), higher numbers reflect higher levels of autocracy in both cases. Przeworski et al. is a dummy variable that takes the value of 1 for autocratic states. It is taken from Alvarez et al. (1996), Przeworski et al. (2000) and Cheibub and Ghandi (2004).

All regressions contain importer-, exporter- and time-specific fixed effects all of which are significant at the 1% level. \*/\*\*/\*\*\* indicates significance at the 10/5/1-% significance level; trading-pair clustered standard errors are given in parentheses below the coefficient.

First and foremost, it is apparent that all three regime type indicators yield the same result: autocracies trade significantly less. Generally, the coefficients for importing and exporting countries have roughly identical magnitudes. The results have one more factor in common. The estimated coefficients on the regime type indicators are largest in the specifications that use five years averages. This indicates that the effect of regime type on trade is persistent; a finding that is in line with that of Milner and Kubota (2005). Furthermore, it suggests that changes in the trade flows take place gradually after a regime change.

Given its dichotomous nature, Przeworski's regime type indicator is the easiest to interpret. According to this indicator, democracies which turn into autocracies experience an average decrease of 23.7-28.6% imports and 20.2-21.8% exports, *ceteris paribus*. As the fixed effects set-up wipes out the effect of non-regime changing countries these figures are likely to underestimate the effect of autocracies. A glance at the data supports this notion. Nigeria transformed from being a democracy in 1982 to an autocracy in 1983 (according to the Przeworski criterion). This shift yielded a decline of 37% of its imports and 26% of its exports.

Both the Polity IV and the Freedom House index are measured on an ordinal scale. On the 21 point scale of the Polity IV index, a one point move towards autocracy reduces imports by 1.8-2.3% and exports by 1.2-1.4%, *ceteris paribus*. This means that if a hypothetical country were to undergo a transition from full democracy to complete autocracy, it would lose about 36% of its imports and about 24% of its exports. On the 1 to 7 scale of the Freedom House index, a hypothetical country that went through the same transition would result lose about 33% of its imports and about 30% of its exports. To give a more concrete example. Imagine that the political regime of Switzerland was transformed into that of Myanmar in the year 2000. The consequence would be a reduction of imports and exports of 29.6% and 20.4% according to the Polity IV index and 33% and 30% according to Freedom House index, *ceteris paribus*. Although there are differences, it is striking how similar the results obtained with the three different indicators are.

Milner and Kubota (2005) show in a sample of developing countries that democracies have lower tariff rates than autocracies. Thus, the results reported in Table 2 – autocracies trade less – could simply be a result of this effect. To investigate this, we add the restriction index, introduced in the previous section, to the specification in equation (16) and re-run the estimation (again employing trading-pair clustered standard errors). The results are shown in Table 3. Not surprisingly, the restriction index has a positive impact on trade flows and is highly significant for importing countries. This indicates that a country with fewer trade restrictions imports more.

For exporting countries, the coefficients on the restriction index is also positive albeit statistically insignificant.

More importantly, we see from Table 3 that the main finding from the baseline model persists: autocracies trade less, even after controlling for differences in trade policy. The coefficients on the Polity IV index and on Przeworski's regime type indicator are somewhat lower than those reported in Table 2, but they are still highly significant. The coefficients on the Freedom House index remain virtually unchanged. This finding shows that the tariff channel, as identified by Milner and Kubota (2005), is not the only transmission mechanism. Our model points to two alternative transmission channels (the accountability channel and the bureaucracy channel) and our findings are consistent with the presence of both.

## 5 Robustness Analysis and IV Estimates

To see whether the results reported in Tables 2 and 3 are sensitive to changes in the specification and estimation method, we have conducted an extensive set of tests of robustness. We use the specification including the restriction index as the baseline (as reported in Table 3).

Firstly, we extend the model with additional control variables that have been proposed by, e.g., Rose (2004) as determinants of international trade flows. These variables are: log of GDP per capita, log of population, a dummy variable indicating a common currency, a dummy variable indicating a generalized system of preferences, a dummy variable taking on the value 1 if the trading partners are members in the same regional trading agreement, a dummy indicating WTO/GATT membership, and, finally, all of the above at the same time.<sup>19</sup> The results of this are presented in Table 4. To save space, we only display the coefficients on the regime type indicators (*autoc*) in the table. We see that the results are not much affected by the inclusion of these additional variables. The significance level remains unchanged and the changes in the size of the coefficients are minuscule.

Secondly, to further elaborate on the robustness of the baseline results, we have employed different estimation techniques that reduce the risk that outliers are driving the results. Again, the specification of Table 3 is used as the starting point and the results are presented in the top of Table 5 and we only report the results for the regime type indicators. As a first step, we re-estimated the model using re-weighted least squares (RLS). This robust regression technique weighs

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<sup>19</sup>Due to perfect collinearity it is not possible to include log(GDP), log(GDP per capita) and log(population) in the same regression. The results in Table 4 show the outcome without population. Of course, the results do not change if log(GDP per capita) is substituted by log(population).

Table 3: Results OLS with restriction index – dependent variable:  $\ln(\text{real imports})$ 

	Polity IV		Freedom House		Przeworski et al.	
<b>autocracy<sub>i t-1</sub></b>	-0.013*** (0.003)	–	-0.054*** (0.012)	–	-0.161*** (0.034)	–
<b>autocracy<sub>e t-1</sub></b>	-0.013*** (0.002)	–	-0.063*** (0.011)	–	-0.180*** (0.032)	–
<b>average autocracy<sub>i (t-1-t-5)</sub></b>	–	-0.019*** (0.003)	–	-0.082*** (0.017)	–	-0.215*** (0.042)
<b>average autocracy<sub>e (t-1-t-5)</sub></b>	–	-0.013*** (0.003)	–	-0.055*** (0.015)	–	-0.179*** (0.041)
<b>restriction index<sub>i</sub></b>	0.109*** (0.019)	0.104*** (0.020)	0.123*** (0.019)	0.138*** (0.020)	0.118*** (0.019)	0.109*** (0.020)
<b>restriction index<sub>e</sub></b>	0.020 (0.020)	0.022 (0.020)	0.015 (0.019)	-0.014 (0.020)	0.026 (0.020)	0.020 (0.020)
<b>log GDP<sub>i</sub></b>	1.185*** (0.065)	1.152*** (0.067)	1.134*** (0.066)	1.051*** (0.077)	1.168*** (0.065)	1.117*** (0.067)
<b>log GDP<sub>e</sub></b>	1.316*** (0.066)	1.339*** (0.067)	1.268*** (0.067)	1.253*** (0.077)	1.298*** (0.066)	1.315*** (0.067)
<b>landlocked</b>	-0.077 (0.157)	-0.053 (0.153)	-0.066 (0.159)	-0.063 (0.149)	-0.090 (0.159)	-0.096 (0.159)
<b>common language</b>	0.395*** (0.063)	0.356*** (0.064)	0.388*** (0.062)	0.307*** (0.063)	0.392*** (0.063)	0.352*** (0.064)
<b>common border</b>	0.137 (0.136)	0.109 (0.135)	0.131 (0.135)	0.154 (0.136)	0.112 (0.136)	0.083 (0.135)
<b>colonial ties</b>	0.442*** (0.122)	0.417*** (0.120)	0.402*** (0.119)	0.369*** (0.115)	0.434*** (0.122)	0.411*** (0.120)
<b>common colonizer</b>	0.333*** (0.109)	0.318*** (0.113)	0.330*** (0.108)	0.266*** (0.113)	0.365*** (0.111)	0.345*** (0.115)
<b>colony post 1945</b>	0.900*** (0.265)	0.919*** (0.259)	0.876*** (0.265)	0.873*** (0.258)	0.911*** (0.272)	0.913*** (0.267)
<b>same country</b>	0.668*** (0.236)	0.547** (0.238)	0.608*** (0.232)	0.267 (0.246)	0.681*** (0.235)	0.551*** (0.238)
<b>log distance</b>	-1.095*** (0.030)	-1.050*** (0.030)	-1.107*** (0.029)	-1.063*** (0.029)	-1.107*** (0.030)	-1.063*** (0.030)
<b>Observations</b>	92,417	77,660	86,640	62,131	94,050	78,827
<b>Importers</b>	75	74	77	75	77	75
<b>Exporters</b>	75	75	77	76	77	76
<b>R-squared</b>	0.7247	0.7421	0.7369	0.7562	0.7337	0.7423

Notes: See notes to Table 2 for the explanation of the autocracy data. The trade restriction index is taken from Dreher (2006).

All regressions contain importer-, exporter- and time-specific fixed effects all of which are significant at the 1% level. \*/\*\*/\*\* indicates significance at the 10/5/1-% significance level; trading-pair clustered standard errors are given in parentheses below the coefficient.

Table 4: Results OLS additional variables – dependent variable:  $\ln(\text{real imports})$ 

Additional Variable(s)		Polity IV		Freedom House		Przeworski et al.	
log GDP per capita (i and e)	$\text{autoc}_{i\ t-1}$	-0.012***	–	-0.055***	–	-0.159***	–
	$\text{autoc}_{e\ t-1}$	-0.013***	–	-0.065***	–	-0.178***	–
	$\text{autoc}_{i\ (t-1-t-5)}$	–	-0.019***	–	-0.079***	–	-0.214***
	$\text{autoc}_{e\ (t-1-t-5)}$	–	-0.013***	–	-0.053***	–	-0.179***
log population (i and e)	$\text{autoc}_{i\ t-1}$	-0.012***	–	-0.055***	–	-0.159***	–
	$\text{autoc}_{e\ t-1}$	-0.013***	–	-0.065***	–	-0.178***	–
	$\text{autoc}_{i\ (t-1-t-5)}$	–	-0.019***	–	-0.079***	–	-0.214***
	$\text{autoc}_{e\ (t-1-t-5)}$	–	-0.013***	–	-0.053***	–	-0.179***
common currency	$\text{autoc}_{i\ t-1}$	-0.015***	–	-0.054***	–	-0.173***	–
	$\text{autoc}_{e\ t-1}$	-0.015***	–	-0.060***	–	-0.188***	–
	$\text{autoc}_{i\ (t-1-t-5)}$	–	-0.020***	–	-0.083***	–	-0.232***
	$\text{autoc}_{e\ (t-1-t-5)}$	–	-0.015***	–	-0.052***	–	-0.197***
generalized system of preferences	$\text{autoc}_{i\ t-1}$	-0.015***	–	-0.053***	–	-0.173***	–
	$\text{autoc}_{e\ t-1}$	-0.015***	–	-0.060***	–	-0.189***	–
	$\text{autoc}_{i\ (t-1-t-5)}$	–	-0.020***	–	-0.082***	–	-0.233***
	$\text{autoc}_{e\ (t-1-t-5)}$	–	-0.015***	–	-0.051***	–	-0.198***
regional trade agreement	$\text{autoc}_{i\ t-1}$	-0.014***	–	-0.053***	–	-0.173***	–
	$\text{autoc}_{e\ t-1}$	-0.014***	–	-0.059***	–	-0.188***	–
	$\text{autoc}_{i\ (t-1-t-5)}$	–	-0.019***	–	-0.081***	–	-0.228***
	$\text{autoc}_{e\ (t-1-t-5)}$	–	-0.014***	–	-0.050***	–	-0.193***
WTO membership (i and e)	$\text{autoc}_{i\ t-1}$	-0.013***	–	-0.054***	–	-0.160***	–
	$\text{autoc}_{e\ t-1}$	-0.013***	–	-0.063***	–	-0.179***	–
	$\text{autoc}_{i\ (t-1-t-5)}$	–	-0.019***	–	-0.082***	–	-0.215***
	$\text{autoc}_{e\ (t-1-t-5)}$	–	-0.013***	–	-0.054***	–	-0.178***
all of the above <sup>a</sup>	$\text{autoc}_{i\ t-1}$	-0.014***	–	-0.054***	–	-0.170***	–
	$\text{autoc}_{e\ t-1}$	-0.014***	–	-0.060***	–	-0.186***	–
	$\text{autoc}_{i\ (t-1-t-5)}$	–	-0.019***	–	-0.077***	–	-0.226***
	$\text{autoc}_{e\ (t-1-t-5)}$	–	-0.014***	–	-0.048***	–	-0.192***

Notes:  $\text{autoc}_{t-1}$  represents the one year lagged autocracy score while  $\text{autoc}_{(t-1-t-5)}$  is the average of the five years prior to the observation;  $i$  and  $e$  stand for importing and exporting country, respectively; (i and e) indicate separate variables for importing and exporting countries. See notes to Table 2 for the explanation of the autocracy data. Only the results for the autocracy variables are shown in the table. However, the base specification is taken from Table 3. All regressions contain importer-, exporter- and time-specific fixed effects all of which are significant at the 1% level. Standard errors are clustered at the trading-pair level. \*/\*\*/\*\* indicates significance at the 10/5/1-% significance level.

<sup>a</sup> Due to perfect collinearity population is excluded in the estimation.

observations in an iterative process.<sup>20</sup> Starting with OLS, estimates are obtained through weighted least squares where observations with relatively large residuals get smaller weights. We see that the coefficients remain highly significant although their magnitudes are somewhat reduced. Comparing the coefficients reported in Tables 3 and 5, we see that the coefficients on the political regime indicator of importing countries are approximately halved, while the coefficients for exporting countries change only minimally. Next, we used the least absolute value estimator, which minimizes the sum of the absolute deviations from the median.<sup>21</sup> Although the magnitude of the coefficient on the regime type indicator of importing countries is somewhat smaller, the results are comparable to those obtained with the RLS estimator and the regime type effect remains highly significant.

Thirdly, we have altered the sample and tested whether this has consequences for the results. We have extended the sample up to the year 2003 using trade data taken from the United Nations Statistical Division Commodity Trade Data Base (Comtrade, 2006).<sup>22</sup> Doing so does not change the results much.

Fourthly, we alter the regression set-up of equation (16). We replace the importer- and exporter specific effects ( $\alpha_i, \gamma_e$ ) by a trading-pair fixed effect ( $\omega_{ie}$ ). As a result, all time-invariant variables in  $X_{ie}$  as well as distance and landlockedness are dropped from the equation. Given our set-up,  $\omega_{ie} \neq \omega_{ei}$ . Moreover, we alter the way we model the error term in the following way:

$$\varepsilon_{iet} = \rho\varepsilon_{iet-1} + \eta_{iet}, \tag{17}$$

where  $\eta_{iet}$  is i.i.d. with a zero mean. In addition to the results for the regime variables we report the results for the AR coefficient  $\rho$ . Turning to the results, we see that the political regime effects for importing countries are in line with the results obtained by the robust estimation techniques with one exception. However, the effects of exporting countries turn statistically insignificant in three out of the six regressions.

Fifthly, although we use lags of the three regime type indicators, this might not be enough to avoid all endogeneity problems and one concern about our results is that they may be contaminated by feedback effects from trade to democracy. As argued by, e.g., López-Córdova and Meisner (2005), involvement in international trade may foster democracy. If so, the coefficients on the regime type indicators reported so far might be biased. To deal with this issue, we re-estimate

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<sup>20</sup>In this context we use the term “robust” as robustness with respect to the dependent variable.

<sup>21</sup>This is also known as mean absolute deviation (MAD) or L1 norm regression.

<sup>22</sup>Feenstra’s (2000) data is based on this data source. He used additional data to augment the raw Comtrade data. Thus, for consistency reasons, we focus on his dataset for the main analysis.

Table 5: Results tests of robustness – dependent variable: ln(real imports)

Technique / Sample		Polity IV		Freedom House		Przeworski et al.	
reweighted least squares (RLS)	$\text{autoc}_i$ $t-1$	-0.008***	–	-0.033***	–	-0.072***	–
	$\text{autoc}_e$ $t-1$	-0.013***	–	-0.059***	–	-0.161***	–
	$\text{autoc}_i$ $(t-1-t-5)$	–	-0.012***	–	-0.046***	–	-0.110***
	$\text{autoc}_e$ $(t-1-t-5)$	–	-0.013***	–	-0.047***	–	-0.172***
least absolute value (LAV aka MAD)	$\text{autoc}_i$ $t-1$	-0.004***	–	-0.033***	–	-0.043***	–
	$\text{autoc}_e$ $t-1$	-0.013***	–	-0.060***	–	-0.171***	–
	$\text{autoc}_i$ $(t-1-t-5)$	–	-0.009***	–	-0.042***	–	-0.080***
	$\text{autoc}_e$ $(t-1-t-5)$	–	-0.013***	–	-0.055***	–	-0.176***
extended sample up to 2003	$\text{autoc}_i$ $t-1$	-0.012***	–	-0.047***	–	-0.162***	–
	$\text{autoc}_e$ $t-1$	-0.011***	–	-0.061***	–	-0.181***	–
	$\text{autoc}_i$ $(t-1-t-5)$	–	-0.019***	–	-0.064***	–	-0.209***
	$\text{autoc}_e$ $(t-1-t-5)$	–	-0.015***	–	-0.054***	–	-0.183***
dyadic fixed effects with AR(1) error term	$\text{autoc}_i$ $t-1$	-0.003**	–	-0.026***	–	-0.033*	–
	$\text{autoc}_e$ $t-1$	-0.001	–	-0.010	–	-0.037**	–
	$\rho$	0.624	–	0.607	–	0.622	–
	$\text{autoc}_i$ $(t-1-t-5)$	–	-0.010***	–	0.006	–	-0.073**
	$\text{autoc}_e$ $(t-1-t-5)$	–	-0.002	–	-0.025**	–	-0.105***
	$\rho$	–	0.608	–	0.591	–	0.612
Instrumental Variables	$\text{autoc}_i$ $t-1$	-0.048***	–	-0.265***	–	-0.757***	–
	$\text{autoc}_e$ $t-1$	-0.012	–	-0.064	–	-0.260	–
	<i>Sargan-Hansen</i>	0.655	–	0.871	–	0.648	–
	$\text{autoc}_i$ $(t-1-t-5)$	–	-0.068***	–	-0.367***	–	-1.004***
	$\text{autoc}_e$ $(t-1-t-5)$	–	-0.010	–	-0.116	–	-0.266
	<i>Sargan-Hansen</i>	–	0.604	–	0.289	–	0.415

Notes: See notes to Tables 2 and 4 for explanations on the autocracy data and the abbreviations used. Only the results for the autocracy variables are shown in the table. However, the base specification is taken from Table 3. All regressions contain importer-, exporter- and time-specific fixed effects all of which are significant at the 1% level with trading-pair clustered standard errors. An exception is the dyadic set-up in which we employ dyadic fixed effects and an autoregressive error term. In the Instrumental Variables regressions *Sargan-Hansen* reports the p-values for the test of over-identification. We instrument the autocracy variables by average party age, amount of checks and balances as well as voting in line with the G7 in the UN General Assembly. The first stage F-statistic, indicating the power of the instruments, easily passes the threshold of 10 as proposed by Staiger and Stock (1997) in all specifications.

\*/\*\*/\*\*\* indicates significance at the 10/5/1-% significance level.

the model using instrumental variables (IV) techniques. In choosing the instruments, we largely follow the existing literature. Milner and Kubota (2005) use the average age of the parties in the political system as an instrument for regime type.<sup>23</sup> As a second instrument, we use an ordinal index of checks and balances constructed by Keefer and Stasavage (2003). Finally, we use the percentage of votes cast in line with the Group of 7 (G7) countries in the United Nations General Assembly in the IV regressions. Dreher and Sturm (2006) show that more democratic countries vote more in line with the G7. We contend that neither of these variables are correlated with the error term in equation (16). We report a summary of the results using all three instruments simultaneously in Table 5. In all specifications, the first stage F-statistic, indicating the relevance of the instruments, easily passes the threshold of 10 as proposed by Staiger and Stock (1997). We also report the p-value of the Sargan-Hansen test for over-identification and note that the test always fails to reject at the 10 percent level. All specifications basically show the same pattern, namely that our previous results if anything *under-estimated* the effect of autocracy on imports. All coefficients on the regime type indicators for importing countries remain significant at the one percent level and significantly increase their (absolute) size. In contrast, the coefficients on the regime type indicators for exporting countries hardly change their size but are no longer significant at conventional levels. Based on the IV estimates, we conclude that our previous results can be interpreted as a lower bound of the effect of autocracy on imports, while our baseline results on the impact of regime type on exports cannot be considered robust.

## 6 Conclusions

The question that motivates this paper is a simple one: does the political regime of a country systematically affect how involved the country is in international trade? Our theoretical model provides two reasons why the answer to this question is likely to be yes. In contrast to previous theoretical work, we argue that the root cause of regime differences in trade flows is differences in political accountability. These differences affect trade flows directly through the impact on trade taxes (which are more prevalent in autocracies than in democracies), but they also work through a more subtle indirect channel. Rulers of societies with weak accountability institutions have no incentive to strengthen these institutions by offering wage incentives to officials in the customs service. The reason is complementarity between different aspects of the institutional environment. As a consequence, the theory suggests that not only do autocracies trade less but that they trade

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<sup>23</sup>The source for this data is Beck et al. (2001).

less conditional on official trade policy.

We test the implications of the model within the framework of a standard gravity model of international trade. This design allows us to distinguish between the effects of the political regime of an importing and of an exporting country. We find that autocracies trade significantly less than democracies, even after controlling for differences in trade policy. The magnitude of the effect is substantial: according to our most conservative estimates, autocracies have between 3.3% and 23.7% less imports and between 3.7% and 19.8% less exports, *ceteris paribus*. These results are robust to a battery of different estimation techniques including instrumental variables estimates. The latter show that the relationship with respect to the exports cannot be considered completely robust. Overall, our analysis shows that autocracies import less (and maybe export less) and that this effect is not driven by differences in trade policy. We propose that it can be explained by systematic differences in the degree of political accountability. In other words, a democracy trades more with the rest of the world because democratically elected politicians are less tempted to use trade taxes to extract rents and because these politicians face the right incentives to build institutions that weed out trade-distorting red tape in the customs service.

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