Trade, Institutions, and Economies in Transition

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August 2007

Abstract

This paper explores the effect of opening up to trade on the outcome of a reform, an outcome that is expressed by a coefficient that reflects the domestic business environment—namely the rule-of-law coefficient. A two-stage game is assumed where (i) in the first stage, the elite offer political contributions contingent on the government’s choice of the rule-of-law coefficient, and subsequently, the government takes into consideration the elite’s contributions when choosing the rule-of-law coefficient since, although it cares about consumers’ well-being, it is financed, at least partly, by the elite’s money; and (ii) in the second stage, the country opens up to trade with a foreign country characterized by the perfect rule-of-law coefficient, the owners of the firms decide if to enter the industry, and profits are realized. To this end, heterogeneity at the firm level is assumed: some firms, but not all, gain from flawed legal institutions. The second-stage analysis relies heavily on Dixit and Stiglitz’s (1977) model of monopolistic competition and

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is clearly inspired by Melitz (2003). Our main finding is that our equilibrium rule-of-law coefficient is higher in comparison with the one that would have prevailed in a closed-economy equilibrium. In other words, we demonstrate that opening up an economy to trade improves the quality of its institutions and increases the attractiveness of its business environment. We show that opening up to trade also relaxes domestic political constraints and improves the outcome of a reform and thus, enhances long-term innovation and growth, assuming the country’s trading partners have a good business environment, i.e., a perfect rule-of-law coefficient.
1 Introduction

During the 1990s, we witnessed the collapse of socialism at an unanticipated rate; a collapse that has raised new policy questions and revived old theoretical issues: How is the transition to a market economy to be effected? What role do institutions and trade play in the transition? Moreover, recent literature points to institutions as being a fundamental factor promoting long-term growth since they are positioned at the core of economic activity, and therefore at the center of the transition to a market regime. The general view expressed in such literature, and which is adopted in the current proposal, is that “institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interactions.”

In this paper we investigate the interactions between interest groups and constitutional changes, which affect current institutions, and how trade in goods supplements weak institutions and mitigates the damage corrupt elites inflict on the economy. Unlike the existing literature (Levchenko 2004, Segura Cayuela 2006, Do and Levenchenko 2005, Galor and Mountford 2006, among others), we investigate the link between social norms and opening up to trade. The paper, therefore, contributes to an ongoing policy debate about the role institutions and trade play in emerging economics.

To this end, a political economic environment of an economy in transition is characterized; assuming interest groups differ with respect to their behavioral norms. It is then investigated how interest groups affect the transition of the institutions and the legal framework to support market regimes, where the new institutions and legal framework affect the business environment and therefore the firms’ profits. This paper, therefore,

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1North 1990, p.3. See also Murrell (1996).
2This research question is related to Acemoglu et al. (2005) who investigated the role institutions play in long-term growth. See also Alesina and Rodrik (1994), Murrell (1996), North (1990), and Rapaczynski (1996).
3Social capital, which is influenced by behavioral norms, affects institutions, growth, and investment (e.g., Knack and Keefer, 1997, Putnam, 2000, Woolcock and Narayan, 2000, and Easterly et al., 2005).
draws from both the literature on institutions and growth (e.g., North 1990, Alesina and Rodrik 1994, Acemoglu and Robinson 2004, and Glaeser et al. 2004) and from the literature on investor rights (e.g., LaPorta et al. 1998, 1999, and 2000, and Glaeser et al. 2001) to explain the transition to capitalism in economies which following the transition to market regimes open to trade. Specifically, the paper tries to identify the importance of the ability to enforce property right institutions and how it is affected by globalization, given that entrepreneurs differ with respect to behavioral norms.\(^4\)

In order to elucidate the bilateral connection between the constitutional conditions and trade, an index is assumed, namely the Rule-of-Law coefficient (henceforth, the RoL coefficient). A coefficient value of zero indicates that the economy is in total anarchy (e.g., there is no limit on the ability of one group to expropriate the other), whereas a coefficient value of 1 indicates that the economy is in complete order under a market regime (e.g., property rights are well defined).

The government initially sets the value of the RoL coefficient, i.e., the status of the judicial and legal system and therefore the ability to enforce investor rights. Interest groups independently attempt to influence the RoL coefficient chosen by the government.\(^5\) Some agents, who use illegal methods of operation, benefit from a lower RoL

\(^4\)Several authors have recently tried to un-bundle institutions. One example is Acemoglu and Johnson (2003), who investigated the importance of “property rights institutions” and “contracting institutions” in the long-run growth, investment, and financial development of the European colonization. Another is Persson and Tabellini (2003), who investigated the policy and economic consequences of different forms of government and electoral rules. See also Freille (2006), who investigated the empirical relationship between decentralization and corruption.

\(^5\)When interest groups prevail, the regulation scheme is affected by competition between the different groups [e.g., Becker (1983), Peltzman (1976), and Stigler (1971), and more recently Grossman and Helpman 1994 and 1995, and Dixit et al. 1997]. The paper relates to this branch, where the novelty is the introduction of a dynamic story in which interest groups not only try to influence government’s decisions, but also try to influence the laws that govern economic transactions and therefore the payoffs from such transactions (e.g., Benabou 2000, and Do and Levchenko 2006). Note that the importance of the initial conditions of the legal system was pointed out in Kremlin Capitalism (Blasi et. al. 1997) as
coefficient, while others profit when it is higher. These variations in benefits produce differing incentives for the interest groups in pursuing the desired level of the RoL coefficient. Specifically, it is assumed entrepreneurs are heterogeneous with respect to their ability to cope with corruption and bureaucracy, and that these differences are mitigated as the RoL coefficient increases. The ability of entrepreneurs to cope with both corruption and bureaucracy is a function of both their type and the RoL coefficient.

Formally, and following Melitz (2003), entrepreneurs must pay an entry cost to start a business. After paying the entry cost, they discover their type, i.e., their ability to cope with both corruption and bureaucracy, where a type is a number between zero and infinity. The government, now, set the value of the RoL coefficient, contingent on the contribution schedule of the elite (which are assumed to be the entrepreneurs). The RoL coefficient affects fixed costs (not entry costs), since it affects the ex post type. In a perfect market regime in which the RoL coefficient equals 1, fixed costs do not depend on the entrepreneur's type. As the RoL coefficient approaches 0, on the other hand, the ability of entrepreneurs to cope with both corruption and bureaucracy (i.e., their ex ante type) is crucial for their survival, where fixed costs are lower for a higher ex ante type. These costs change monotonically with the RoL coefficient and that fixed costs under perfect market regime are bounded away from zero.

being a key factor in the success of the privatization process in Russia during the transition period. The importance of the RoL coefficient was also pointed out as being a key factor in Eastern Asian progress. Corruption (which is possible with a low RoL coefficient) is one of the “six deadly sins” of Eastern Asia, and is one of the six major causes that hinder that region’s progress [The Economist, 1998].

6Following Acemoglu (2006) and Acemoglu and Robinson (2006), among others, we model the elite as groups that have de Juro power; in other words, they have the power to affect the rules that will govern the transition. In practice, the question who is "the elite", is a key question, one which we remain agnostic about in this paper; though the model illustrates that the business conduct of the elites has an important effect on the efficiency of equilibria.
The entrepreneurs are the owners, when ownership is identified with residual rights of control of physical assets [Hart (1991), see also Grossman and Hart (1986)]. Owners are entrepreneurs who may vary in their behavioral norms (e.g., use of corrupt, as opposed to legal methods of acquiring firms). According to a different approach, which is not taken in this proposal, entrepreneurs vary both in their productive activities, such as innovation, and in their unproductive activities, such as rent seeking or organized crime (Baumol, 1990).

Next, the entrepreneurs, who now own a firm and know their type, decide whether to produce, where the competitive environment is an assumed monopoly competition (i.e., firms have market power), or to exit. This decision depends on the fixed costs, which are a function of the entrepreneurs ex post type, namely its type given the RoL coefficient. At the second stage, the economy opens to trade, where the other economy has a RoL coefficient of 1.

It is shown that trade (indirectly) imports institutions; in the sense that knowing an economy will open to trade in the future will cause it to set a higher RoL coefficient. A slightly different approach, not taken in the current paper, occurs when residual rights of control are attributed to employee decisions [Coase (1988), Williamson (1985)].

LaPorta et al. (1998) examined legal rules covering the protection of shareholders. Murphy, Shleifer, and Vishny (1993) discussed the negative effect of rent seeking on growth. Benassy-Quere et al. (2007) show that institutions matter for FDI inflows irrespective of GDP per capita. In particular, they point out that bureaucracy, corruption, but also information, banking sector and legal institutions are important determinants of inward FDI. They also argue that measuring the impact of institutions on FDI encounters the classical problem of reverse causality. Indeed, higher FDI could put pressure on governments to improve institutions (see Selowski and Martin, 1997). The literature on institutions and growth encounters the same difficulty, which is tackled through the use of innovative instrumental variables for institutions (see Hall and Jones, 1999; and Acemoglu et al., 2001 and 2002). Other researchers, who studied the link between institutions and FDI, are Kinoshina and Campos (2003) and Meon and Sekkat (2004), who focused on transition economies and MENA countries, respectively. For the interactions between institutions and trade–FDI, see Levenchenko 2004, Antras 2003 and 2005, and Antras and Helpman 2005, among others.
The paper, therefore, sheds new light on corrupt entrepreneurs’ ability, and therefore incentives, to corrupt transition to a market regime. In particular, the paper identifies the conditions whereby the transition of the judiciary and legal system is kept at bay, and therefore leads to an enduring decline in output, as witnessed in Russia seven years after the transition from communism.\textsuperscript{11} An additional benefit to trade is identified, which should be factored into the calculus of benefits and costs from trade. Trade not only indirectly imports factors of production, but under certain conditions, it also imports institutions. If fixed costs under market regime are sufficiently low, such that the mass of entrepreneurs who benefit from a ruleless system is not too big, then trade (indirectly) affects the government’s decision and help them choose a higher RoL coefficient in equilibrium.

This work, therefore, differs from Segura-Cayuela (2006), who argued that part of the reason for poor growth performance may be related to the interaction between weak institutions and trade. In particular, he argues that “price effects of taxation and expropriation in closed economies also hurt the elites, and this puts a natural barrier against inefficient policies. Trade openness removes this barrier and enables groups with political power to exercise this power in more inefficient ways.” This paper differs from that paper, since we focus on entrepreneurs’ ability to cope with corruption and bureaucracy, and not on the elite’s ability to expropriate others. We show that trade may both increase welfare since it imports “strong” institutions, and increase potential profits since it lowers fixed costs for the majority of entrepreneurs. It is interesting to note that Law and Demetriades (2006), using dynamic panel data techniques and data from 43 developing countries during the period 1980-2001, showed that openness, in terms of trade and capital flows, is particularly potent in promoting financial development in middle-income countries, but much weaker in low-income countries. Cheptea (2007) also finds

\textsuperscript{11}See Roland (2000).
support for a positive correlation between trade and institutions, focusing on two factors promoting CEE–EU trade integration: trade liberalization and institutional reforms.\textsuperscript{12}

Do and Levchenko (2006), while assuming a fixed mass of firms, showed that openness may be detrimental to institution quality. They assumed heterogeneity with respect to productivity. This paper, unlike Do and Levchenko, models heterogeneity with respect to entrepreneurs’ ability to deal with bureaucracy and corruption and assumes institutions affect this ability. The current paper also allows for free entry, where the political environment allows us to relax the assumption that the number of firms is constant.\textsuperscript{13} The two papers differ in the conditions required for us to observe that institution quality improves with the introduction of trade. Specifically, the regularity conditions, which link productivity and the ability to deal with corruption (i.e., with “weaker” institutions), are not required. Similar to Do and Levchenko, we also link firm size and corruption, and therefore support the empirical observation that “weak” institutions have a greater negative impact on the growth of small firms, compared with large firms, as documented by Beck et al. (2005). Although both papers linked institutions with fixed costs, the interpretation given here differs from that given by Do and Levchenko, since we do not need to argue that corruption is correlated with productivity. To this end, Faccio (2005) showed that firms owned by politically connected entrepreneurs are less productive, on average.

The intuitive nature of the aforementioned results stems from the political-economic structure, and particularly from the assumption that an interest group exists that is

\textsuperscript{12}In general, trade openness is associated with better institutions in a cross-section of countries (Ades and Di Tella 1997, Rodrik et al. 2004, and Rigobon and Rodrik 2005, among others).

\textsuperscript{13}Note that the paper can easily be extended to adopt the approach of Benabou (2000), whereby wealthier entrepreneurs carry larger weights with the government, and therefore increase the set of parameters for trade to deteriorate the economy’s institutions.
connected to the government and benefits from a ruleless system (low RoL coefficient).\footnote{Corruption (which is possible with a low constitutional index) is one of the “six deadly sins” of Eastern Asia and is one of the six major causes hindering Eastern Asian progress (“Six Deadly Sins,” The Economist, May 5th, 1998).} Moreover, this group uses its own power to redistribute profits, and this ability decreases the higher the RoL coefficient is; in other words, institutions constrain the behavior of entrepreneurs. On the other hand, domestic welfare increases with the RoL coefficient if the institutional changes sufficiently to constrain unlawful business conduct. The number of firms increases in equilibrium.

2 The Model

2.1 Demand

The preferences of a representative consumer over the set of available goods $\Omega$ are captured by the following C.E.S. utility function:

$$U = \left[ \int_{\omega \in \Omega} q(\omega)^{\rho} d\omega \right]^{\frac{1}{\rho}}.$$  (1)

The goods are substitutes, implying that the elasticity of substitution between any two goods $\sigma = \frac{1}{1-\rho} > 1$. Following Dixit and Stiglitz (1977), the total demand for a given variety $\omega$ is given by:

$$q(\omega) = Q \left[ \frac{p(\omega)}{P} \right]^{-\sigma},$$  (2)

where $Q = \left[ \int_{\omega \in \Omega} q(\omega)^{\rho} d\omega \right]^{\frac{1}{\rho}}$, $p(\omega)$ is the price of variety $\omega$, and $P = \left[ \int_{\omega \in \Omega} p(\omega)^{1-\sigma} d\omega \right]^{\frac{1}{1-\sigma}}$ is the ideal price index. Moreover, the total spending on any individual variety $\omega$ is given by:

$$r(\omega) = R \left[ \frac{p(\omega)}{P} \right]^{1-\sigma},$$  (3)

where $R = PQ = \int_{\omega \in \Omega} r(\omega) d\omega$ denotes aggregate expenditure.
2.2 Production

There is a continuum of firms of mass $M$, each choosing (optimally) to produce a different variety. Labor is the only factor of production and is inelastically supplied at its aggregate level $L$. Production technology is of the form:

$$l = \frac{f}{\varphi} + q. \quad (4)$$

Firms share the same $f > 0$, but have a different $\varphi$ and thus, a different fixed cost of production. We can then index firms by $\varphi$. All firms face a residual demand curve with constant elasticity $\sigma$ and have the same marginal cost of production. Normalizing the wage to one, we obtain the following pricing strategy for all firms:

$$p(\varphi) = \frac{1}{\rho} = p. \quad (5)$$

Firm profit is then:

$$\pi(\varphi) = r(\varphi) - l(\varphi) = \frac{r}{\sigma} - \frac{f}{\varphi}, \quad (6)$$

since as it is evident from equations (3) and (5), firm revenue is independent of $\varphi$. The same applies to demand at the firm level as equations (2) and (5) demonstrate (i.e., $q(\varphi_1) = q(\varphi_2) \forall \varphi_1, \varphi_2$). Using equations (3), (5), and (6), we can write firm profit as:

$$\pi(\varphi) = \frac{R}{\sigma} (P\rho)^{\sigma-1} - \frac{f}{\varphi}. \quad (7)$$

The $\varphi$’s in equilibrium are drawn from a probability density function $\mu(\varphi)$ with support a subset of $(0, \infty)$. This implies the ideal price index then equals:

$$P = \left[ \int_0^{\infty} p^{1-\sigma} M\mu(\varphi) \, d\varphi \right]^{\frac{1}{1-\sigma}} = M^{\frac{1}{1-\sigma}} \frac{1}{\rho}. \quad (8)$$

Moreover, we have:

$$Q = \left[ \int_0^{\infty} q^\theta M\mu(\varphi) \, d\varphi \right]^{\frac{1}{\theta}} = M^{\frac{1}{\theta}} q, \quad (9)$$

$$R = PQ = Mr, \quad (10)$$
\[ \Pi = \int_0^\infty \pi(\varphi) M\mu(\varphi)\,d\varphi = M \left( \frac{\bar{r}}{\bar{\varphi}} - \frac{\bar{f}}{\varphi} \right) = M\pi(\bar{\varphi}) = \pi, \tag{11} \]

where \( \bar{\varphi} = \left[ \int_0^\infty \varphi^{\sigma-1}\mu(\varphi)\,d\varphi \right]^\frac{1}{\sigma-1} \Leftrightarrow \bar{\varphi}^{-1} = \int_0^\infty \varphi^{-1}\mu(\varphi)\,d\varphi \). Thus, \( \bar{\varphi} \) is the harmonic mean of the \( \varphi \)'s and is independent of \( M \).

### 2.3 Firm Entry and Exit

There is a large pool of prospective entrants into the industry. In order to actually enter, all firms must pay a sunk cost \( f_e > 0 \) (measured in terms of labor). They then draw a \( \varphi \) from a common distribution \( g(\varphi) \), which has positive support over \((0, \infty)\). The associated (continuous) cumulative distribution function is \( G(\varphi) \). Let \( \varphi^0 \) refer to this draw of \( \varphi \). Entrants are aware that should they decide to produce, their fixed cost will be a function of both their draw of \( \varphi \), \( \varphi^0 \), and the RoL coefficient (or level of corruption). In particular, it will be given by the following function:

\[ \frac{f}{\varphi(\varphi^0, \theta)} = \frac{f}{\varphi^0 + \theta(\varphi^M - \varphi^0)}, \tag{12} \]

where \( \varphi^M \equiv \varphi(\varphi^0, 1) \) and is the same across firms independently of their \( \varphi^0 \). In other words, under a perfect market economy regime, all firms will be facing the same fixed cost of production. Note also that \( \varphi^0 = \varphi(\varphi^0, 0) \). Finally, we maintain the assumption that there is no time discounting but instead, active firms, independently of their fixed cost of production, face a probability \( \delta \) in every period of a bad shock that would force them to exit.

Intuitively, firms initially learn their ability to deal with corruption. Then, depending on this ability and on the actual level of corruption (chosen by the government), firms decide whether to engage in production or not. Our setup implies that some entrants would benefit from an economy in total anarchy and ridden with corruption (the ones with \( \varphi^0 > \varphi^M \)), whereas the rest would prefer a perfect market economy regime (the ones with \( \varphi^0 < \varphi^M \)).
2.4 The Government

The incumbent government cares about both the total level of political contributions and the level of national welfare. The government values political contributions since they can be used to finance its next electoral campaign and thus facilitate its reelection. The level of national welfare also matters to the incumbent government, as higher aggregate well-being might increase its chances of winning another mandate. We assume the government’s objective function is of the form:

\[ G = C + \alpha W, \]  

where \( C \) represents the sum of political contributions and \( W \) denotes aggregate welfare, and where \( \alpha > 0 \).

2.5 The Rule-of-Law Coefficient

Lobby \( \varphi \), representing firm of type \( \varphi \), makes its political contribution contingent on the RoL coefficient chosen by the government. Let \( c_{\varphi} (\theta) \) denote the contribution schedule tendered by lobby \( \varphi \). The lobby tailors this schedule to maximize the total profits of its members. It then collects the necessary donations in such a way as to allow all to share in the gains from the political contribution. Put differently, the joint profit of the members of lobby \( \varphi \) is \( V_{\varphi} = W_{\varphi} - c_{\varphi} \), where \( W_{\varphi} \) is their gross-of-contributions joint profit, i.e.,

\[ W_{\varphi} = \pi \left( \varphi \left( \varphi^0, \theta \right) \right). \]  

\( \theta \in [0, 1] \) is a RoL coefficient, measuring the state of the judicial and legal system and therefore serving as a proxy for the level of corruption in an economy. A value of zero signifies the economy is in total anarchy, whereas an index value of unity implies that we have a perfect market economy with no corruption. Our setup implies that firms differ in their ability to deal with a given degree of corruption.
In the game, the RoL coefficient is determined by the government and the interest groups; in other words, it is endogenous in the model. This coefficient takes into account the ability of interest groups and the state to expropriate others, and the ability of the legal system to create viable checks and balances. Formally, the government chooses the RoL coefficient in a common-agent equilibrium so as to maximize its benefit (as defined in Berheim and Whinston, 1986, Lemma 1). 

2.6 Timing

The timing of our game is as follows:

- **Stage 0:** Prospective entrants decide whether to pay the sunk cost $f_e$ and enter the industry or not. The ones that decide to do so, then, draw a $\varphi$, $\varphi^0$.

- **Stage 1:** Each entrant announces his contribution schedule, which is a function of the RoL coefficient chosen by the government. Given these contribution schedules, the government picks the RoL coefficient so as to maximize its objective function.

- **Stage 2:** Firms choose whether to actually engage in production or not. Production then takes place, profits are realized.

This outlines the basic structure of our model. We solve our game recursively. Specifically, we first characterize the closed and open economy equilibria for a given $\theta$. Subsequently, we turn to the government’s problem and solve for the optimal $\theta$ under both autarky and trade: $\theta^*_A$ and $\theta^*_T$, respectively. Finally, we compare the two solutions and show that under certain conditions, $\theta^*_T > \theta^*_A$.

\textsuperscript{15}See also Grossman and Helpman, 1994, Proposition 1.
3 Equilibrium in a Closed Economy

We only consider steady-state equilibria. Given $\theta$, an entrant will decide to produce as long as $\pi(\phi(\theta)) \geq 0$. Otherwise, he will exit. The value function for each entrant then equals:

$$v(\phi) = \max \left\{ 0, \sum_{t=0}^{\infty} (1 - \delta)^t \pi(\phi) \right\} = \max \left\{ 0, \frac{1}{\delta} \pi(\phi) \right\}. \quad (15)$$

Therefore, the cutoff level of producing firms is given by $\phi^* = \inf \{ \phi : v(\phi) > 0 \}$. It is easy to check that $\lim_{\phi \to 0} \pi(\phi)$ equals $-\infty$. Thus, $\pi(\phi^*)$ must equal zero. Any entrant with $\phi^0$ such that $\phi(\phi^0, \theta) < \phi^*$ would earn a negative profit and will hence exit immediately. In essence, only the entrants with relatively high ability of dealing with corruption (or, the relatively corrupt ones) will engage in production. The equilibrium distribution of $\phi$'s, $\mu(\phi, \theta)$, is then:

$$\mu(\phi, \theta) = \begin{cases} g(\phi^{-1}(\phi, \theta)) \frac{1}{1 - G(\phi^{-1}(\phi^*, \theta))} & \text{if } \phi \geq \phi^*, \\ 0 & \text{otherwise,} \end{cases} \quad (16)$$

where $\phi^{-1}$ is the inverse function of $\phi(\phi^0)$. Moreover, the ex-ante probability of successful entry is:

$$p_{in} = 1 - G(\phi^{-1}(\phi^*, \theta)) \quad (17)$$

Furthermore, the harmonic mean of the active $\phi$'s is given by:

$$\bar{\phi}(\phi^*, \theta) = \left[ \frac{1}{1 - G(\phi^{-1}(\phi^*, \theta))} \int_0^\infty \phi^{\sigma-1} g(\phi^{-1}(\phi, \theta)) \, d\phi \right]^{\frac{1}{\sigma-1}}. \quad (18)$$

On a different note, all incumbent firms with $\phi > \phi^*$ earn positive profits, implying that $\pi > 0$. The present value of average profit flows $v = \sum_{t=0}^{\infty} (1 - \delta)^t \pi = \frac{1}{\delta} \pi$ is thence strictly positive. We define now the net value of entry $v_e$ as:

$$v_e = p_{in} \bar{v} - f_e = \frac{1 - G(\phi^{-1}(\phi^*, \theta))}{\delta} \pi - f_e. \quad (19)$$

Since we assume free entry, in equilibrium, $v_e$ must equal to zero.
We now have our two fundamental equilibrium conditions:

Zero Cutoff Profit: \( \pi(\varphi^*) = 0 \iff \varphi^* = \frac{\sigma f}{r} \) and \( (20) \)

Free Entry: \( v_e = 0 \iff \pi = \frac{\delta f_e}{1 - G(\varphi^{-1}(\varphi^*, \theta))} \). \( (21) \)

Equation (19) gives us \( \varphi^* \). We can then easily obtain \( \pi \) from (20). Note that this equilibrium is unique.

Every period, \( \delta M \) incumbent firms are hit by a bad shock and exit. In a steady-state equilibrium like the one here, aggregate variables must remain constant through time. Therefore, every period, we must concurrently have a mass of new entrants \( M_e \) such that \( p_{in} M_e \) (i.e., the mass of successful new entrants) exactly equals \( \delta M \). These new entrants require \( L_e = M_e f_e \) units of labor to cover their sunk cost, leaving \( L_p = L - L_e \) units of labor for production purposes. It is direct to show that:

\[
L_e = M_e f_e = \frac{\delta M}{p_{in}} f_e = M \pi = \Pi. \quad (22)
\]

Clearly, aggregate payments to production workers, \( wL_p = L_p \), must equal the difference between aggregate revenue and aggregate profit. So, using (21), we get:

\[
L_p = R - \Pi \iff R = L_p + L_e = L. \quad (23)
\]

The mass of active firms in any period then equals:

\[
M = \frac{R}{r} = \frac{L}{\pi} = \frac{L}{\sigma \left( \frac{1}{\varphi} + \frac{1}{\psi} \right)}. \quad (24)
\]

Using (23), we finally obtain the equilibrium ideal price index \( P = M^{\frac{1}{\pi - \sigma}} \). The resulting welfare per worker is:

\[
W = P^{-1} = M^{\frac{1}{\pi - \sigma}} \rho. \quad (25)
\]
4  Equilibrium in an Open Economy

We now model trade between the domestic economy and a foreign one that is identical in every respect except for the RoL coefficient. In particular, we assume the latter is a perfect market economy with no corruption (i.e., its RoL coefficient $\theta = 1$). We moreover maintain the assumption that domestic firms need to incur two additional costs in order to sell abroad: a fixed per-period cost $f_\varphi(\varphi_0, \theta) > 0$ and a per-unit transportation cost.\footnote{Regardless of whether an active firm decides to export or not, it still incurs the fixed cost $f_\varphi(\varphi_0, \theta)$.} The former is measured in terms of units of labor and differs among firms. The latter is of the iceberg type, is common across firms, and is denoted by $\tau > 1$. $\tau$ represents the number of units of a particular variety that need to be shipped so that 1 unit arrives at destination. Without loss of generality, we assume that domestic and foreign firms face the same transportation costs.

We focus our analysis on the home country. Each firm’s domestic pricing strategy is still $p_d(\varphi) = \frac{1}{\rho} = p_d$. For the exporting firms, the prices in the foreign market are higher due to the transportation costs: $p_x(\varphi) = \frac{\tau}{\rho} = p_x$. This implies that the revenues of an exporting firm from the domestic and the foreign sales equal, respectively:

$$r_d(\varphi) = R(P\rho)^{\sigma-1} = r_d$$ and

$$r_x(\varphi) = \tau^{1-\sigma}r_d = r_x.$$ (26)

Total revenues of a firm selling domestically then equals:

$$r(\varphi) = \begin{cases} r_d & \text{if the firm does not export, and} \\ r_d + r_x = (1 + \tau^{1-\sigma})r_d & \text{if the firm exports.} \end{cases}$$ (28)

It is apparent that no firm would ever export and not also sell domestically, since it would do strictly better by also producing for the home market. As a result, we can
write each firm’s profit as a sum of its domestic and its export profit (if applicable), accounting for $\frac{f}{\varphi(\varphi', \theta)}$ solely in the domestic profit:

$$
\pi_d(\varphi) = \frac{r_d}{\sigma} - \frac{f}{\varphi} \quad \text{and}
$$

$$
\pi_x(\varphi) = \frac{r_x}{\sigma} - \frac{f_x}{\varphi}.
$$

Thus, each firm’s combined profit equals:

$$
\pi(\varphi) = \pi_d(\varphi) + \max\{0, \pi_x(\varphi)\}. \quad (31)
$$

As before, the cutoff $\varphi$ for active firms is given by $\varphi^* = \inf\{\varphi : v(\varphi) > 0\}$, where $v(\varphi) = \max\{0, \sum_{t=0}^{\infty} (1 - \delta)^t \pi(\varphi)\} = \max\{0, \frac{1}{r} \pi(\varphi)\}$. However, we now have a second cutoff level for exporting firms, given by $\varphi^*_x = \inf\{\varphi : \varphi \geq \varphi^* \text{ and } \pi_x(\varphi) > 0\}$. The cutoff levels must clearly satisfy $\pi_d(\varphi^*) = 0$ and $\pi_x(\varphi^*_x) = 0$, resulting in the following equilibrium zero cutoff profit conditions:

$$
\pi_d(\varphi^*) = \frac{r_d}{\sigma} - \frac{f}{\varphi^*} = 0 \Leftrightarrow \varphi^* = \frac{f \sigma}{r_d} \quad \text{and}
$$

$$
\pi_x(\varphi^*_x) = \frac{r_x}{\sigma} - \frac{f_x}{\varphi^*_x} = 0 \Leftrightarrow \varphi^*_x = \frac{\sigma - 1}{f_x \sigma} \frac{r_d}{f_x}. \quad (33)
$$

We maintain the assumption that $\sigma - 1 f_x > f$, which implies that $\varphi^*_x > \varphi^*$. In other words, in equilibrium, only the entrants with the highest ability to deal with corruption (or, the most corrupt ones) produce for both the domestic and the foreign market, whereas the ones with the lowest ability of dealing with corruption (or, the least corrupt ones) do not produce at all and exit immediately. The ones in between only sell domestically.

The distribution of $\varphi$’s in equilibrium is once again given by $\mu(\varphi, \theta) = \frac{g(\varphi^{-1} \varphi', \theta)}{1 - G(\varphi^{-1} \varphi^*, \theta)}$ for all $\varphi \geq \varphi^*$. The ex-ante probability of successful entry is still $p_{in} = 1 - G(\varphi^{-1} \varphi^*, \theta)$. In addition, the ex-ante probability of exporting and the ex-post fraction of firms that export are both given by $p_x = \frac{1 - G(\varphi^{-1} \varphi^*_x, \theta)}{1 - G(\varphi^{-1} \varphi^*, \theta)}$. If, then, $M$ is the
mass of active domestic firms in any given period, the number of varieties available to
the domestic consumers equals \( M_t = M + p_x M = (1 + p_x) M \).

Furthermore, the harmonic mean of the \( \varphi \)'s in equilibrium is given by:

\[
\tilde{\varphi}_t = \left[ \frac{M}{M_t} \frac{1}{1 - G(\varphi^{-1}(\varphi^*, \theta))} \int_{\varphi^*}^{\infty} \varphi^{\sigma - 1} g\left(\varphi^{-1}(\varphi, \theta)\right) d\varphi + \frac{p_x M}{M_t} \frac{1 - G(\varphi^{-1}(\varphi^*_x, \theta))}{1 - G(\varphi^{-1}(\varphi^*_x), \theta)} \int_{\varphi^*_x}^{\infty} \left(\varphi / \tau\right)^{\sigma - 1} g\left(\varphi^{-1}(\varphi, \theta)\right) d\varphi \right]^{\frac{1}{1 - \sigma}}
\]

where \( \tilde{\varphi} \) and \( \tilde{\varphi}_x \) are obtained through equation (17): \( \tilde{\varphi} = \tilde{\varphi}(\varphi^*, \theta) \) and \( \tilde{\varphi}_x = \tilde{\varphi}(\varphi^*_x, \theta) \).

Our second equilibrium condition is the free entry condition: \( v_c = p_m \bar{v} - f_e = \frac{1 - G(\varphi^{-1}(\varphi^*, \theta))}{\delta} \bar{\pi} - f_e = 0 \iff \bar{\pi} = \frac{\delta f_e}{1 - G(\varphi^{-1}(\varphi^*, \theta))}. \) We can easily solve for \( \bar{\pi} \) using (31). Once again, our equilibrium is unique.

Finally, using the same reasoning as before, it is direct to show that \( R = L \). This implies that:

\[
M = \frac{R}{r} = \frac{L}{\bar{v}} = \frac{L}{\sigma \left( \frac{L}{\bar{v}} + p_x \frac{L_x}{\varphi^*_x} \right)}.
\] (35)

We can then easily obtain the equilibrium number of varieties, ideal price index, and welfare per worker:

\[
M_t = (1 + p_x) M, \quad (36)
\]

\[
P = M_t^{\frac{1}{\sigma}} / \rho \quad \text{and} \quad (37)
\]

\[
W = P^{-1} = M_t^{\frac{1}{\sigma - 1}} / \rho. \quad (38)
\]
5 The Rule-of-Law Coefficient

Next, the government’s problem is solved for the optimal $\theta$ under both autarky and trade: $\theta^*_A$ and $\theta^*_T$, respectively. Subsequently, in Section 5.3, the two solutions are compared and it is shown that under certain conditions, $\theta^*_T > \theta^*_A$.

Henceforth, we focus on truthful strategies, i.e., on contribution schedules that mirror the relative value a firm attaches to the various actions. Specifically,

$$c^T_\phi = \max[0, W\phi - B\phi]$$

for some $B\phi > 0$ (see Grossman and Helpman, Eq. (10), 1994).17 We also assume that an interior solution exists.

Truthful Nash equilibria (TNE), i.e., equilibria derived under truthful strategies, have an appealing structure, since in any equilibria the RoL coefficient satisfies

$$\theta^* = \arg \max_{\theta} \left[ aW + \int_0^\infty W_\phi \mu (\phi^0, \theta) d\phi^0 \right]$$

(39)

Hence, in TNE

$$a\nabla_\theta W + \int_0^\infty \nabla_\theta \left[ W_\phi \mu (\phi^0, \theta) \right] d\phi^0 = 0$$

where the operator $\nabla_\theta$ denotes the gradient with respect to $\theta$. This equation characterizes the equilibrium RoL coefficient supported by differential contribution schedules. Note that this is the first-order-condition that is necessary for the maximization of (39).

17Theorem 3 in Berheim and Whinston (1986) shows that all equilibria supported by truthful strategies, and only these equilibria, are stable to non-binding communication among players.
5.1 Closed Economy Regime

The RoL coefficient is now characterized, given a closed economy regime. To this end, note that if $\varphi > \varphi^M$ then a firm benefits from, and therefore contributes to, a low RoL coefficient. If, on the other hand, $\varphi < \varphi^M$, then a firm benefits from, and therefore contributes to, a high RoL coefficient. The sum of the contributions tendered by interest groups, therefore, equals

$$C = \int_0^{\varphi^M} \Delta_1 \mu(\varphi^0, \theta) \, d\varphi^0 + \int_{\varphi^M}^{\infty} \Delta_2 \mu(\varphi^0, \theta) \, d\varphi^0$$

where

$$\Delta_1 \equiv \max \{\pi(\varphi(\varphi_0, \theta)), 0\} - \max \{\pi(\varphi_0, \theta = 0), 0\}$$

and

$$\Delta_2 \equiv \pi(\varphi(\varphi_0, \theta)) - \pi^m.$$ 

In other words, a firm contributes the difference between its worst outcome and its equilibrium profits.

Assumption 1 

$$\frac{\vartheta \varphi^m - \varphi^*}{\vartheta(\varphi^* - \varphi^m) - \varphi^*} f > \eta \equiv \frac{dM}{d\vartheta} \frac{\vartheta}{M}.$$ 

Simply put, the elasticity of the number of firms with respect to $\vartheta$ is not too big. This is true, for example, if the elasticity of substitution $\eta$ is sufficiently small, and therefore existing firms’ market power is sufficiently large. Assumption 1 might also hold if fixed costs $f$ are sufficiently large, and therefore barriers to entry are sufficiently large.

Lemma 1 Given Assumption 1, $\frac{d\Delta_1}{d\vartheta} > 0$.

In other words, firms of type $\varphi < \varphi^M$ contribute to the government’s incentive to increase $\vartheta$. Firms that benefit from rule-of-law benefit from a high $\vartheta$, i.e., $\frac{d\Delta_1}{d\vartheta} > 0$. On the other
hand, and independent of $\theta$, $0 > \frac{d\Delta}{d\theta}$. Firms that benefit from rulelessness contribute to the government’s incentives to lower $\theta$, i.e., $0 > \frac{d\Delta}{d\theta}$.

**Assumption 2** $\frac{dM}{d\theta} < \frac{L \varphi_m}{\sigma f g (\theta \varphi_m)} \frac{1}{g(\varphi'(\theta))}$

That is, the probability of entry $(1 - p_m)$ increases with $\theta$.

**Lemma 2** Given Assumption 2, $\frac{dW}{d\theta} > 0$.

In other words, if the probability of entry $(1 - p_m)$ increases with $\theta$ then aggregate welfare also increases with $\theta$; the number of firms, and therefore variety, increases with $\theta$.

### 5.2 Open Economy Regime

The equilibrium $\theta$, given an open economy regime, is now characterized. To this end, many of the techniques and intuition derived above, under a closed economy regime, carries over to the open economy regime. In particular, the following two assumptions are made:

**Assumption 3**

$$\frac{M \sigma}{\theta L} \cdot \frac{\varphi_m - \varphi^*}{(\theta \varphi^* - \varphi_m - \varphi^*) f} > \eta$$

$$\frac{M \sigma}{\theta L} \cdot \frac{1}{\tau^{1-\sigma}} \left( \frac{\varphi_m - \varphi^*}{\varphi^*} \frac{(f + f_x)}{f} \right) > \eta$$

Assumption 3, similar to Assumption 1, implies that firms which benefit from rule-of-law contribute to the government’s incentive to increase $\theta$. The difference between Assumption 1 and Assumption 3 stems from the ability to sell to foreign markets.
Assumption 4

\[
\frac{dM}{d\theta} < \frac{L\varphi_m}{\sigma f} g(\theta \varphi_m) \cdot \frac{1}{g(\varphi^*(\theta))} \quad \text{and} \\
\frac{dM}{d\theta} < \frac{L\varphi_m}{\sigma f} g(\theta \varphi_m) \cdot \frac{\tau^{1-\sigma}}{g(\varphi^*_T(\theta))}
\]

Assumption 4, similar to Assumption 2, implies that the probability of entry increases with \(\theta\). Given Assumption 3, it can then be shown that aggregate welfare increases with \(\theta\).

### 5.3 The Optimal Regime

This brings us to the main result of the paper. If the mass of firms which benefit from rulelessness is sufficiently small, then the RoL coefficient in equilibrium is larger under trade. Trade facilitates stronger institutions.

**Proposition 1** Given Assumptions 1 to 4, if \(\int_{\varphi_m}^{\infty} g(\varphi_0) d\varphi_0\) is sufficiently small, then \(\theta^*_T > \theta^*_A\).

To derive Proposition 1, assume \(\theta = \theta^*_A\). Then, if \(\int_{\varphi_m}^{\infty} g(\varphi_0) d\varphi_0\) is sufficiently small, the first-order-conditions under the open economy regime are strictly larger then 0. Therefore, it is optimal to increase \(\theta\), and thus \(\theta^*_T > \theta^*_A\).

### 6 Concluding Remarks

This paper investigates the interactions between trade and corruption and shows that as long as the majority of firms benefit from rule-of-law, opening the economy to trade in goods strengthens its legal institutions. Otherwise, trade becomes a treacherous force which weakens the legal institutions. Put differently and under the conditions...
mentioned above, trade contributes to the government’s incentives to strengthen its legal institutions.

Two factors enhance the government’s incentive to increase the RoL coefficient; aggregate welfare and firms of type $\phi < \phi^M$. A third factor, firms of type $\phi > \phi^M$, moderate the government’s incentive to increase the RoL coefficient. Hence, the RoL coefficient is an outcome of the three aforementioned factors. Therefore, the more the government values contributions, the lower is the equilibrium RoL coefficient. Governments that value political contributions create weaker institutions and, therefore, introduce more corruption.

We plan in the future to further understand the interactions between institutions and trade. We wish to extend the economic environment to more than two trading partners. This extension will help us investigate if a domino effect exists. In other words, when an economy improves its legal institution does it lead in future periods to stronger institutions for its trading partners?

Another avenue we plan to investigate, is how the composition of the RoL coefficient affects the equilibrium outcome. If indeed there are many combinations that yield a given RoL coefficient, which one should be chosen? Should it be the coefficient with the least amount of political resistance? Put differently, in making recommendations to economies in transition, should the recommendation take into account political constraints.
Assumption 6

\[
\frac{dM}{d\theta} < \frac{L\varphi_m}{\sigma f} g(\theta \varphi_m) \cdot \frac{1}{g(\varphi^*(\theta))} \quad \text{and} \quad \frac{dM}{d\theta} < \frac{L\varphi_m}{\sigma f} g(\theta \varphi_m) \cdot \frac{\tau^{1-\sigma}}{g(\varphi^*_\tau(\theta))}.
\]

Assumption 6, similar to Assumption 3, implies that the probability of entry increases with \( \theta \). Given Assumption 5, it can then be shown that aggregate welfare increases with \( \theta \).

5.3 The Optimal Regime

This brings us to the main result of the paper. If the mass of firms which benefit from rulelessness is sufficiently small, then the RoL coefficient in equilibrium is larger under trade. Trade facilitates stronger institutions.

Proposition 7 If \( \int_{\varphi_m}^{\infty} g(\varphi_0) d\varphi_0 \) is sufficiently small, then \( \theta^*_T > \theta^*_A \).

To derive Proposition 7, assume \( \theta = \theta^*_A \). Then, if \( \int_{\varphi_m}^{\infty} g(\varphi_0) d\varphi_0 \) is sufficiently small, the first-order-conditions under the open economy regime are strictly larger then 0. Therefore, it is optimal to increase \( \theta \), and thus \( \theta^*_T > \theta^*_A \).

6 Concluding Remarks

This paper investigates the interactions between trade and corruption and shows that as long as the majority of firms benefit from rule-of-law, opening the economy to trade in goods strengthens its legal institutions. Otherwise, trade becomes a treacherous force which weakens the legal institutions. Put differently and under the conditions mentioned above, trade contributes to the government’s incentives to strengthen its legal institutions.
Two factors enhance the government’s incentive to increase the RoL coefficient; aggregate welfare and firms of type $\phi < \phi^M$. A third factor, firms of type $\phi > \phi^M$, moderate the government’s incentive to increase the RoL coefficient. Hence, the RoL coefficient is an outcome of the three aforementioned factors. Therefore, the more the government values contributions, the lower is the equilibrium RoL coefficient. Governments that value political contributions create weaker institutions and, therefore, introduce more corruption.

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