Economic Integration and the Civilizing Commerce Hypothesis

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Boston College Working Papers in Economics, 2005

Originally posted on: http://ideas.repec.org/p/boc/bocoec/673.html

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September, 2005

Abstract

Economic integration lowers one form of trade costs, tariffs, and stimulates changes in other trade costs. This paper offers a model in which integration may raise or lower the important trade cost associated with insecurity. The model can help to explain the varied experience with integration and it points to the usefulness of combining enforcement policy integration with trade policy integration.

"... the curious incident of the dog in the night-time."

"The dog did nothing in the night-time."

"That was the curious incident," remarked Sherlock Holmes. ˜*Silver Blaze,* A. Conan Doyle

The received theory of international trade is curious because it contains no international traders; their actions and interactions take place offstage. This paper sets the play on the traders and their environment under the stimulus of trade liberalization. Like Tom Stoppard's *Rosenkrantz and Guildenstern Are Dead,* which moves the actions in Shakespeare's *Hamlet* offstage, the action of standard trade theory moves offstage.[1] Trade costs in this paper are richly endogenous and run by the decisions of trade actors.[2] Observing the actors leads to insights about the knock on effects of economic integration that may lower or raise some elements of trade costs even as tariff cuts lower other elements. The insights suggest that successful regional integration will in some situations require deeper integration involving competition policy and government enforcement provision while in other cases less active government is needed.

The mixed experience with trade liberalizations argues for the usefulness of a theory of endogenous nontariff costs of trade. Some regional agreements such as NAFTA create much more intraregional trade than standard models predict (Anderson and van Wincoop, 2002), while others produce disappointingly little. Schiff and Winters (2003, p. 32) review 9 episodes of developing country regional agreements, of which 2 decreased trade and 2 others increased trade very modestly.[3] Nontariff trade costs appear to be larger than tariffs (Anderson and van Wincoop, 2004) and to vary more across countries and time, so it is plausible that they may move with liberalization.

This idea has a distinguished heritage — the Scottish school of Political Economy believed that commerce was civilizing (Smith, 1976), as participants learned the value of refraining from predatory behavior along with

[1] I am in debt to Avinash Dixit for this analogy.

[2] Trade costs are either missing entirely or exogenous in the received theory of trade.

[3] Schiff and Winters report more sophisticated evaluation of the effect of regional agreements, with much the same conclusions. The Central American Common Market (CACM) has a particularly interesting history. In its first form it increased trade spectacularly between 1960 and 1970, trade fell in the 70's following on the outbreak of civil war and the agreement eventually died. The reestablishment of the CACM in 1991 led to a modest increase in intraregional trade.

honest dealing and honoring promises.[4] More recent experience sometimes confirms and sometimes denies their liberal optimism, suggesting the usefulness of modeling the phenomenon.

The key mechanisms of this paper are endogenous changes in the security of trade with special emphasis on the endogenous provision of law enforcement to protect traders. See Anderson and Marcouiller (2002) for evidence on the quantitative importance of insecurity as a trade cost. The narrow focus abstracts from the usual concerns of international trade theory with the pattern of production and why countries levy tariffs or enter trade agreements. Except in the most sketchy way, all this is outside the model. A link to standard political economy concerns is made by keeping track of the traders' interests, thinking that these are at least influential if not decisive. But the state in this paper is rudimentary.

The dramatis personae are merchants, traders, cops and robbers (Anderson and Bandiera, 2005). Trade requires labor drawn from the same pool as robbers (or extortionists). Cops frustrate a portion of the encounters between traders and robbers. Merchants provide the capital required to carry on trade. They have some power collectively to select the vigor (and expense) of law enforcement, forming a guild to choose the enforcement level and collect the revenue to pay for it. The guild may also control the volume of trade. This setup is consistent with the observation that much law enforcement is private and that much trade is or has been carried on by actors with market power. Section 1 sets out the analysis in a single market, adding to Anderson and Bandiera (2005) a model of enforcement effort choice. Section 2 sets out the key mechanism of the paper, the comparative static effect of (unilateral) trade liberalization on the level of enforcement. In one scenario, in a parameter range called the strong enforcement case, the trade increase is amplified by an endogenous increase in the level of enforcement effort. In the other scenario, the weak enforcement case, the trade increase may be perversely damped by an endogenous fall in the level of enforcement.

Regional integration sets the scene of Section 3. The actors play in two separated markets that are connected because the traders and robbers come from a common pool. Economic integration is a joint trade liberalization

[4]Here is Smith in Book III, Chapter IV: }"...commerce and manufactures gradually introduced order and good government, and with them the liberty and security of individuals, among the inhabitants of the country, who had before lived in almost a continual state of war with their neighbours, and of servile dependency on their superiors. This, though it has been the least observed, is by far the most important of all their effects."

that raises the gross gain from trade in each market. In the normal response case, regional integration damps the response of enforcement to liberalization with complementarity and amplifies the response of enforcement to liberalization with substitutability. In the case of perverse responses of enforcement to liberalization (which requires enforcement to be weak), complementarity makes the response even more perverse with regional integration, while substitutability admits the possibility that a unilateral liberalization will lower enforcement while a multilateral liberalization will raise enforcement. Moreover, with complementarity it is possible that enforcement will fall with a multilateral liberalization while it rises with a unilateral liberalization.

Section 4 considers scenarios in which merchants in the two markets coordinate their actions, private deep integration. Coordination may either raise or lower enforcement. Deeper integration involves further action of the two liberalizing governments. Strikingly, governments have an incentive to tolerate collusion of the guilds in trade control in the weak enforcement case, but an incentive to oppose monopoly in the strong enforcement case. Cooperation in enforcement, in contrast, is always beneficial. The conclusion speculates upon possible implications of the model for government policy in a richer description of the economic and government policy making environment.

The model is related to a literature on institutions and insecurity (for example, Dixit, 2004, and references therein) and a smaller literature on trade and insecurity (for example, Skaperdas and Syropoulos, 2001, 2002). The novelty of the present line of research is that, quite plausibly, predation occurs on the trade activity itself.

1 Merchants, Traders, Cops and Robbers

This setup of this paper extends the model of Anderson and Bandiera (2005) to a setting of endogenous enforcement choice. Trade is carried on by traders who carry goods from low cost origin with fixed price c to high value destination with fixed price b. Trade capital is supplied by merchants who each earn competitive returns on their trade capital, e.g., ships, which is in fixed supply for the trade services market. Labor is supplied from a common pool from which predators are also drawn.

The neoclassical trading firm hires capital and labor so as to minimize costs. It is easiest to think of the merchants as supplying their own labor

to the trade activity, but in any case the performance problems between capital and labor are solved outside the model, which consists of a black box neoclassical cost function. Thus the merchants in their role as traders hire additional traders who are paid a fixed wage w. Merchants in their role as capitalists may also act collectively to choose enforcement and possibly to limit trade.

The traders come from a labor pool in which their alternative activity is preying on the trade. In equilibrium the robbers must earn an expected return equal to w. The traders and the robbers interact in anonymous hide and seek, modeled as an objective probability of an encounter which is a logistic function of the ratio of predators to prey. Predators win all encounters if not prevented by the cops. It is easiest to think of the 'win' being theft of all the shipment, but the model also encompasses extortion by which a bargained share of the goods must be surrendered.

The basic elements of the model are the traders and robbers and their technologies for these two alternative activities. Their general equilibrium interaction combines equality of returns in the two activities, the rational expectations equilibrium shipment success rate, the labor market clearing condition and the zero arbitrage condition in trading. For simplicity we shut down other channels of general equilibrium, arguing below that the simplification is harmless.[5] Traders and robbers are not directly involved either in production or consumption; their sole interest is the highest expected return on their time.

The new element in this model is the choice of enforcement level. Since enforcement is a public good, the merchants overcome the free rider problem by forming an institution called a guild to set enforcement so as to maximize their return on capital net of enforcement costs. They face a rising cost curve for cops. The cops' enforcement effort frustrates a portion of the encounters between predators and prey. The cops are drawn from outside the model, but they must be paid from revenues raised inside the model.

[5] A full general equilibrium treatment of trade and predation in a two good two country model is in Anderson and Marcouiller (2004), with similar qualitative results on autarky, secure and insecure trade. Simulation shows how narrow is the parameter range which permits trade. The terms of trade effects of predation can create a 'paradox of trade-creating predation', whereby predation brings terms of trade such that the fixed trade cost can be offset in both countries. The present paper simplifies the structure to obtain analytic results in a model with enforcement and state policy.

1.1 Basic Elements

Traders

Traders hire labor and capital and 'sell' trade services by buying in low cost region 1 to sell in high price region 2. We fix buyers' willingness to pay in region 2 at b and we assume that any quantity of the good can be purchased at price $0 < c < b$ in region 1.

Minimum trade costs are given by the Cobb-Douglas function $w^{\alpha}r^{1-\alpha}q$ where q is the trade volume, w is the wage rate, r is the service price of trade capital and α is the parametric cost share for labor.[6] The trade services unit cost, equal to the marginal cost of a price-taking competitive trading firm, is given by:[7]

$$t(q,w) = kwq^{\left(\frac{1}{\alpha}-1\right)},\ k > 0. \tag{1}$$

The demand for labor in the trading industry is equal to[8]

$$q^{1/\alpha}k.$$

Robbers

Predation is robbery for simplicity, but the model also encompasses extortion, as argued below. Predation is the alternative use of labor. Like traders, robbers are risk neutral.[9] A simple model of interaction between traders and robbers yields clear implications which should hold up more generally. Robbers can only attempt to steal goods and only while these are in transit between the two regions. Once the trader and buyer meet exchange is secure.[10] Robbers sell their loot in a thieves market at a price normalized

[6] A number of our results hold for more general cost functions as we shall note below where applicable.

[7] The short run cost function with fixed capital K is given by $kwq^{1/\alpha}$, where $k = [(1-\alpha)/K]^{(1-\alpha)/\alpha} > 0$. This is formed by using $(1-\alpha)w^{\alpha}r^{-\alpha}q = K$ to solve for $r(w,K,q)$, then substituting to obtain $\overline{C}(w,K,q) = kwq^{1/\alpha}$.

[8] Here we use Shephard's Lemma.

[9] Risk aversion in the absence of insurance markets would tend to diminish predation relative to trading under the plausible hypothesis that informal insurance and self insurance are easier for traders.

[10] If both goods and money are subject to predation or if goods can be stolen from buyers after purchase, the setups are more cumbersome, but nothing essential changes. Moreover, it is quite plausible that goods in transit are less secure than goods at rest; our model focuses on a convenient limit case. Our simplifying assumption can be rationalized by enforcement at points of sale, by reputation of buyer and seller, or by the ability of

to one.[11]

Traders and robbers are specialized: traders never attack each other because such conflict is too expensive in the even match that results, and predators similarly do not attack each other even when one predator has goods to steal. Thus the only matches are between traders and predators, and predators always win. There is at most one match per period. Traders cannot coordinate on a common defense strategy, though each trader can individually take defensive actions to avoid meeting the robbers while in transit.

The common objective probability of successful shipment by traders is built as a compound of two elements, the avoidance probability and the enforcement probability. The probability that the prey avoids the predator is a decreasing function F of the ratio of predators B to prey given by the volume of trade q. For convenience, throughout this paper the objective avoidance probability is given by the logistic function $F(B/q) = 1/[1+\theta B/q]$ where θ is a parameter capturing the effectiveness of the robbers' technology for seeking and chasing relative to the traders' ability to hide and run. It is sometimes convenient to refer to this below as the predation technology. The other element of shipment success is the enforcement probability M. Of those shipments which fail to avoid the predators, a fraction M will succeed anyway. Thus the objective success rate is given by $F + (1 - F)M = M + (1 - M)F$.

Predation can also be taken to mean extortion, as is now easy to see. The M parameter can represent a bargained share left to the trader following an encounter. Behind the bargaining outcome lie outside options which might reflect spoliation of the goods in the event of a struggle, or the effects of an alarm to the cops.

Agents form beliefs π about the success rate of traders, and in equilibrium the beliefs converge on $M + (1 - M)F$.

Toward Equilibrium

The full equilibrium is solved for the values of B and q, the wage rate w and the equilibrium success rate π. It is extremely useful to first characterize the rational expectations success rate conditional on trade volume. Potential predators allocate themselves between predation and trading to equalize payoffs given the wage rate and their beliefs about success rates in predation.

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massed concentrations of buyers and sellers to coodinate to deter opportunism which is against their collective interest.

[11] That traders and robbers sell the goods at different prices reflects the intuition that consumers' willingness to pay for stolen goods is different. All results are qualitatively unchanged if we assume that both traders and robbers sell at the same price b.

In equilibrium the beliefs converge to objective success rates (which depend on B). Labor market equilibrium links the wage to a given volume of trade, hence links the equilibrium success rate to a given volume of trade. The full equilibrium is solved from the zero profit condition in trading, embedding equilibrium wages and success rates.

1.2 The Equilibrium Success Rate

The agents' beliefs about π determine the expected payoffs to trading and predation and hence the choice between the two activities. In rational expectations equilibrium, the subjective probability must equal the objective probability, the returns to labor on both types of activity must be equal and the labor market must clear.

The expected return to predation per predator is $(1-\pi)q/B$,[12] while employment in trade services pays w. Agents are indifferent between predation and trade services when

$$w = \frac{(1-\pi)q}{B} \Rightarrow \frac{B}{q} = \frac{1-\pi}{w}. \tag{2}$$

Substituting the labor allocation condition (1.2) into the objective probability function yields the success rate conditional on the wage. For the logistic function this simplifies to:[13]

$$\pi(w) = M + w/\theta. \tag{3}$$

The labor market clears when the total supply of labor N is equal to the sum of labor demanded in trade services and predation. Using (1.2), (1.4) and the demand for labor in the trade industry $q^{1/\alpha}k$ yields:

$$N = kq^{1/\alpha} + q[1-\pi(w)]/w \tag{4}$$

[12]Predators sell their loot securely in a thieves market at constant price normalized to one, without loss of generality.

[13]In general, the fixed point problem has a trivial solution at $\pi = 1$, since $F(0) = 1$. Graphing $F[(1-\pi)/w]$ against π shows that if $\pi = 1$ is the only solution, it is stable under the plausible hypothesis that the subjective probability π adjusts toward the objective probability given the beliefs $F[(1-\pi)/w]$. If an interior solution exists and is unique, it must be stable because $-F'/w < 1$ in the neighborhood of the solution. In this case the secure equilibrium is unstable. There could be multiple interior equilibria, depending on the shape of the cumulative density function F. With multiple equilibria, unstable interior solutions are flanked by stable interior solutions.

Solving (1.4) for the unique[14] market clearing wage yields the equilibrium wage function:

$$W(q) \equiv \frac{q(1-M)}{N - kq^{1/\alpha} + q/\theta}. \tag{5}$$

Note that $W_q > 0$, the equilibrium wage is an increasing function of trade volume.

Substituting (1.5) into (1.3), we derive the equilibrium success rate as a function of the volume of trade q and of the exogenous parameters $(M, N, k, \theta, \alpha)$:

$$\Pi(q) = \pi[W(q)] = M + \frac{1-M}{\theta(N/q - kq^{1/\alpha - 1}) + 1}. \tag{6}$$

1.3 The Full Equilibrium

The equilibrium volume of competitive trade is determined by the no arbitrage condition of profit-maximizing traders in a free entry equilibrium. Traders expect to break even when $\pi b - c - t = 0$. Their beliefs about π must be consistent with the equilibrium probability of success. The wage rate which helps determine the trade cost t and the success rate π must be consistent with labor market equilibrium for the volume of trade. The full equilibrium of the model is determined by goods and labor market clearance simultaneously, embedding the equilibrium probability of success as a function of the wage.

The competitive equilibrium quantity for a given wage uniquely satisfies

$$Q(w) \equiv q : \left(M + \frac{w}{\theta}\right) b - c - wkq^{(\frac{1}{\alpha} - 1)} = 0. \tag{7}$$

The equilibrium pair (w, q) is determined by equations (1.5) and (1.7). Figure 1 illustrates. Equilibrium with insecure trade is found where $w \leq \theta(1-M)$. The graphs of (1.5) and (1.7) are drawn in this region for the case where $Mb - c < 0$.

For some parameter ranges, Q will lie everywhere below W and autarky is the only equilibrium while for other parameter ranges, secure trade is the only equilibrium. See Anderson and Bandiera (2005) for details. This paper

[14]The right hand side of (1.4) is decreasing in w and is unboundedly large at very low w, so a unique stable solution exists.

considers the more interesting case of interior equilibrium at point E in Figure 1.

The alternative form of the choice of trade volume is monopoly. This form becomes natural in the context of the merchant guilds required to solve the collective action problem of law enforcement. The earnings of capital in trade services are given by

$$S(q,w,M)=\int_0^q(\pi b-c-t)\,dq=\left[(M+w/\theta)b-c-\alpha wkq^{1/\alpha-1}\right]q. \quad (8)$$

Competitive trading implies $S_q=0$ while monopoly trading implies

$$\begin{aligned} S_q+S_wW_q &= 0 & (9)\\ &= [\pi b-c-t]+[(\pi-M)b-\alpha t]\,W_qq/W & (10)\end{aligned}$$

under the plausible assumption that the monopoly understands the dependence of both trade costs and the shipments success rate on the underlying labor market equilibrium. Equilibrium can lie in one of two regions. The strong enforcement case $M>1-\alpha(1-c/b)$ implies that $S_q>0, S_w<0$ while the weak enforcement case $M<1-\alpha(1-c/b)$ implies that $S_q<0, S_w>0$. Figures 2 and 3 illustrate. Further analysis is in the Appendix.

The guild uses its knowledge of the externalities generated in the labor market in choosing the optimal trade volume. There is a negative pecuniary externality due to the cost push from more trade to higher demand for labor to higher trade costs t. Opposing this is a positive nonpecuniary externality, safety in numbers, due to the rise in wages pulling predators into trade and increasing security. The weak enforcement case means that $S_q=\pi b-c-t<0$, associated with $S_w>0$, where the safety in numbers externality dominates the cost push externality. The strong enforcement case implies, in contrast, that cost push dominates safety in numbers.

The effect of trade liberalization is a reduction in c. The government of the importing country has, for some reason outside the model, previously levied a tariff and is now lowering it. The effect on marginal surplus is given by $S_{qc}=-1$. The result, not surprisingly, is a rise in trade volume q for given M, as illustrated in Figure 1 by the equilibrium point E moving northeast along $W(q)$. With monopoly too, equilibrium trade volume rises with a fall in c, illustrated by analyzing Figures 2 and 3.

2 Liberalization and Enforcement

The key question of this paper is the effect of trade liberalization on the choice of enforcement level. For simplicity, trade liberalization is modeled as a fall in c. Predation understood as extortion justifies taking the model as a metaphor focusing on changes in c. If predation is extortion by customs officials, then auditing may well compel corrupt officials to correctly collect taxes while extracting added bribes from shippers in order to let the goods through in a timely manner.[15] In contrast, the metaphor of theft suggests that liberalization should be modeled as a rise in b, with tariffs only being paid on the goods which escape predation. The technical analysis of this case is more complex because b enters multiplicatively with π, but the flavor of results is similar.[16]

With competitive trading $dM/dc < 0$ and with monopoly trade and strong enforcement equilibrium, $dM/dc < 0$. Thus commerce is civilizing, liberalization promotes institutional improvement. In contrast, with monopoly trading and weak enforcement equilibrium, it is possible that $dM/dc > 0$. However, even allowing for endogenous M, a fall in c always raises q, trade liberalization does increase trade.

2.1 Enforcement Choice

The merchants act collectively in a guild to provide enforcement against predation to their trade. From their total earnings S the merchants must pay for enforcement M, which costs $aM + (m/2)M^2$.

In the competitive trade version of the model, the merchants cooperate to select the level of enforcement but compete in the level of trade that each selects. In the monopoly trade version of the model, the merchants cooperate

[15]The extortion metaphor requires interpreting enforcement expenditures as compelling more honest behavior by the corrupt offiicals. If the expenditures imply collecting information about demands for bribes, the interpretation fits easily with the model. If, quite reasonably, the 'enforcement' expenditures include lobbying the government to compel better behavior by the officials, the enforcement cost function is a black box which ideally should be opened. I am in debt to Avinash Dixit for pointing this out.

[16]The implication for the results is a fairly mild change. With predation as theft and hence liberalization raising b, M rises with liberalization if $(\pi - M)b - \alpha t < 0$, whether trade is competitive or monopolistic. If $(\pi - M)b - \alpha t > 0$, associated with weak (costly) enforcement, then it is possible for M to fall with liberalization, a possibility which is strengthened with monopoly power in trade but which exists with competitive trade.

in both setting the level of trade and the level of enforcement effort: the guild sets both M and q. In either case, the selection of M and q is assumed to be simultaneous for simplicity.

Net surplus of the merchants is given by $G \equiv S - aM - (m/2)M^2$. This is the objective function used for the choice of M in either version of the model. The first order condition is $G_M = S_M + S_w W_M - a - mM = 0$. (1.5) implies that $W_M = -W/(1-M)$. The second order condition is met, $G_{MM} = -m < 0$. For large enough m it will not pay to enforce secure trade, there will be an interior solution. In the absence of fixed costs and with a sufficiently small, provided there is positive trade it will always pay to provide at least some enforcement, $M > 0$.

In the full equilibrium model the level of trade is chosen simultaneously with the enforcement level. As for the determination of q, competitive equilibrium implies that q is solved from $S_q = \pi b - c - t = 0$, while monopoly equilibrium implies that q is chosen so that $G_q = S_q + S_w W_q = 0$. The second order condition for the full monopoly equilibrium implies $G_{MM} = -m < 0$, $G_{qq} < 0$, $|G| = G_{MM}G_{qq} - G_{Mq}^2 > 0$. For the full equilibrium with competitive trade, the stability condition requires $S_{qq} + S_{qw}W_q < 0$ and $D = G_{MM}(S_{qq} + S_{qw}W_q) - G_{Mq}(S_{qM} + S_{qw}W_M) > 0$.

2.2 Comparative Statics

The formal analysis is based upon the systems of the first order condition for enforcement and either the competitive trade equilibrium condition or the monopoly trade first order condition. Differentiating the relevant system totally with respect to M, q, c in the competitive trade case ($S_q = 0, G_M = 0$) yields

$$\begin{matrix} dM/dc \\ dq/dc \end{matrix} = \frac{1}{D}\begin{pmatrix} -S_{qM} \\ G_{MM} \end{pmatrix} = \begin{matrix} -b(1-\pi)/D(1-M) \\ -m/D \end{matrix} .$$

Clearly, both enforcement and trade fall with a rise in c.

The monopoly case ($G_q = 0$, $G_M = 0$) yields:

$$\begin{pmatrix} dM/dc \\ dq/dc \end{pmatrix} = \frac{1}{|G|}\begin{pmatrix} -G_{qM} \\ G_{MM} \end{pmatrix} = \frac{1}{|G|}\begin{pmatrix} -b\frac{1-\pi}{1-M} + \frac{W_q q}{W}\frac{(\pi - M)b - \alpha t}{1-M} \\ -m \end{pmatrix}. \quad (11)$$

Strong enforcement $M > 1 - \alpha(1 - c/b)$, is sufficient for $dM/dc < 0$. In contrast, the perverse response $dM/dc > 0$ occurs only when enforcement is weak, implying that the monopoly trade equilibrium lies in the interval where

$S_w > 0, S_q < 0$. In this case, $G_{Mq} = [S_{qM} + S_{qw}W_M] - S_w W_q/(1-M) < 0$ can arise. A sufficient condition for the perverse response is equilibrium where success rates are sufficiently high, since it can be shown that elasticity of W with respect to q greater than one arises if and only if π is in the upper range of values. Note that regardless of the response of M, trade volume rises with liberalization.

3 Regional Integration and Enforcement

The preceding analysis dealt with unilateral liberalization and its effect on enforcement. Regional integration implies simultaneous liberalization. There are spillover effects between countries which affect the choice of enforcement level, and these can either amplify or dampen the response of enforcement to regional integration.

It is straightforward to construct a parallel market alongside the first, with all variables in the new market labeled with asterisks. The two markets are connected because both markets draw traders and robbers from a common labor pool. There is a negative pecuniary externality between markets as expansion anywhere raises the wage rate paid to traders and thus trade costs. There is also a positive nonpecuniary externality as expansion anywhere pulls predators into productive activity, safety in numbers. The net effect is captured in the sign of the cross effect of trade volume in the partner's market on the willingness to pay for trade services in the own market. Demand is substitutable when expansion in partner volume lowers the willingness to pay for trade services in the own market, and demand is complementarity when expansion raises the willingness to pay in the own market.

The general case of regional liberalization and enforcement is a rather complex and forbidding structure. In the case of symmetric markets however, the simplicity reveals the essence of how regional integration affects enforcement. The insights should obtain more generally.

When demand for trade services in the two markets is substitutable, the improvements in enforcement effort under regional liberalization will be larger than with unilateral liberalization. Moreover, the simultaneous liberalization of regional integration can convert a perverse unilateral response into its opposite. In contrast, when demand is complementary, the enforcement response to multilateral liberalization is less than the enforcement response

to unilateral liberalization. This can result in a case where unilateral liberalization would raise enforcement while multilateral liberalization will lower enforcement.

The essential difference made by simultaneous liberalization is that expansions in one market affect the other market by improvements in security and also by cost push. The labor market ramifications are thus amplified. With $dc = dc^*$, $dM = dM^*$, $dq = dq^*$we can collect the new cross effect terms to form

$$\frac{dM}{dc} = \frac{-\left[(1-\pi)b + t\right] + \left[2(\pi - M)b - (1+\alpha)t\right] W_q q/W}{|G|(1-M)}. \tag{12}$$

The difference between the unilateral and multilateral responses is given by

$$\frac{dM}{dc}|_{c^*} - \frac{dM}{dc} = -\frac{(\pi - M)b - t}{2}.$$

The numerator signs the cross effect in demand between markets. Thus $(\pi - M)b - t > 0$ implies that a rise in q^* will raise wages and raise the willingness-to-pay for the marginal shipment, $\pi b - c - t$. This is the case of complementarity in demand. The weak enforcement case is necessary but not sufficient for complementarity since $S_w = q\left[(\pi - M)b - \alpha t\right] > 0$. Strong enforcement, in contrast, guarantees substitutability. When demand is substitutable, $(\pi - M)b - t < 0$, multilateral liberalization raises enforcement levels more than does unilateral enforcement.

The implication is that in the normal case, regional integration damps the response of enforcement to liberalization with complementarity and amplifies the response of enforcement to liberalization with substitutability. In the case of perverse responses of enforcement to liberalization (which requires enforcement to be weak), complementarity makes the response even more perverse with regional integration, while substitutability admits the possibility that a unilateral liberalization will lower enforcement while a multilateral liberalization will raise enforcement. Moreover, with complementarity it is possible that enforcement will fall with a multilateral liberalization while it rises with a unilateral liberalization.

4 Deeper Integration

Deeper economic integration may arise out of private initiative as home and foreign merchants cooperate. In response, states may benefit from changing

the market organization of trade and enforcement. Counter-intuitive results can arise depending on the strength of enforcement.

Governments presumably want more output and enforcement than do merchants because this intuitively appears to benefit the workers in the trade services sector. In the absence of a full model of government this is only a presumption. A full model is beyond the scope of this paper, so the sketch of deep integration policy here is necessarily just that. Nevertheless, the properties of the model discussed here will be important elements of a complete treatment.

It appears intuitively undesirable from the point of view of the state to have the volume of trade controlled by a monopoly and the more so if, following integration, the two trade monopolies succeed in cooperatively maximizing profits. States could prevent cooperation by restoring competitive trading through competition policy. Abstract for the moment from any consequent failure of enforcement provision, though it is a strong possibility since monopoly busting may destroy the offstage mechanism by which the free rider problem of public goods provision is overcome. The model reveals that breaking the monopoly is undesirable when enforcement is weak while it is desirable with strong enforcement. In contrast, private cooperation in setting enforcement levels is desirable when enforcement is strong and undesirable when enforcement is weak.

Consider the first order condition of a guild that controls trade volume and compare it in non-cooperative and cooperative equilibrium.

$$\begin{aligned} G_q &= S_q + S_w W_q = 0 \; vs. \\ G_q + G_q^* &= G_q + S_w^* W_q = 0. \end{aligned}$$

In the strong enforcement case, $S_w, S_w^* < 0$, implying that q is below its competitive efficient level, and all the more so if the trading guilds cooperate. In the strong enforcement case, moreover, $G_{Mq} > 0$, so a rise in volume q due to a reversion to competitive trade will increase the equilibrium level of enforcement. Thus, where private enforcement is strong, the state presumably benefits from the breakup of monopoly power in trade both internationally and within its own trade sector.

In the weak enforcement case, in contrast, monopoly busting in trade is undesirable. $S_q < 0$ implies that the monopoly sells more than the competitive volume of trade because it internalizes the labor market effects of trade in a setting where safety in numbers dominates the cost push effect.

International cooperation in the choice of trade volume would raise the volume still more, so internationally coordinated competition policy would be still more costly. This setup provides a rationale for trading monopolies such as the East India companies of the UK and Holland that were designed to monopolize both directions of trade from colonies to the mother country.

Now consider international cooperation in enforcement. Marginal increases in enforcement effort spill over onto connected markets. Interestingly, the sign of the externality can go in either direction. In the strong enforcement case the effect is positive from the point of view of the merchants, implying that the noncooperative equilibrium enforcement level is too low. Enforcement is also too low for the states which presumably value enforcement more than do the merchants. In the weak enforcement case, in contrast, the externality is negative from the point of view of the merchants,[17] implying that the noncooperative equilibrium level of enforcement is too large. Depending on the degree to which the government's objective function differs from the guild's objective function in each country, this may imply that governments should discourage international coordination of enforcement when enforcement is weak.

Formalizing the discussion, consider the joint profit maximizing level of enforcement in the Home Country.

$$\begin{aligned} G_M + G_M^* &= 0 \\ G_M^* &= S_w^* W_M = -S_w^* w/(1-M). \end{aligned}$$

In the strong enforcement case, $S_w^* < 0$ while in the weak enforcement case $S_w^* > 0$. When the guild maximizes profits controlling both enforcement and the volume of trade, the boundary between weak and strong enforcement is tight as in the preceding section. When the guild only controls enforcement, the boundary is looser, but the implication is exactly the same; for sufficiently large enforcement, $S_w^* < 0$.

Enforcement provision by the state and cooperation on enforcement between states appears to be potentially beneficial based on the model.[18] First, the appropriate policy toward the undesirable aspect of private cooperation

[17]The negative externality is similar to the effect that improved enforcement in one community has in pushing predators on to the other community.

[18]The caveat about the incompleteness of the model bears repeating more loudly here. Private and government provision are likely to be less than perfect substitutes, to have different cost structures and to interact in ways which pose significant modeling challenges.

(output for strong enforcement and enforcement for weak enforcement) may be difficult to implement without compromising the policy toward the desirable aspect (enforcement for strong enforcement and output for weak enforcement). This potential dilemma is lessened if the state can take over enforcement from the merchants and then states cooperate internationally in enforcement. When state enforcement is strong, the states have an incentive to cooperate on enforcement effort in a manner similar to the private merchants. With weak enforcement, states can raise enforcement levels over the noncooperative state levels which presumably exceed noncooperative private levels and hence cooperative private levels.

It is plausible that rich states have strong enforcement while poor ones have weak enforcement. The model thus suggests that private enforcement provision is more destructive of trade liberalization potential for poor states than for rich ones. Beside the difficulties listed above, state provision can be an escape from the perverse possibility under weak enforcement that trade liberalization will lower enforcement effort. Successfully reaping the gains from trade may, for poor states, need state provision of enforcement.

5 Optimal Tax/Subsidy Policy

Trade policy may plausibly be active for reasons to be found inside the model. This section of t he paper examines trade policy which maximizes the interest of merchants in the setting used in preceding sections. In the single country case, the optimal trade policy may either tax or subsidize trade. In the multi-country model, the Nash equilibrium trade policy will be inefficient due to international externalities traveling through the labor market. Efficient policy may require either more subsidy or more tax. These externalities operate independently of the terms of trade externalities which are the focus of the standard understanding of co-operative trade policy. It is convenient to assume that enforcement is now parametric since allowing for its endogenous determination makes no difference to the qualitative results of this section.

In the single country case, the surplus earned by merchants is $S(q, w)$. Competitve traders determine a trade volume which solves $S_q = 0$ while a merchant guild sets aggregate volume such that $S_q + S_w W_q = 0$. The government can influence the choice of q by altering c with a tax or subsidy. The net payoff for a government which acts to advance the merchants' interest

but also cares about revenue is given by

$$G(c) = S[q(c), W[q(c)], c] + \lambda q(c - c^0).$$

Here, $q(c - c^0)$ is the revenue raised by a tax $c - c^0$ when this is positive or the subsidy required when $c - c^0$ is negative. $\lambda \geq 1$ is the Marginal Cost of Funds which must be raised from alternative revenue sources. For simplicity λ is assumed to be constant.

The optimal tax policy for the merchant-dominated government differs depending on whether trade is determined competitively or monopolistically. For the monopoly trade case, making use of the monopolist's first order condition, the government objective function rises with c according to

$$\begin{aligned} G_c &= (\lambda - 1)q + \lambda(c - c^0)dq/dc = -q\left[1 - \lambda/MCF^c\right] \\ MCF^c &\equiv q/\left[q + (c - c^0)dq/dc\right]. \end{aligned}$$

If lump sum taxation is available, $\lambda = 1$ and $G_c < 0$ except at $c = c^0$, free trade, where $MCF^c = 1$. Otherwise, $G_c = 0$ requires $c > c^0$, at least a small amount of trade taxation to substitute for more expensive alternative revenue sources.[19]

In contrast, competitively determined trade implies an untreated externality at the free trade point.

$$G_c = (\lambda - 1)q + \lambda(c - c^0)dq/dc + S_w W_q dq/dc.$$

For the case where $\lambda = 1$, the implied trade policy is $c - c^0 = -S_w W_q$. The merchant-dominated government should subsidize trade if $S_w > 0$ and tax trade if $S_w < 0$. Revenue motives combine with the externality correction when $\lambda > 1$.

More interesting considerations of trade policy arise in the two country model due to international externalities. For simplicity, assume $\lambda = 1 = \lambda^*$, so there is no revenue motive, and assume that trade is monopolistically determined so there is no domestic externality motive. The objective functions of the two governments are given by $G = S\{q(c, c^*), W[q(c, c^*), q^*(c, c^*)], c\} +$

[19]The second order condition for this and succeeding problems is normally met, as may be checked in this case: $G_{cc} = (2\lambda - 1)dq/dc + \lambda(c - c^0)d^2q/dc^2$, which is negative by $dq/dc < 0$ unless the combination of large taxes and $d^2q/dc^2 > 0$ prevents it. In that case, a lower tax rate will satisfy both the first and second order conditions.

$q(c-c^0)$ and $G^* = S^*\{q^*(c,c^*), W[q(c,c^*), q^*(c,c^*)], c^*\} + q^*(c^* - c^{*0})$. The Nash equilibrium in noncooperative trade policies is determined by:

$$\begin{aligned} G_c &= 0 = (c-c^0)dq/dc + S_w W_{q^*} dq^*/dc \\ G^*_{c^*} &= 0 = (c^* - c^{*0})dq^*/dc^* + S^*_w W_q dq/dc^*. \end{aligned}$$

While the monopoly is able to internalize the effect of its own volume decision on the labor market, it is by assumption unable to do so for foreign volume. This leaves a role for government to respond at the margin to the international externality. The tax or subsidy implied is

$$c - c^0 = -S_w W_{q^*} R^*_q$$

where R^*_q is the slope of the foreign best response function, the values of q^* which satisfy $S^*_{q^*} + S^*_w W_{q^*} = 0$ for any given value of q. A similar optimal tax characterizes the foreign government's policy.

The implication is that trade is optimally subsidized when $S_w > 0$ and $R^*_q > 0$ or $S_w < 0$ and $R^*_q < 0$ while trade is optimally taxed when S_w and R^*_q differ in sign. The slope of the best response functions is determined by differentiating the first order conditions of monopoly trade guilds. Assuming the stability condition is met, the sign of R^*_q is given by the sign of $S_{q^*w} W_q + S^*_w W_{q^*q} = [(\pi^* - M^*)b^* - t^*]W_q/W + [(\pi^* - M^*) - \alpha^* t^*]\, W_{q^*q}$. The second term can have either sign while the first term is polsitve when trade is complementary in the two markets, a rise in q increases the foreign willingness to pay for trade $\pi^* b^* - c^* - t^*$. Since $(\pi^* - M^*)b^* - t^* > 0 \rightarrow (\pi^* - M^*) - \alpha^* t^* > 0$, a sufficient condition for $R^*_q > 0$, strategic complementarity, is demand complementarity combined with $W_{q^*q} > 0$. Now notice that if demand is complementary in both directions, $(\pi - M)b - c - t > 0$ and hence $S_w = [(\pi - M)b - \alpha t] > 0$. Thus for demand complementarity and the sufficient condition on the curvature of the equilibrium wage function W, trade will be subsidized in the Nash equilibrium. Essentially similar considerations hold for the foreign government's decisions.

The other case of subsidy arises when $S_w < 0$ and $S^*_w < 0$. These conditions imply demand substitutability and with $W_{q^*q} > 0$, they imply strategic substitutability, $R^*_q < 0$ and $R_{q^*} < 0$. Taxation arises when S_w and R^*_q differ in sign. In the symmetric case this requires $[(\pi - M)b - t]^2\, W_{qq} + [(\pi - M)b - t]\,[(\pi - M)b - \alpha t] < 0$, concavity of W and more meaningfully $(\pi - M)b - \alpha t > 0 > (\pi - M)b - t$, demand subsitutability but $S_w > 0$.

Now consider cooperative trade policy. It is defined by

$$\begin{aligned} G_c + G_c^* &= 0 \\ G_{c^*} + G_{c^*}^* &= 0. \end{aligned}$$

Here the new cross effects G_c^*, G_{c^*} incorporate the externality of domestic policy on the other government's objective function. The implications for jointly optimal policy are seen by evaluating the cross effect at the Nash equilibrium values of policy. For example, $G_c + G_c^* = S_w^* W_q dq/dc$. This has the sign of $-S_w^*$. In the case of demand complementarity, which implies $S_w^* > 0$, the implication is that trade should be still more subsidized; Nash trade policy does not subsidize sufficiently. In the case of $S_w^* < 0$, the subsidy should be lower or the trade tax higher in the joint optimum than in the Nash equilibrium. Finally, with demand substitutability but $S_w > 0$, the trade tax should be lower in the joint optimum than in the Nash equilibrium. This last case resembles the standard optimal Nash tariff vs. the jointly efficient trade analysis. The differences between the present analysis and the standard one are wide, however, because the present analysis centers on quite a different international externality which operates through endogenous trade costs rather than endogenous terms of trade.

6 Conclusion

A richer model of government would allow a more convincing exploration of the interaction of trade liberalization with policies designed to affect the other costs of trade. The present model has at least opened the door to such an exploration by constructing a model in which the level of trade and the level of enforcement are endogenously determined. A major challenge is to embed the government in political economy. The possibly most relevant use of the model would view the predators as corrupt customs officials with the costly enforcement being lobbying by merchants to reduce extortion by officials. The current model assumes a cost of enforcement function which is almost without content, and it is far from clear that it can stand as a good metaphor for lobbying costs to persuade a top politician to crack down on his bureaucracy.[20]

[20] I am in debt to Avinash Dixit for pointing this out.

The organization of the provision of enforcement is the most important topic for deeper exploration. Private enforcement could be provided by a trading monopoly, a monopoly enforcer such as a mafia, or by a guild which permits competitive trading. Details of the economic environment are likely to determine which organizational form can be successful, and therefore which state policies may be able to reap the benefits of private enforcement without the costs of monopoly. Some types of enforcement activity are less purely public than the setup of this paper. Such forms are less subject to underprovision due to free riding, but may present negative externality problems (car alarms deflect predators onto unprotected cars). If the state takes over the provision of enforcement, it must of course collect revenues to pay for it. These may include revenue raised from the taxation of trade, leading to the interaction of trade taxes with the insecurity of trade.

Turning to the description of the state itself, usually the merchants' interest will be well represented in the state's objective function. A challenge is to incorporate the interests of the traders/predators. In the current setup these supply both markets so they are in some sense global factors. States presumably care about the interests of their legitimate citizens and perhaps even their illegitimate ones, so a way must be found to incorporate the trader/predators. Moreover, the current setup must be embedded in a general equilibrium model of production and consumption, thus endogenizing b and c, and yielding descriptions of other interest groups which must be recognized in the state's objective function. Anderson and Marcouiller (2005) provide a 2 country Ricardian general equilibrium model of trade subject to predation which shows how challenging this general equilibrium extension will be.

An important topic for another paper is the effect of capital mobility on the merchants' interests, and hence the desirability of integration in the form of International Capital mobility.

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8 Appendix

A guild which controls trade volume choose is an interior volume where:

$$-S_q/S_w = W_q.$$

Figures 2 and 3 illustrate. Characterizing the equilibrium is greatly aided by considering two limiting values of the derivatives of the surplus function. $S_w(q, M) = 0 \Rightarrow q^w = (b/\theta k\alpha)^{\alpha/(1-\alpha)}$. Evaluating at the secure equilibrium wage $w = \theta(1 - M)$,

$$S_q[q, \theta(1 - M), M] \Rightarrow q^0 = \left(\frac{b - c}{\theta k(1 - M)}\right)^{\alpha/(1-\alpha)}.$$

The case $q^0 > q^w$ implies that the interior equilibrium is associated with $S_q > 0$. Manipulating the expressions for q^w and q^0, $S_q > 0$ if and only if $M > 1 - \alpha(1 - c/b)$ and $S_q < 0$ if and only if $M < 1 - \alpha(1 - c/b)$. These are the strong enforcement and weak enforcement cases respectively.

Interior equilibrium requires that the second order condition is met, and that positive profits are earned. It is possible that autarky is the only stable equilibrium or that secure trade is the only stable equilibrium. See Anderson and Bandiera for more discussion of a closely related model.