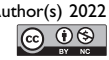
JOURNAL OF THEORETICAL POLITICS

Article

The political economy of noncompliance in customs unions

Journal of Theoretical Politics
2023, Vol. 35(1) 31–57



DOI: 10.1177/09516298221130262
journals.sagepub.com/home/jtp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Abstract

States create customs unions to accrue consumer welfare gains. Given the incentives to cheat to protect domestic firms from foreign competition, they create regulatory regimes with international courts to manage noncompliance. I develop a formal model that explains how the politics of compliance in regulatory regimes systematically distorts the welfare gains that states accrue from developing customs unions. The model predicts that regulatory regimes are most effective at enforcing compliance (i.e., at reducing trade barriers) in industries with intermediate levels of firm homogeneity in terms of productivity. In highly homogenous industries, regulatory regimes are not effective because noncompliance is minimal enough that litigation is not cost-effective; in highly heterogenous industries, regulatory regimes are not effective because courts, concerned about noncompliance with their rulings, are unlikely to rule against the defendants, deterring the plaintiffs from bringing cases. The model also predicts the downstream consequences for the performance of individual firms and consumer welfare.

Keywords

European Union, formal model, international courts, international trade, noncompliance

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States create customs unions—a form of economic integration in which a regional trade bloc eliminates discriminatory internal trade barriers—to improve consumer welfare.[1] Customs unions are critical in the modern global economy. Both the United States and the European Union (EU)—the two largest economies in the world—are customs unions.[2] Like trade agreements, customs unions improve consumer welfare by altering the composition of the economy: productive, exporting firms gain market share at the expense of unproductive, import-completing firms, causing prices to drop, and improving consumer welfare (Melitz, 2003; Chaney, 2008).[3] However, governments also have short-term political incentives to cheat by imposing discriminatory trade barriers that protect those unproductive, import-completing firms from foreign competition, thereby reducing the negative impact of the customs union on their profitability. Given these incentives to cheat, under what conditions do customs unions actually generate the intended welfare gains?

In this paper, I argue that customs unions can generate welfare gains, but because of the politics of the regulatory regimes that states establish to enforce them, how well they actually work in practice varies by industry. The primary contribution of this paper is to identify the characteristics of the industries in which these regulatory regimes are most effective at enforcing the rules of customs unions, as these will be the industries in which customs unions are most effective at generating welfare gains for their member states—the reason they are created. Contemporary models of trade in economics (e.g., Melitz, 2003; Chaney, 2008) imply that customs unions should be most welfare-enhancing in industries where firms are highly heterogeneous in terms of their productivity (there is more price competition, creating incentives for governments to protect domestic firms from foreign competition).[4] In contrast, the main finding of my analysis is that, because of the politics of noncompliance, customs unions generate the largest welfare gains in industries with intermediate levels of heterogeneity in terms of firm productivity.

This finding builds on several insights from the recent literature on international institutions and noncompliance. Aware of the incentives to protect unproductive domestic firms, governments create regulatory regimes by empowering courts—like the United States Supreme Court (USSC) and the Court of Justice of the European Union (CJEU)—to adjudicate disputes in which a member state government is accused of violating the rules of the customs union. This will only improve welfare gains (by improving compliance with the rules of the customs union) when (a) private plaintiffs or prosecutors (like the Justice Department in the US and the Commission in the EU) are willing to bring cases against noncompliant member states and (b) courts are willing to rule against those member states. However, recent research shows that courts care about noncompliance with their rulings, and are therefore hesitant to rule against defendants when it is costly for the defendant to come into compliance (Carrubba and Gabel, 2015). Research also shows that prosecutors, anticipating this strategic behavior, only bring cases they expect to win (König and Mäder, 2014; Fjelstul and Carrubba, 2018).

In highly heterogeneous industries, where the potential welfare gains of a customs union are greatest (allowing in foreign firms by lowering trade barriers will reduce consumer prices), governments have the strongest incentives to protect unproductive, import-competing firms. These are the industries in which courts are needed to prevent cheating. However, in these industries, courts will be more hesitant to rule against noncompliant

defendants, who could ignore the ruling due to short-term political incentives to protect unproductive domestic firms. Anticipating this strategic behavior, plaintiffs are deterred from bringing cases, and noncompliance goes uncorrected. In short, when the potential gains are greatest, the politics are most pernicious. In highly homogeneous industries, courts are also ineffective at reducing noncompliance, as noncompliance is minimal enough that litigation is not cost-effective. Thus, customs unions generate the largest welfare gains in industries with intermediate levels of firm homogeneity. Existing trade theories that do not explicitly account for the politics of noncompliance will incorrectly predict that customs unions will generate the largest welfare gains in highly heterogeneous industries.

To identify the characteristics of the industries in which customs unions improve consumer welfare, given the politics of noncompliance, I embed a model of international trade (with firms and consumers) in a model of compliance (with a government, a plaintiff, and a court). I do this by micro-founding the costs of compliance for the government in the compliance model in the economy of the trade model. This allows the costs of compliance to be a function of the distributive consequences of trade liberalization. I model the government as having politically motivated preferences over economic outcomes in the trade model. The trade barriers it chooses directly affect those outcomes.

In addition to predicting the characteristics of the industries in which a custom union will generate the intended welfare gains, my model also predicts the downstream consequences for individual firms. Since courts are most effective at enforcing the rules of customs unions in industries with intermediate levels of firm homogeneity, these are also the industries in which the magnitude of the impact of a customs union on the performance of individual firms is the largest. I identify which firms are most helped and hurt.

In sum, this paper contributes to the literature on trade liberalization by developing a theoretical account of how the politics of noncompliance affects the ability of states to generate welfare gains from a customs union. The model predicts the characteristics of industries—those with intermediate levels of heterogeneity in terms of firm productivity—in which regulatory regimes will be most effective at enforcing compliance and in which customs unions will generate the largest welfare gains. It also predicts the downstream consequences for the performance of individual firms.

1. International regulatory regimes

Noncompliance with the rules of customs unions (i.e., the imposition of trade barriers) is very common, even in the EU (König and Mäder, 2014). To manage noncompliance, states rationally design international regulatory regimes to adjudicate disputes over compliance with the rules of the customs union (Koremenos et al., 2001; Carrubba and Gabel, 2015). States create bureaucracies to monitor and prosecute member state noncompliance and international courts to adjudicate disputes over noncompliance. (In some regimes, private actors can also bring noncompliance cases.) Once states create courts, there are two aspects to compliance. There is initial compliance with the rules of the regime (*ex ante* compliance), and there is compliance with the rulings of courts in noncompliance cases (*ex post* compliance). There is no guarantee that member states will respect adverse

court rulings (Garrett et al., 1998; Alter, 2000; Conant, 2002; Slepcevic, 2009; Panke, 2010; Carrubba and Gabel, 2015).

Member state governments, plaintiffs, and courts all operate strategically within the formal procedures of regulatory regimes. This produces a political process in which regulatory regimes successfully prevent or correct some violations, but permit others (Carrubba and Gabel, 2015). Moreover, the politics of noncompliance generates systematic bias in the types of noncompliance cases that actually make it to court. Existing literature on compliance provides some general intuition about when noncompliance should get litigated: it depends on governments' costs of compliance (e.g., Carrubba and Gabel, 2015).

Courts are concerned with *ex post* compliance with their rulings, and are therefore less likely to rule against governments when the costs of compliance are high (Alter, 2000; Pollack, 2003; Vanberg, 2005; Carrubba, 2005; Carrubba et al., 2008; Carrubba, 2009; Gilligan et al., 2010; Carrubba et al., 2012; Johns, 2012; Carrubba and Gabel, 2015; Martinsen, 2015; Larsson and Naurin, 2016). Plaintiffs anticipate this behavior and drop cases when they are unlikely to win. The literature on international bureaucracies, like the European Commission, has long suspected that institutional plaintiffs strategically choose which noncompliance cases to pursue (Mbaye, 2001; Börzel, 2003; Thomson et al., 2007; Hartlapp and Falkner, 2009; Steunenberg and Rhinard, 2010). The most recent literature finds empirical evidence that the Commission drops cases when the costs of compliance are high (König and Mäder, 2014; Fjelstul and Carrubba, 2018). The key takeaway is that the politics of noncompliance leads to uneven enforcement outcomes, and that this variation is not random.

Since this bias in which cases are litigated is driven by the costs of compliance, we should expect the value of a regulatory regime to depend on the character of those costs. But without a theoretical model that explains where the costs of compliance come from, we cannot characterize how this bias will affect the ability of the regime to facilitate deep cooperation—the degree to which an international agreement causes states to behave differently than they would have otherwise (Downs et al., 1996).[5] In this paper, I provide a theoretical account of where those costs come from and show how the politics of noncompliance leads to a systematic bias in the welfare gains that states expect to enjoy by creating customs unions.

2. Formal model

I develop my formal model in three steps. I start with a two-country open economy based on Melitz (2003), which is the starting point for most new-new trade theory (NNTT) models (Chaney, 2008; Demidova and Rodríguez-Clare, 2009; Melitz and Redding, 2014; but not Melitz and Ottaviano, 2008). This is a simplified version of a NNTT model that preserves the basic equilibrium behavior, but leaves out some machinery that is not critical to my theoretical story.

Second, I add a policy-making subgame at the start of the game in which the government of one of the countries, which I call the home country, can choose trade barriers, holding the trade barriers of the other country constant. This is one of the first studies that explores how a strategic government with political preferences would choose trade

barriers in a NNTT framework. This model serves as a counterfactual—it identifies the trade barriers that a government would choose in the absence of a regulatory regime.

Third, I add a regulatory regime by adding a litigation subgame between the policy-making subgame and the economy subgame. After the home government chooses trade barriers, a plaintiff can bring a noncompliance case against the government. A reduced-form strategic court adjudicates the case. I calculate comparative statics to identify the characteristics of the industries in which a regulatory regime will be most effective at reducing trade barriers relative to the counterfactual. Then, I identify the downstream effects on firm performance and consumer welfare.

I micro-found the costs of compliance for the government of the home country, which allows the compliance decision of the government (i.e., the trade barriers it chooses) to depend on how trade liberalization impacts the performance domestic firms and the welfare of consumers, which governments care about (like Rosendorff, 2005; but unlike Carrubba and Gabel, 2015; Johns, 2012). Existing models of trade in economics almost always treat trade barriers as exogenous (Melitz, 2003; Chaney, 2008; an exception is Demidova and Rodríguez-Clare, 2009), but I allow the home government to choose optimal trade barriers. Unlike optimal tariff models from economics, the government is not a social planer or a welfare-maximizer (e.g., Demidova and Rodríguez-Clare, 2009). It has competing, politically motivated preferences: it cares about the performance of import-competing domestic firms (due to lobbying) and consumer welfare (due to electoral incentives), both of which depend on the trade barriers that are ultimately implemented after any litigation.

I base the economy on NNTT models (i.e., Melitz, 2003; Chaney, 2008; Melitz and Redding, 2014), which more accurately captures the process by which firms select into exporting—a firm's productivity determines whether exporting is profitable—than classical models (Heckscher-Ohlin and Ricardo-Viner) or new trade theory (NTT) models (Krugman, 1980). Unlike these other trade theories, NNTT correctly predicts that only the most productive firms export. Firm selection into exporting affects prices, which affects consumer welfare. Since my goal is to identify how the politics of noncompliance distorts the distributive consequences of trade liberalization (i.e., firm profits and consumer welfare gains), it is important to model firm selection appropriately.

3. An open regional economy

I start by modeling a single-industry open economy with two countries: a home country H and a foreign country F. I will analyze the model from the perspective of country H. There are two types of actors in each country: firms and consumers. Let $i \in \{H, F\}$ index the origin country of firms. Let $j \in \{H, F\}$ index the market served by a firm, which can either be its own domestic market ($j = i$) or the other market ($j \neq i$).[6]

There is a mass of firms in each country M_i. Each firm produces a unique variety of good $\omega \in \Omega$. As such, ω uniquely identifies firms. Each firm also has a productivity $\varphi > 1$, which is drawn from a probability density function $g(\varphi)$.[7] In equilibrium, all firms with the same productivity φ will behave identically. Each destination country has a representative consumer C_j, with income I_j. Unlike Melitz (2003), I assume that the mass of firms in each country M_j and consumer income I_j are exogenous, which

means that the economy is in partial equilibrium. Solving for a general equilibrium adds considerable complexity to the model without substantively changing any of my results.[8]

In the model, all firms choose whether to produce for their own domestic market and whether to export to the other country. Conditional on serving a market, each firm chooses a price to charge. Then, the representative consumer in each country observes the available varieties and chooses a quantity of each variety to purchase.

3.1. Demand: Consumer preferences

The representative consumers have constant elasticity of substitution (CES) preferences (Dixit and Stiglitz, 1977). This is the standard approach to modeling consumers in NTT and NNTT models (Krugman, 1980; Melitz, 2003; Chaney, 2008; but not Melitz and Ottaviano, 2008). Each consumer demands at least some of each available variety.[9] In this sense, they have a love for variety. Their income limits the quantity of available varieties they can buy. The utility of the consumer in destination country j is:

$$u_{C_j} = \left[\sum_i \int_{\Omega_i} q_{ij}(\omega)^{\frac{\sigma-1}{\sigma}} \, \mathrm{d}\omega \right]^{\frac{\sigma}{\sigma-1}} \tag{1}$$

where $q_{ij}(\omega)$ is the quantity of each variety demanded from origin country i (the choice variable), σ is the elasticity of substitution, and Ω_i is the set of varieties that are available from origin country i.[10]

CES preferences introduce monopolistic competition. Under monopolistic competition, firms perceive competition from other firms, but pricing is not a strategic game between firms (unlike oligopolistic competition). Firms also have market power, which means that a firm can change consumer demand for its variety by changing the price that it charges. In equilibrium, firms can make a profit in the short run (unlike the perfect competition, where firms do not make a profit). Thus, using CES preferences will allow me to study how regulatory regimes will impact firm performance.

3.2. Supply: Firm preferences

Firms care about net profit. The net profit that a firm with productivity φ in origin country i makes from serving destination country j is gross profit minus a fixed cost f. Gross profit is the quantity sold $q_{ij}(\varphi)$ times per-unit profit, which is the price of a unit $p_{ij}(\varphi)$ minus the marginal cost $c_{ij}(\varphi)$ of producing it. The net profit earned by a firm in origin country i from serving destination country j is:

$$\pi_{ij}(\varphi) = q_{ij}(\varphi)\big(p_{ij}(\varphi) - c_{ij}(\varphi)\big) - f \tag{2}$$

To produce goods for a market, a firm must pay a fixed cost f, which we can think of as a marketing cost.[11] Firms also pay a per-unit cost to produce a good. I assume there is only one factor of production and normalize the cost of that factor to one per unit. More productive firms enjoy lower marginal costs. A firm's marginal cost in the domestic market is the inverse of its productivity, $c_{ii}(\varphi) = \frac{1}{\varphi}$.

Firms pay additional variable costs when exporting due to trade barriers. Substantively, trade barriers include tariffs (i.e., taxes on imports) and non-tariff barriers that have an equivalent effect, like product standards that *de facto* discriminate against foreign firms. Destination country j imposes trade barriers $b_{ij} \geq 1$ on firms in i that sell to j. There are no trade barriers in the domestic market, so $b_{jj} = 1$. For example, country H imposes b_H on firms from country F. I model these trade barriers as a multiplier on the marginal cost of producing a good. Thus, the marginal cost to a firm in country i of selling one unit in country j is $c_{ij}(\varphi) = \frac{b_j}{\varphi}$. In the next section, I will endogenize the trade barriers b_H imposed by country H by allowing the government of country H to choose optimal barriers, given politically motivated preferences.

I assume that firm productivity in each country is Pareto distributed (e.g., Chaney, 2008). The empirical literature in economics finds that firm productivity is approximately Pareto distributed (Axtell, 2001; Luttmer, 2007; Helpman et al., 2004; Gabaix, 2009), so this is a realistic assumption. The probability density function (PDF) and the cumulative distribution function (CDF) for the Pareto distribution are, respectively:

$$g(\varphi) \equiv \frac{\theta}{\varphi^{\theta+1}} \quad \text{and} \quad G(\varphi) \equiv 1 - \varphi^{-\theta} \tag{3}$$

where θ is the shape parameter of the distribution.[12] A high θ means that firms are more homogeneous (and less productive on average) and a low θ means that firms are more heterogeneous (and more productive on average) (Figure 1). I assume that θ is the same in both countries. As I discuss below, the parameter θ will be my primary independent variable of interest in the full model. It manipulates both the homogeneity of firms and the average productivity of firms in the industry.

3.3. Open economy equilibrium

Proposition 1 summarizes equilibrium behavior in the economy.[13] Although the setup of the model is slightly different from canonical NNTT models (e.g., Melitz, 2003; Chaney, 2008), to reduce complexity, equilibrium behavior is similar. Firms in country i only produce for market j if they are sufficiently productive: $\varphi > \varphi^*_{ij}$. The variable costs of trade (i.e., trade barriers) make exporting more costly than producing for the domestic market. Thus, $\varphi^*_{HF} > \varphi^*_{HH}$ and $\varphi^*_{FH} > \varphi^*_{FF}$. In equilibrium, firms that export are more productive than firms that produce for the domestic market. This is a key feature of NNTT models. Firms choose an optimal price $p^*_{ij}(\varphi)$ in each market they serve, which is a constant markup over marginal cost (which is higher when exporting).

Each representative consumer C_j observes the price of each available variety, and chooses an optimal quantity of each available variety to consume, subject to an income constraint. The optimal quantity depends on P^*_j, which the equilibrium Dixit-Stiglitz price index (Dixit and Stiglitz, 1977; Chaney, 2008). Consumer welfare W^*_j is the inverse of the price index. See the Appendix for equilibrium equations and full proofs.[14]

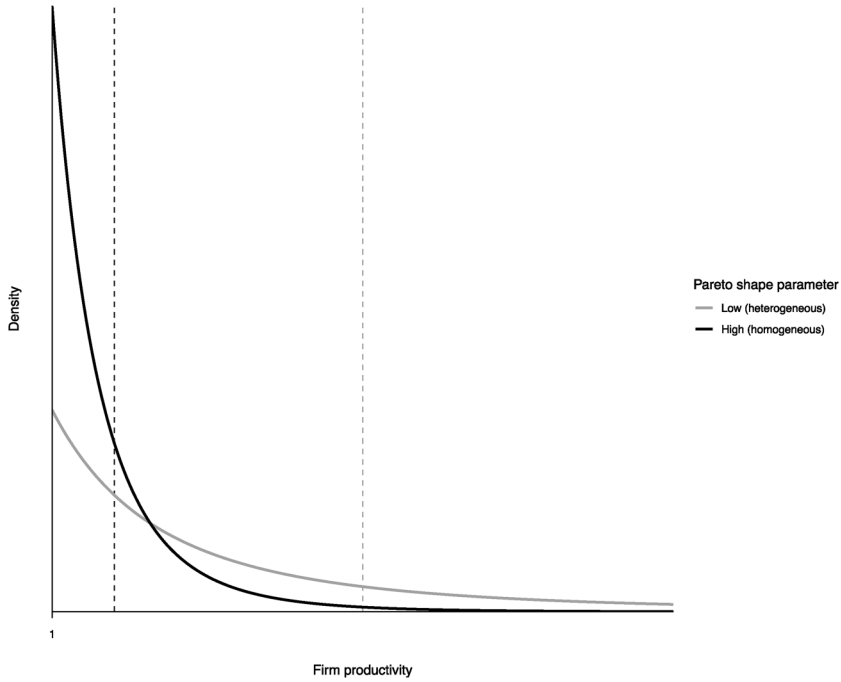

Figure 1. Distribution of firm productivity.
Note: As the shape parameter of the Pareto distribution increases, firms become more homogeneous in terms of their productivity (i.e., more firms are concentrated at lower levels of productivity) and the average productivity of firms decreases.

Proposition 1. The equilibrium of a single-industry open economy with two countries, H and F, and heterogeneous firms that produce substitutable varieties under monopolistic competition is:

1. Firms in origin country i only produce for destination country j when they are sufficiently productive:

$$\varphi_{ij} > \varphi_{ij}^{*} = b_{ij}\left[\frac{\sigma f\theta}{I_j(1-\sigma+\theta)}\sum_i M_i(b_{ij})^{-\theta}\right]^{\frac{1}{\theta}}$$

2. Each firm φ in country i that produces for country j chooses an optimal price, $p_{ij}^{*}(\varphi) = (\frac{\sigma}{\sigma-1})c_{ij}(\varphi)$, which is a constant markup over marginal cost.
3. Each representative consumer C_j chooses an optimal quantity of available varieties to consume, $q_{ij}^{*}(\varphi) = p_{ij}^{*}(\varphi)^{-\sigma}I_j(P_j^{*})^{\sigma-1}$, subject to an income constraint I_j.

To lay the groundwork for the remainder of the paper, I present several key comparative statics.[15] See the Appendix for details. First, I look at how changes in the trade

barriers b_H imposed by country H affect the production cut-points for firms producing for country H. These are φ^*_{HH}, for firms in H that produce for the domestic market, and φ^*_{FH}, for firms in F that export to H. These comparative statics indicate how changing the trade barriers that a country imposes impacts the behavior of firms that produce for that country, which determines the distributive consequences of those trade barriers (i.e., the effect on firm profits and consumer welfare).

As trade barriers b_H decrease, the domestic production cut-point φ^*_{HH} increases and the exporting cut-point for foreign firms φ^*_{FH} decreases (Figure 2, panels A and B). This changes the composition of the industry: more firms in F can afford to export to H, and fewer firms in H can afford to produce for the domestic market. More productive firms charge lower prices (they have lower marginal costs and pass some of these savings on to consumers in the form of lower prices), so this decreases the price index P^*_H. This increases consumer welfare W^*_H, which is the inverse of the price index.

Second, I look at how changes in the distribution firm productivity affect these cut-points. We can manipulate the shape of this distribution by varying θ. Increasing θ simultaneously increases firm homogeneity and decreases average productivity (Figure 1). As firms become more homogeneous and less productive on average, both productivity cut-points decrease (Figure 2, panels C and D). When firms are more homogeneous, price competition is less intense and market share is more evenly distributed across firms.

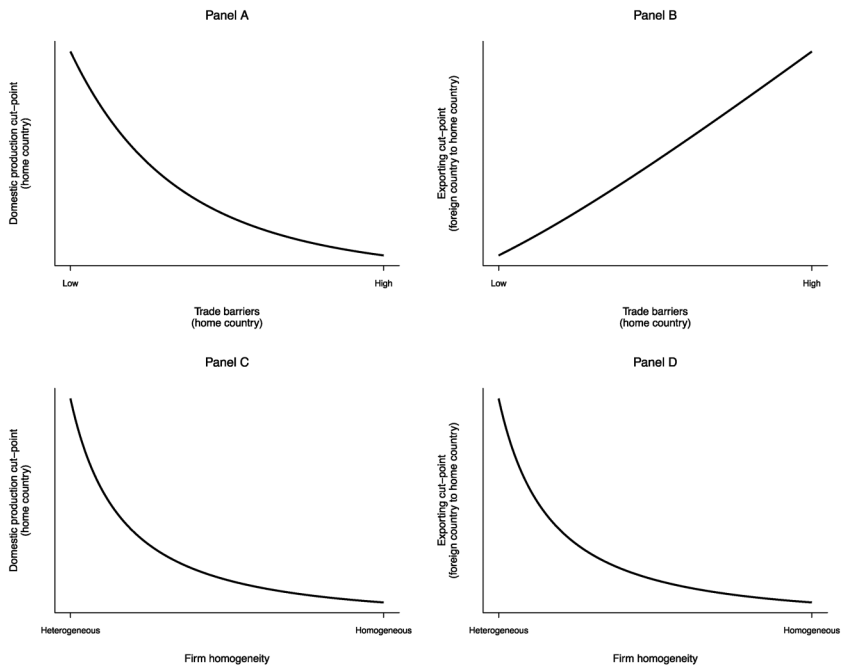

Figure 2. Comparative statics in an open economy.
Note: The domestic production cut-point in country H is decreasing in trade barriers and the exporting cut-point for firms in country F that export to country H is increasing in trade barriers. Both cut-points are decreasing in firm homogeneity.

Result 1. As the trade barriers b_H imposed by country H increase, the domestic production cut-point φ^*_{HH} for firms in H decreases and the exporting cut-point φ^*_{FH} for firms in F that export to H increases, causing more firms in H to produce for the domestic market and fewer firms in F to export to H. As firm homogeneity θ increases, these productivity cut-points, φ^*_{HH} and φ^*_{FH}, both decrease.

4. Adding a strategic government

Next, I relax the assumption that the trade barriers b_H imposed by country H are exogenous by adding a policy-making subgame at the start of the game in which the government of country H, G_H, can choose optimal trade barriers b_H. I assume that country F prefers free trade, $b_F = 1$. After government G_H chooses trade barriers b_H, the economy plays out just as before, conditional on b_H. This version of the model (with a strategic government, but without a regulatory regime) will serve as a counterfactual to the full model (with a regulatory regime) by establishing the trade barriers that the government of country H would choose in the absence of a regulatory regime.

I micro-found the preferences of government G_H in the domestic economy. The government chooses trade barriers, those trade barriers influence the behavior of firms and consumers, and the government has preferences over the consequences. Specifically, the government cares about the distributive consequences of these changes—the impact of its trade barriers on the profits of domestic firms and the welfare of consumers.

The government G_H balances two competing interests in choosing trade barriers b_H. First, it wants to protect domestic firms from foreign competition (firms in country F that export to country H). Higher trade barriers help firms in country H retain market share that they would otherwise lose to high-productivity foreign firms (Melitz, 2003). Protectionism is especially important for low-productivity firms in country H, which, in equilibrium, are forced out of the market due to price competition. These firms have strong incentives to lobby the government of country H for higher trade barriers (a high b_H). Import-competing firms can often overcome their collective action problem to lobby their government (Grossman and Helpman, 1994).

The government also cares about consumer welfare. In NNTT models, consumer welfare is the inverse of the price index. The government has an electoral incentive to keep prices low (inflation is unpopular), which it can do by lowering trade barriers. In equilibrium, firms in country F that export to country H pass on the extra costs of trade barriers to consumers in the form of higher prices (prices are a constant markup over variable cost). Thus, from the perspective of the representative consumer C_H in country H, any trade barriers that H imposes on firms from country F are a tax. In addition, trade barriers imposed by country H increase the average prices charged by domestic firms in H by insulating unproductive firms (which charge higher prices) from foreign competition.

The utility function for government G_H captures this fundamental tradeoff. It is increasing in the average profit of domestic firms (before market entry) and decreasing in the domestic price index. The functional form is:

$$u_{G_H}(b_H) = w\pi_{HH}(\tilde{\varphi}) - (P^*_H)^2 \tag{4}$$

where $\pi_{HH}(\tilde{\varphi})$ is the domestic profit of the average firm in country H, P_H^* is the equilibrium price index in country H, and w is a weight that indicates how much government G_H cares about the profitability of firms versus the welfare of consumers.[16] I assume that the political costs of price inflation are accelerating. A high w indicates a preference for protectionism (i.e., higher trade barriers) and a low w indicates a preference for trade liberalization (i.e., lower trade barriers). For intermediate values of w, equation (4) produces interior solution. For extreme values of w, there are boundary solutions.[17]

It is important that the government cares about the profit of the average firm in country H before market entry, $\pi_{HH}(\tilde{\varphi})$, which captures how *all domestic firms* are impacted by trade barriers, as opposed to the profit of the average firm in country H that produces for the domestic market in equilibrium, $\pi_{HH}(\tilde{\varphi}_{HH}^*)$, which captures only how *surviving domestic firms* are impacted. Competition from foreign firms (firms in country F that export to H) causes some unproductive firms in country H to go out of business (rather than make negative profits). This selection effect increases average profits, as more productive firms enjoy higher profit margins in equilibrium. But the government cares about the impact on all domestic firms, including the firms that go out of business. Those firms are the ones that have the strongest incentive to lobby the government for protectionism.

In equilibrium, government G_H chooses optimal trade barriers b_H^*. There is a unique solution, which is an interior solution for intermediate values of w. After the government chooses trade barriers, the economy plays out the same as before, conditional on the optimal trade barriers b_H^* in equilibrium. Again, I hold the trade barriers imposed by the government of country F constant at $b_F = 1$.

Proposition 2. The government G_H chooses optimal trade barriers b_H^* in equilibrium. Conditional on b_H^*, Proposition 1 describes firm and consumer behavior.

In equilibrium, as firms become more homogeneous (i.e., as θ increases), government G_H prefers smaller trade barriers (Figure 3).[18] When firms are more homogeneous, price competition in the domestic market is less intense. Market share is more evenly distributed across firms, and more domestic firms can afford to stay in business. As such, there is less need for the government to protect domestic firms, which means it can reorient its trade policy towards consumer interests—that is, it can lower trade barriers. This encourages more foreign firms to enter the domestic market and pushes out unproductive domestic firms, lowering average prices, and improving consumer welfare. This is the baseline against which I compare the equilibrium behavior under a regulatory regime.

Result 2. The optimal trade barriers b_H^* imposed by the government G_H of country H are deceasing in firm homogeneity θ. This increases the domestic production cut-point φ_{HH}^* in country H, decreases the exporting cut-point φ_{FH}^* for firms in country F that export to H, and increases consumer welfare W_H^*.

5. Adding a regulatory regime

Next, I add a regulatory regime to the model. A regulatory regime has three basic elements: (a) a treaty that establishes a customs union by prohibiting intra-bloc trade barriers; (b) a

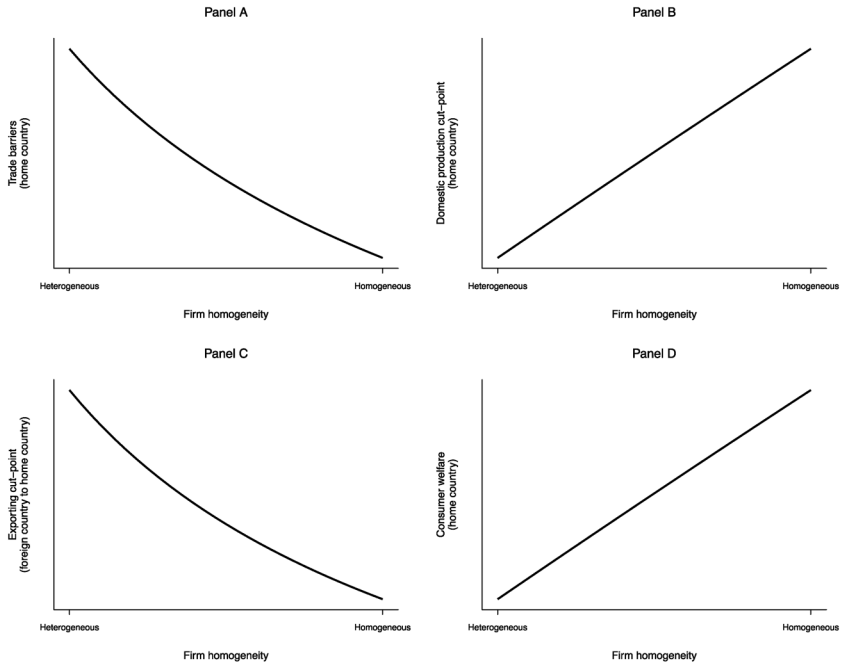

Figure 3. Optimal trade barriers without a regulatory regime in equilibrium.
Note: The optimal trade barriers imposed by the government of country H are deceasing in firm homogeneity. The domestic production cut-point in country H is increasing, the exporting cut-point for firms in country F that export to country H is decreasing, and consumer welfare in country H is increasing.

court that can adjudicate noncompliance cases against governments; and (c) a plaintiff that has standing to bring cases against noncompliant governments. The plaintiff could be a private actor, like a foreign firm that wants cheaper access to the defendant's market, or third-party institution that has the authority to prosecute noncompliance, like the Justice Department in the US or the European Commission in the EU.

To model a regulatory regime, I add a litigation subgame between the policy-making subgame and the economy subgame. The government G_H of country H chooses *ex ante* trade barriers $b_{H0} > 1$ (i.e., trade barriers before any litigation). A plaintiff observes these trade barriers and chooses whether or not to bring a case. If the plaintiff brings a case, a reduced-form court issues a ruling. The *ex post* trade barriers $b_{H1} > 1$ (i.e., the trade barriers after any litigation) depend on the outcome of the case. If there is no litigation, the *ex post* trade barriers are the same as the *ex ante* trade barriers. The economy plays out just as before, conditional on the *ex post* trade barriers b_{H1}.

The parameter b_T is the value of b_{H1} that is required by the treaty that establishes the customs union. I assume $b_T = 1$, which models a fully-implemented customs union that has (at least legally) eliminated all intra-bloc trade barriers. *Ex post* noncompliance occurs when government G_H chooses $b_{H1} > b_T = 1$. The parameter b_T is exogenous. This is a

realistic assumption. The rules prohibiting intra-bloc trade barriers are set by a treaty (or a constitution in the case of a federal state, like the US) that is signed and ratified by all member states. In established customs unions, the governments that sign the treaty are not the same governments as the governments that make compliance decisions. Present-day governments, which are what my model focuses on, inherit the rules and do not have any unilateral say over them.

For example, the present-day governments of EU member states, which have to decide how closely to comply with Article 30 of the Treaty on the Functioning of the European Union (the article that prohibits intra-EU trade barriers), are not the same governments that signed the Treaty of Rome back in 1957. The present-day government of a member state could have very different ideological preferences over trade liberalization than the government that signed the treaty, committing the member state to eliminating trade barriers. Changing the treaty requires unanimity, and there are always some member states that prefer intra-EU free trade, so the rules of the customs union are exogenous from the perspective of individual governments making day-to-day compliance decisions.

The customs union has a court that adjudicates disputes over noncompliance. Recent studies view courts as strategic actors (Vanberg, 2015; Carrubba, 2005; Carrubba and Gabel, 2015, 2017). Courts care about the degree to which member states comply with their treaty obligations (*ex ante* compliance), but they also care about compliance with their rulings (*ex post* compliance). As such, courts anticipate how likely a government is to comply when they issue rulings (Carrubba and Gabel, 2015; Martinsen, 2015; Larsson and Naurin, 2016). Carrubba and Gabel (2015) show that a government is more likely to ignore the ruling of the court when its cost of compliance is high, and that a court is therefore less likely to rule against a government when the government's cost of compliance is high.[19]

I incorporate this insight into my model by modeling the court as a reduced-form player. Conditional on the plaintiff bringing a case, there is some probability $h(c_H^*)$ of *ex post* compliance, which is the joint probability that the court rules against the government and that the government complies with the court's ruling. From the plaintiff's perspective, this is the probability of successful litigation. Consistent with Carrubba and Gabel (2015), this probability is endogenous to the government's cost of compliance in equilibrium c_H^*.[20] As the cost of compliance increases, the conditional probability of *ex post* compliance decreases, $h'(c_H^*) < 0$.[21] The government is less likely to comply with an adverse ruling and, anticipating that, the court is more hesitant to rule against the government. This reduced-form way of modeling a strategic court—as an endogenous probability—incorporates the key insight of Carrubba and Gabel (2015).[22]

I micro-found the cost of compliance c_H^* for government G_H in equilibrium in the domestic economy: it is the absolute difference between the government's utility for compliance, $u_{G_H}(b_T)$, and its equilibrium utility in the counterfactual, $u_{G_H}(b_H^*)$, where the government can choose an optimal trade barriers free from institutional constraints, $c_H^* = |\, u_{G_H}(b_H^*) - u_{G_H}(b_T) \,|$. Note that the cost of compliance is an equilibrium quantity because it depends on equilibrium behavior in the counterfactual model.

If the court rules in favor of the government, or if it rules against the government and the government does not comply with the adverse ruling, then the *ex post* trade barriers

are the same as the *ex ante* trade barriers, $b^*_{H1} = b^*_{H0}$. However, if the government loses and comes into compliance, it eliminates trade barriers, $b^*_{H1} = b_T$. Thus, equilibrium *ex post* trade barriers b^*_{H1} are either the government's equilibrium *ex ante* trade barriers or the trade barriers required by the treaty, $b^*_{H1} \in \{b^*_{H0}, b_T\}$.[23] In equilibrium, *ex ante* noncompliance is $b^*_{H0} - b_T$ and *ex post* noncompliance is $b^*_{H1} - b_T$.

5.1. Plaintiff preferences

The plaintiff P prefers *ex post* compliance with the rules of the customs union (i.e., free trade, or $b_{H1} = 1$). Thus, the utility of the plaintiff is a function of *ex post* noncompliance, $b^*_{H1} - b_T$. I use an exponential loss function to model this preference. Litigation is costly. If the plaintiff brings a case, it pays a cost k, where k is drawn from a distribution with cumulative distribution function $J(k)$.[24] This cost is private information. The utility of the plaintiff is given by the following piece-wise function:

$$u_P(b_{H1}) = \begin{cases} -(b_{H0} - b_T)^2 & \text{if there is no case} \\ -(b_{H0} - b_T)^2 - k & \text{if there is a case and ex post noncompliance} \\ -k & \text{if there is a case and ex post compliance} \end{cases} \quad (5)$$

If the plaintiff P brings a successful case, government G_H comes into compliance and eliminates trade barriers, $b_{H1} = b_T$. The plaintiff does not suffer any policy loss and only pays the cost of bringing a case $-k$. If the plaintiff does not bring a case, or does bring a case, but there is *ex post* noncompliance (i.e., if the court rules in favor of the government or the government ignores an adverse ruling), then *ex post* trade barriers are the same as ex ante trade barriers, $b_{H1} = b_{H0}$. The plaintiff suffers policy loss based on the degree of *ex post* noncompliance, $b_{H0} - b_T$.[25]

5.2. Regulatory regime equilibrium

In equilibrium, the plaintiff P only brings a noncompliance case against government G_H when the cost of litigation is sufficiently small relative to the probability of *ex post* compliance, $k < k^*$. Thus, the plaintiff drops the case when litigation is unlikely to induce compliance. This is consistent with recent empirical work on the European Commission, which finds evidence that the Commission drops costly cases (König and Mäder, 2014; Fjelstul and Carrubba, 2018), something earlier work had suspected (Mbaye, 2001; Börzel, 2003; Thomson et al., 2007; Hartlapp and Falkner, 2009; Steunenberg and Rhinard, 2010). The probability that the plaintiff brings a case in equilibrium is the probability that the cost is below the cut-point: $\Pr(k < k^*)$ or $J(k^*)$.

Proposition 3. Under a regulatory regime, the plaintiff P brings a noncompliance case against government G_H when the cost of bringing a case is sufficiently small: $k < k^* \equiv h(c^*_H)(b^*_{H0} - b_T)^2$.

In equilibrium, government G_H anticipates the probability that the plaintiff will bring a case, $J(k^*)$, and the conditional probability of *ex post* compliance, $h(c^*_H)$, and chooses *ex ante* trade barriers b_{H0} that maximize its expected utility, which is a function of *ex post*

trade barriers b_{H1}:

$$E\left[u_{G_H}(b_{H0})\right] = J(k^*)\Big(h(c_H^*)u_{G_H}(b_T) + \big(1 - h(c_H^*)\big)u_{G_H}(b_{H0})\Big) + \big(1 - J(k^*)\big)u_{G_H}(b_{H0}) \tag{6}$$

where $u_{G_H}(b_{H0})$ is given by equation (4). There is a unique solution in which the government chooses *ex ante* trade barriers that are optimal in expectation.[26] The economy plays out as before (see Proposition 1), conditional on *ex post* trade barriers b_{H1}^*, which are stochastic. As such, we have to consider the economy in expectation, conditional on expected *ex post* trade barriers $E[b_{H1}^*]$. Expected *ex post* trade barriers are:

$$E\left[b_{H1}^*\right] = J(k^*)\Big(h(c_H^*)b_T + \big(1 - h(c_H^*)\big)b_{H0}^*\Big) + \big(1 - J(c_H^*)\big)b_{H0}^* \tag{7}$$

Proposition 4. Under a regulatory regime, government G_H anticipates the probability that the plaintiff P will bring a case $J(k^*)$ and the probability of *ex post* compliance $h(c_H^*)$, and chooses optimal *ex ante* trade barriers b_{H0}^*. Conditional on expected *ex post* trade barriers $E[b_{H1}^*]$, Proposition 1 describes firm and consumer behavior.

5.3. Systematic bias in noncompliance cases

I use this equilibrium to show how the politics of noncompliance in regulatory regimes generate systematic bias in the types of noncompliance cases that get litigated, and that this bias creates a distortion in the economy: regulatory regimes reduce trade barriers most in industries with intermediate levels of firm homogeneity. Then, I identify the downstream consequences for firm performance and consumer welfare.

I start by calculating the effect of a regulatory regime on *ex ante* trade barriers and *ex post* trade barriers in expectation. To review, equilibrium *ex ante* trade barriers are b_{H0}^*, expected equilibrium *ex post* trade barriers are $E[b_{H1}^*]$, and equilibrium trade barriers in the counterfactual are b_H^*. The effect of the regime on *ex ante* trade barriers is the difference between equilibrium *ex ante* trade barriers in the full model (with a regime) and equilibrium trade barriers in the counterfactual model (without a regime): $b_{H0}^* - b_H^*$. Similarly, the effect of the regime on expected *ex post* trade barriers is $E[b_{H1}^*] - b_H^*$. *Ex ante* noncompliance is $b_{H0}^* - b_T$ and expected *ex post* noncompliance is $E[b_{H1}^*] - b_T$.

In equilibrium, the existence of a regulatory regime causes the government to reduce *ex ante* trade barriers, $b_{H0}^* < b_H^*$. The government makes a concession to the regime in order to lower the probability of enforced compliance, which is the joint probability of a case and *ex post* compliance, $J(k^*)h(c_H^*)$. Figure 4 shows an example. In equilibrium, *ex ante* trade barriers in expectation are less than optimal trade barriers in the counterfactual, but trade barriers are not eliminated entirely: $1 < b_{H0}^* < b_H^*$. The width of Region 1, $b_{H0}^* - b_T$, indicates the degree of *ex ante* noncompliance that remains and the width of Region 2, $b_H^* - b_{H0}^*$, indicates the size of the concession.

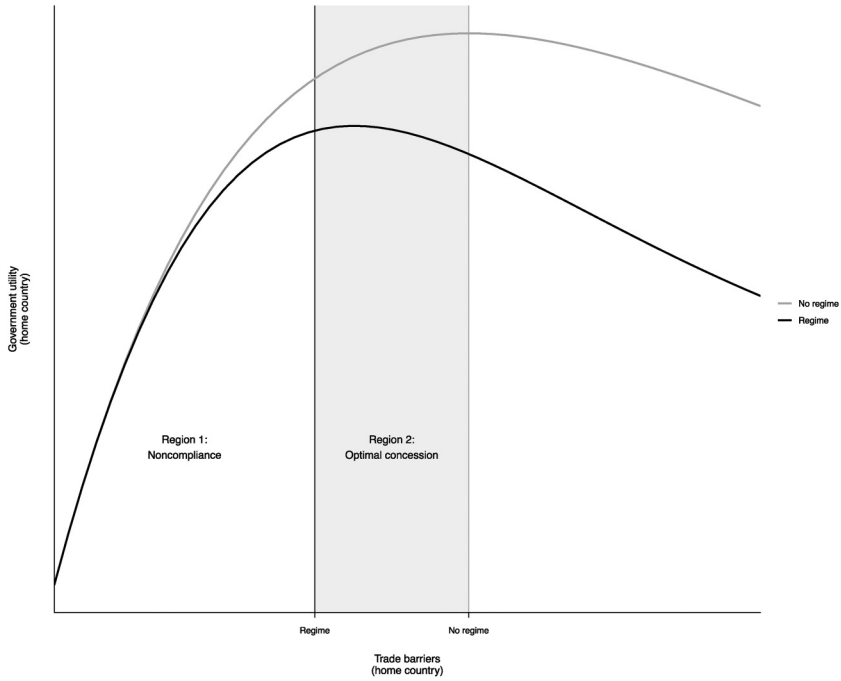

Figure 4. Optimal concession under a regulatory regime in equilibrium.
Note: Under a regulatory regime, the government makes an optimal concession to avoid litigation. The size of this concession in equilibrium is the effect of the regime on trade barriers. The width of Region 1 indicates the amount of ex ante noncompliance and the width of Region 2 indicates the size of the concession.

Result 3. The regulatory regime causes the government G_H to make an optimal concession in equilibrium by reducing expected *ex ante* trade barriers: $b^*_{H0} - b^*_H < 0$. This also reduces *ex post* trade barriers in expectation: $E[b^*_{H1}] - b^*_H < 0$.

In equilibrium, *ex ante* trade barriers b^*_{H0} are decreasing in firm homogeneity θ (Figure 5), just like equilibrium trade barriers b^*_H in the counterfactual (see Result 2). This means that *ex ante* noncompliance, $b^*_{H0} - b_T$, is also decreasing in firm homogeneity θ. The same is true for expected *ex post* noncompliance, $E[b^*_{H1}] - b_T$.[27]

However, the fact that both *ex ante* and *ex post* trade barriers decrease as firm homogeneity θ increases does not mean that regulatory regimes are most effective at reducing trade barriers when firms are more homogeneous. In fact, a regulatory regime reduces trade barriers most for intermediate levels of firm homogeneity θ. This is the main result of the model. Panel A of Figure 5 plots equilibrium *ex ante* trade barriers against equilibrium trade barriers in the counterfactual. Panel C does the same for *ex post* trade barriers. The vertical differences between these lines, $b^*_{H0} - b^*_H$ in panel A and $E[b^*_{H1}] - b^*_H$ in Panel C, are shown in panels B and D, and represent the effect of a regulatory regime on the expected trade barriers imposed by country H in equilibrium.

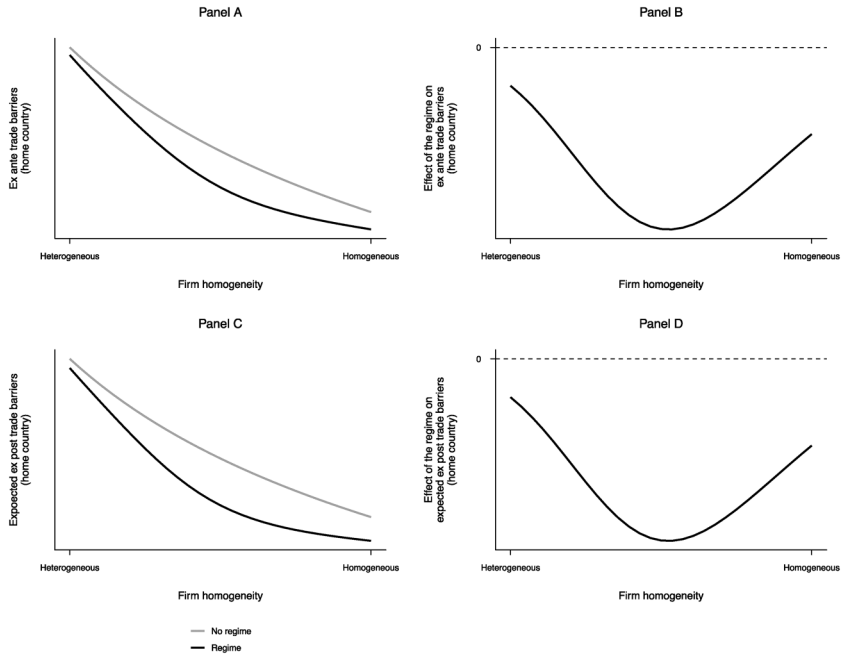

Figure 5. Effect of a regulatory regime on trade barriers in equilibrium.
Note: The negative effect of a regulatory regime on ex ante and ex post trade barriers in equilibrium is largest in industries with intermediate levels of firm homogeneity.

The magnitude of that difference is the greatest in industries with an intermediate level of firm homogeneity θ.

Result 4. As firm homogeneity θ increases, the *ex ante* trade barriers b^*_{H0} imposed by government G_H in equilibrium decrease. The negative effect of a regulatory regime on the *ex ante* trade barriers imposed by government G_H in equilibrium, $b^*_{H0} - b^*_H < 0$, is largest for intermediate levels of firm homogeneity θ. The same is true for expected *ex post* trade barriers in equilibrium $E[b^*_{H1}]$.

This non-monotonic result is because the plaintiff has competing incentives to bring a case. As firms become more homogeneous, the government prefers lower, more compliant trade barriers (see Result 2). Consequently, the cost of compliance decreases (Figure 6, panel A). This increases the probability of *ex post* compliance (Figure 6, panel B). In other words, the court becomes more likely to rule against the government because the government is more likely to comply with an adverse ruling. Thus, when firms are heterogeneous, *ex ante* noncompliance is high, and the plaintiff would like to bring a case, but the probability of *ex post* compliance is low, so the benefit of litigating does not outweigh the cost, and the plaintiff is deterred. On the other hand, when firms are homogeneous, the probability of *ex post* compliance is high, but *ex ante* noncompliance is low, so again, the benefit of litigating does not outweigh the cost, and the plaintiff is deterred.

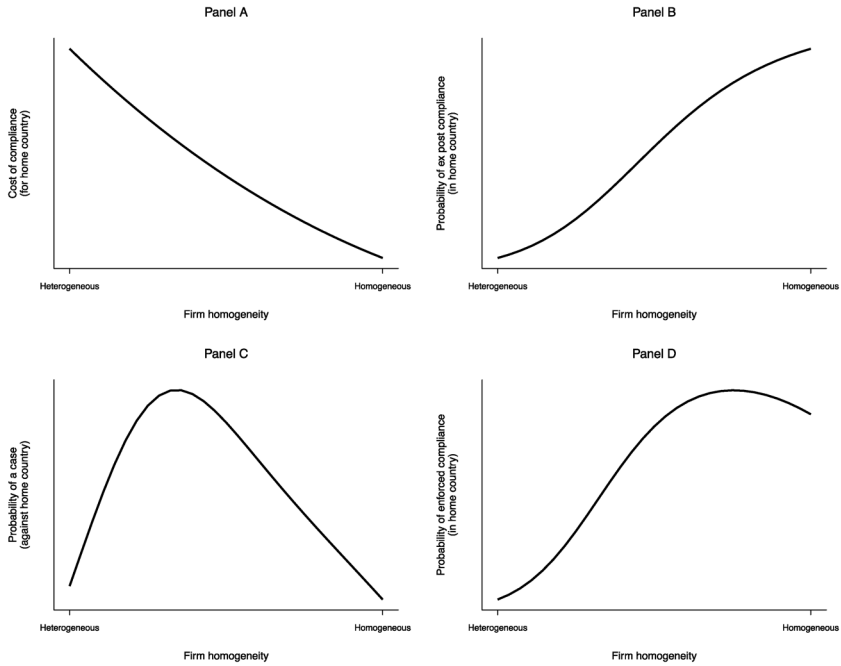

Figure 6. Comparative statics with a regulatory regime.
Note: With a regulatory regime, the cost of compliance is decreasing in firm homogeneity. The conditional probability of ex post compliance is increasing. The probability of a case and the probability of enforced compliance are largest in industries with intermediate levels of firm homogeneity.

For intermediate levels of firm homogeneity, the benefit of correcting *ex ante* compliance and the probability of *ex post* compliance are both high enough, relative to the cost of litigating, that the plaintiff is willing to bring a case. Thus, the probability of litigation is the highest in industries with intermediate levels of firm homogeneity (Figure 6, panel C). The probability of enforced compliance, which is the joint probability that the plaintiff brings a case, that the court rules against the government, and that the government comes into compliance, is also the largest in these industries (Figure 6, panel D). The government makes a larger concession when the threat of enforced compliance is higher.

In sum, the politics of noncompliance lead to a systematic bias in the noncompliance cases that get litigated. The plaintiff drops cases (a) in highly heterogeneous industries, where noncompliance high, but the court is unlikely to rule against the government, and (b) in highly homogeneous industries, where noncompliance is low, and the benefit of correcting it does not outweigh the costs of litigation. Thus, while compliance is always better when firms are more homogeneous, regulatory regimes reduce trade barriers most in industries with intermediate levels of firm homogeneity.

5.4. The distributive consequences of regulatory regimes

A customs union with a regulatory regime affects firm performance by reducing trade barriers. Reducing trade barriers helps productive, exporting firms in country F to gain market share at the expense of unproductive, non-exporting firms in country H, improving consumer welfare (e.g., Melitz, 2003; Chaney, 2008). But the politics of noncompliance create a systematic distortion in the economy: the regulatory regime reduces noncompliance most in industries with intermediate levels of firm homogeneity. This has downstream effects on firm performance and consumer welfare.

By incentivizing government G_H to lower *ex ante* trade barriers b^*_{H0}, the regulatory regime increases the domestic production cut-point φ^*_{HH} for firms in country H and decreases the exporting cut-point φ^*_{FH} for firms in country F that export to country H in expectation. Thus, more firms in F export to H and fewer firms in H produce for the domestic market. This change in the composition of the industry in country H has implications for consumer welfare. Since the most unproductive firms in H go out of business, the average productivity of firms increases. More productive firms charge lower prices, so this lowers the price index P^*_H and increases consumer welfare W^*_H.

Result 5. The regulatory regime increases the domestic production cut-point φ^*_{HH} for firms in country H and decreases the exporting cut-point φ^*_{FH} for firms in country F that export to country H. The least profitable firms in country H go out of business and the most productive firms in country F that only produce for the domestic market start to export. Firms in country H make lower profits under the regime, and firms in country F that export make higher profits. This change in the composition of the industry in country H improves consumer welfare W^*_H.

Figure 7 shows the how a customs union with a regulatory regime distorts firm performance by plotting profits in equilibrium as a function of productivity in a world with a regime and in a world without a regime (the counterfactual). Panel A shows firms in country H. Firms in Regions 1 are too unproductive to produce for the domestic market, and are not affected by the regime. Firms in Region 2 go out of business because of the regime. They are productive enough to produce without the regime (point A), but not with the regime (point B). Firms in Region 3 and 4 produce for the domestic market with or without the regime (firms in Region 4 also export to country F), but they make lower profits under the regime due to more intense price competition from foreign firms.

Panel B shows firms in country F. Firms in Region 5, like those in Region 1, are too unproductive to produce, and are not affected by the regime. Firms in Region 6 only produce for the domestic market, and are not affected by the regime as long as country F prefers to comply. Firms in Region 7 start to export to country H because the regime lowers the exporting cut-point φ_{FH} by inducing government G_H to make a concession (i.e., to reduce trade barriers). They are not productive enough to export without the regime (point F), but they are productive enough with the regime (point E). Firms in Region 8 export with or without the regime, but make higher profits under the regime.

Due to the politics of noncompliance, the regulatory regime decreases trade barriers most in industries with intermediate levels of firm homogeneity. Thus, these distributive consequences of the regime—the impact on firm performance and consumer welfare—are also largest in industries with intermediate levels of firm homogeneity. Figure 8

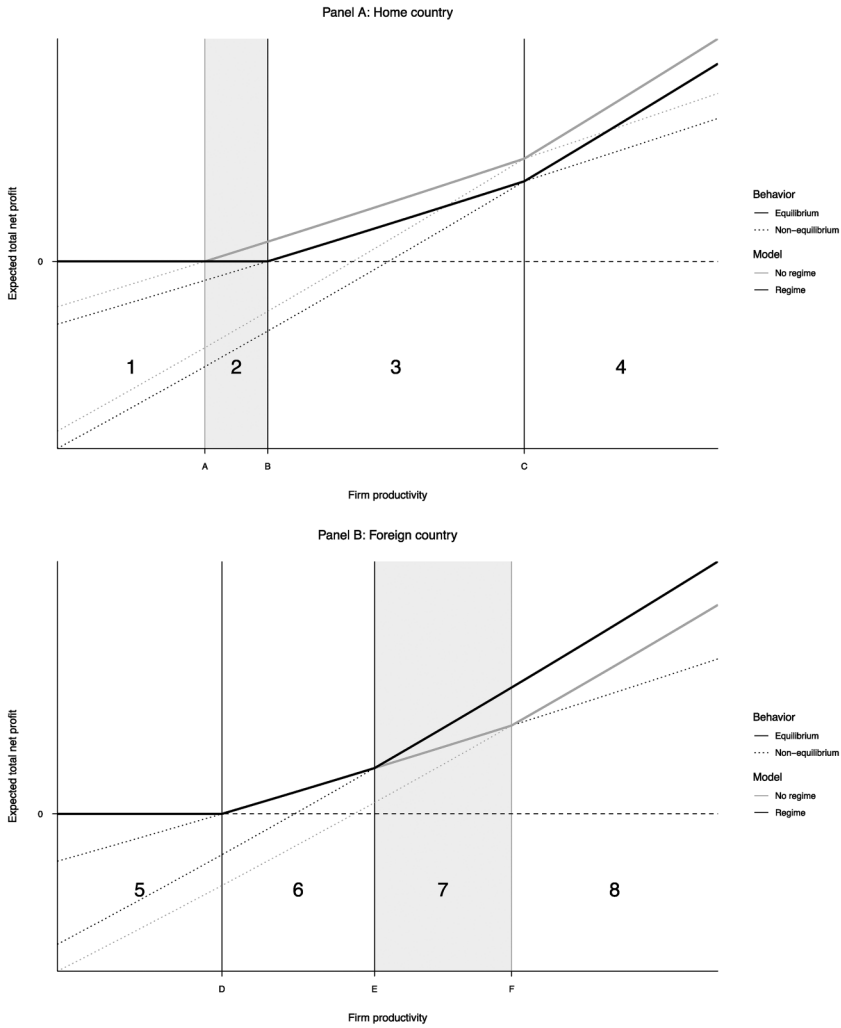

Figure 7. Distributive consequences of a regulatory regime for firms.
Note: The regulatory regime has distributive consequences for firms. Panel A shows firms from country H and Panel B shows firms from country F. Firms in Region 2 go out of business because of the regime, and firms in Region 7 start to export to country H.

shows these effects. The domestic production cut-point φ^*_{HH} for firms in country H is increasing in firm homogeneity (Panel A), but the positive effect of the regime on the cut-point (Region 2 in Figure 7) is largest for intermediate levels of homogeneity. The exporting production cut-point φ^*_{FH} for firms in country F that export to country H is decreasing in firm homogeneity (Panel C), but the negative effect of the regime on the cut-point (Region 7 in Figure 7) is largest for intermediate levels of homogeneity. These effects carry over to consumer welfare. Welfare W^*_H in country H is increasing in firm

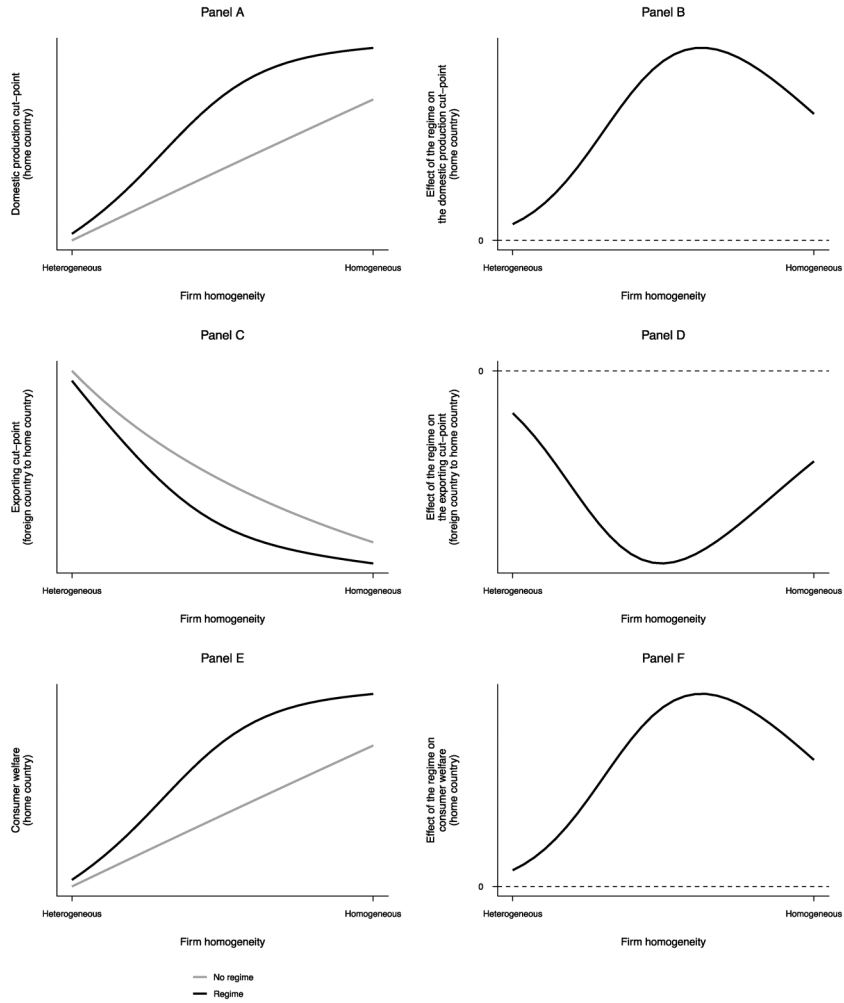

Figure 8. Distortions in the distributive consequences of regulatory regimes.
Note: The effect of a regulatory regime on the domestic production cut-point in country H (positive), the exporting cut-point for firms in country F that export to country H (negative), and consumer welfare (positive) are largest for industries with intermediate levels of firm homogeneity.

homogeneity due to this change in the composition of the industry, but the effect of the regime on welfare is largest for intermediate levels of homogeneity.

Result 6. The positive effect of the regulatory regime on the domestic production cut-point φ^*_{HH} for firms in country H, the negative effect of the regime on the exporting cut-point φ^*_{FH} for firms in country F that export to country H, and the positive effect of the

regime on consumer welfare W_H^* are largest for industries with intermediate levels of firm homogeneity θ.

In sum, by reducing trade barriers, regulatory regimes create distributive consequences: they allow new firms to export and push unproductive firms out of business. This raises average firm productivity, lowers average prices, and improves consumer welfare. But the politics of noncompliance generates systematic bias in the types of cases that get litigated, causing the regime to reduce trade barriers more in industries with intermediate levels of firm homogeneity. The consequences of the regime for firm performance and consumer welfare are therefore largest in these industries.

6. Conclusion

Governments create customs unions to accrue consumer welfare gains. To ensure that they actually realize these gains, they rationally design regulatory regimes to manage noncompliance with the rules of the customs union. But the politics of noncompliance generates systematic bias in the noncompliance cases that get litigated. I develop a formal model that explains how the politics of noncompliance in regulatory regimes systematically distorts the welfare gains that states accrue—the very reason they create customs unions in the first place. I show that if we do not take into account the politics of noncompliance, our theoretical predictions about the distributive consequences of trade liberalization—how lowering trade barriers impacts firms and consumers—will be systematically biased.

The model predicts the industries in which regulatory regimes will be effective at reducing trade barriers—those with intermediate levels of homogeneity in terms of firm productivity—as well as the downstream consequences for the performance of individual firms and for consumer welfare gains. Regulatory regimes are most effective at reducing trade barriers in industries with intermediate levels of firm homogeneity. In highly homogeneous industries and highly heterogeneous industries, regulatory regimes are not as effective at helping member states accrue consumer welfare gains.

However, the reason why regulatory regimes are ineffective in highly heterogeneous industries is very different than the reason they are ineffective in highly homogeneous industries. In heterogeneous industries, price competition is higher, giving governments more incentive to impose trade barriers to protect domestic firms. Regulatory regimes are ineffective because governments are less likely to comply with adverse court rulings, making the court hesitant to rule against them (Carrubba and Gabel, 2015). This deters plaintiffs from bringing noncompliance cases, creating a persistent compliance deficit (König and Mäder, 2014; Fjelstul and Carrubba, 2018).

In homogeneous industries, on the other hand, regulatory regimes are ineffective because the benefits of successfully prosecuting noncompliance are low relative to the costs of litigation. In homogeneous industries, price competition is low and governments are more willing to comply. The court is more likely to rule in favor of the plaintiff, but compliance is good enough that the benefit of bringing governments into compliance is not worth the cost of litigating. In homogeneous industries, the regime is ineffective because it is not used, not because it cannot correct violations.

There are several directions for future research. First, future research can explore empirical variation in the kinds of actors that can bring cases in customs unions and

micro-found the preferences of those actors in the economy. Second, future research can examine whether the distortions in welfare gains caused by the politics of noncompliance explain variation in public support for economic integration within and across countries. Third, future research can assess the long-term consequences of uneven welfare gains for the political stability of customs unions. Finally, future research can explore how variation in the institutional design of regulatory regimes conditions their effectiveness. Better designed regimes could minimize these distortions. Regimes that rely on retaliation-based punishment mechanisms, rather than a court, could create different distortions.

In sum, if member states always complied with the rules of customs unions, they would accrue the largest welfare gains from creating customs unions in industries with high levels of firm heterogeneity. Taking into account the politics of noncompliance in the regulatory regimes that states create to enforce those agreements, I predict that the largest gains from trade will actually be in industries with intermediate levels of firm homogeneity. Thus, factoring in the politics of noncompliance is critical to our understanding of the conditions under which regional economic integration via the development of customs unions actually generates the intended welfare gains in practice.

Acknowledgements

I thank Cliff Carrubba, Matt Gabel, Pablo Montagnes, Adam Glynn, Siv Cheruvu, participants at the 2018 Emory-Duke-Rochester Political Economy Research Conference, the anonymous reviewers, and the editor for their helpful comments and suggestions.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

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Supplemental material

Supplemental material for this article is available online.

Notes

1. Trade barriers include tariffs and non-tariff barriers, including quantitative restrictions (quotas), that *de facto* discriminate against goods from other members.
2. Articles 30 of the Treaty of the Functioning of the European Union (TFEU) and the Commerce Clause of the United States Constitution both prohibit discriminatory internal

trade barriers. Article 30 states that "Customs duties on imports and exports and charges having equivalent effect shall be prohibited between Member States. This prohibition shall also apply to customs duties of a fiscal nature." The Commerce Clause (Article I, Section 8, Clause 3) states that Congress has the power "To regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes." The Supreme Court has long upheld the Dormant Commerce Clause doctrine, which prohibits states from creating discriminatory internal trade barriers in the absence of Congressional action.

3. In contemporary trade models, productive firms have lower marginal costs, and they pass on these savings to consumers in equilibrium in the form of lower prices.
4. Note that in contemporary trade theory (Melitz, 2003; Chaney, 2008), productivity is the only way in which firms differ from each other. Productivity is the sole determinant of whether a firm produces for the domestic market and exports to foreign markets.
5. Scholars have studied the conditions under which international institutions can facilitate deep cooperation across a wide variety of contexts (Keohane, 1984; Chayes and Chayes, 1993; Burley and Mattli, 1993; Alter, 2001; Rosendorff and Milner, 2001; Stone Sweet and Brunell, 1998; Rosendorff, 2005; Simmons, 2009).
6. For firms in the home country H that produce for the domestic market, the origin and destination countries are both $i = j = H$. For firms in H that export, the origin country is $i = H$ and the destination country is $j = F$. For firms in the foreign country F that produce for the domestic market, the origin and destination countries are both $i = j = F$. For firms in F that export, the origin country is $i = F$ and the destination country is $j = H$.
7. The corresponding cumulative distribution function is $G(\varphi)$.
8. A general equilibrium features free entry (firms choose whether to enter the market prior to learning their productivity and only enter when the expected profits exceed a fixed cost of entry) and labor market clearing (total firm revenue equals total labor payments). See Melitz (2003) for details.
9. Whether any given variety ω is available for purchase in a given market depends on whether the firm that produces it chooses to produce for that market.
10. A high σ implies a weaker love of variety because small changes in price will cause a consumer to shift more of her consumption to cheaper varieties. As σ goes to infinity, varieties become perfect substitutes. As it goes to 0, varieties become perfect complements.
11. The fact that firms pay fixed costs to produce and export introduces increasing returns to scale (Krugman, 1980), an innovation of new trade theory (NTT) models and a feature of all NNTT models. Increasing returns to scale account for why we observe intra-industry trade (i.e., trade flows between two countries within the same industry), which is not predicted by classical theories (e.g., the Heckscher-Ohlin and Ricardo-Viner models). Intra-industry trade is prevalent in customs unions, which is another reason to base the economy in the model on NNTT instead of classical theories.
12. We must assume that $\theta > \sigma - 1$ for average firm productivity in equilibrium to be finite. Melitz (2003) and Chaney (2008) make the same assumption.
13. Throughout, I use an asterisk to indicate equilibrium quantities.
14. Adding free entry and labor market clearing and solving for a general equilibrium makes the model significantly more complicated. This additional complication does not change the takeaways of the model.
15. I use a computational simulation to calculate comparative statics. It is well-known in the economics literature that deriving smooth comparative statics in models of international trade with monopolistic competition is difficult, and that is before making trade barriers an endogenous choice variable.

16. The average productivity of firms in country H before selection into production is $\tilde{\varphi} = \frac{\theta}{\theta - 1}$, which is the mean of the Pareto distribution.
17. If w is sufficiently high, meaning the government cares significantly more about domestic firm profits than consumer welfare, then equation (4) will be strictly increasing in b_H, and the government will prefer to keep out foreign firms ($b_H \to \infty$). If w is sufficiently low, other the other hand, meaning the government cares significantly more about consumer welfare than firm profits, then equation (4) will be strictly decreasing in b_H, and the government will prefer free trade ($b_H = 1$).
18. I calculate comparative statics numerically using computational simulations. I calibrate the values for the exogenous parameters to produce an interior solution. See the Appendix for details.
19. In their model, *ex post* compliance with the ruling of the court is induced by the threat of punishment by third-party governments who support the ruling.
20. Fjelstul and Carrubba (2018) also use this approach to model the behavior of a strategic court.
21. In the computational simulations that I use to calculate comparative statics, I use a logistic function as the functional form for $h(c_H^*)$. I choose parameter values for the logistic function (the location and scale parameters) that produce an interior solution.
22. Note that the outcome of the court case is probabilistic because of the uncertainty over whether the court will be willing to rule against government G_H and whether the government will be willing to comply with the court's ruling, which is captured by the endogenous joint probability $h(c_H^*)$, not because the court is uncertain about whether the government has complied. The government's *ex ante* compliance decision b_{H0} is common knowledge, so the court knows the degree of noncompliance.
23. I assume that government G_H either fully complies with an adverse ruling, b_T, or fully ignores it and keeps b_{H0}. Allowing the government to partially comply *ex post* would not substantively change the equilibrium. Even if the government only partially complies *ex post*, that outcome will still incentivize the government to try to avoid litigation by making a concession.
24. In the computational simulations that I use to calculate comparative statics, I use an exponential CDF as the functional form of $J(k)$. I choose a parameter value for the exponential distribution (the rate parameter) that produces an interior solution.
25. If the plaintiff P were another government, we could micro-found its preferences in the economy, like I do with the preferences of the government G_H of country H. But in many customs unions, like the EU, the plaintiff is usually a firm or a monitoring institution. To ensure that the model applies to a broader set of empirical cases, I do not micro-found the plaintiff's preferences in the economy.
26. I calculate optimal *ex ante* trade barriers in equilibrium using a computational simulation. I use this simulation to numerically calculate comparative statics. See the Appendix for details.
27. Note that *ex post* trade barriers are strictly less than *ex ante* trade barriers in expectation, $E[b_{H1}^*] < b_{H0}^*$, because they are a convex combination of *ex ante* trade barriers b_{H0}^* and no trade barriers b_T.

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