

Accepted Manuscript

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PII: S0167-7187(16)30034-0
DOI: [10.1016/j.ijindorg.2016.05.001](https://doi.org/10.1016/j.ijindorg.2016.05.001)
Reference: INDOR 2303



To appear in: *International Journal of Industrial Organization*

Received date: 31 January 2016
Revised date: 30 April 2016
Accepted date: 3 May 2016

Please cite this article as: Holger Breinlich, Volker Nocke, Nicolas Schutz, International Aspects of Merger Policy: A Survey, *International Journal of Industrial Organization* (2016), doi: [10.1016/j.ijindorg.2016.05.001](https://doi.org/10.1016/j.ijindorg.2016.05.001)

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Highlights

- Survey the literature on merger policy in open economies.
- Use a reduced-form approach to derive general insights on the scope for conflict.
- Over-/under-enforcement of merger policy can occur, depending on market structure.
- Study the interactions between trade and merger policy.
- Discuss quantitative evidence on conflict between antitrust authorities.

ACCEPTED MANUSCRIPT

International Aspects of Merger Policy: A Survey*

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May 10, 2016

Abstract

This paper surveys the literature on merger policy in open economies. We first adopt a reduced-form approach to derive general insights on the scope for conflict between national antitrust authorities and on the gains from international merger policy coordination. Taking trade costs as given, we use standard oligopoly models to derive conditions on market structure, under which underenforcement or overenforcement of national merger policies can arise. We then study the interactions between merger policy and trade policy, and find that trade liberalization often leads to stricter national merger policies. We conclude by discussing empirical evidence on conflict between antitrust authorities.

Keywords: Mergers and Acquisitions, Merger Policy, Trade Policy, Oligopoly, International Trade

Journal of Economic Literature Classification: F12, F13, L13, L44

1 Introduction

In a globalizing world, an increasing share of mergers involves firms selling in multiple countries. Due to international differences in market structure and consumer preferences, but also due to the presence of trade costs and to the ownership structure of the merging and non-merging firms in the industry, any such merger can have different effects in different

*We thank the editor Michelle Sovinsky and an anonymous referee for helpful comments. Nocke gratefully acknowledges financial support from the European Research Council (project no. 313623). Part of this research was conducted while Schutz was visiting the Kyoto Institute of Economic Research at Kyoto University. He is grateful to KIER for their hospitality and to the International Research Unit of Advanced Future Studies for providing financial support.

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countries. In fact, it may well improve market performance in some countries, and worsen it in others. This may in turn lead national antitrust authorities to reach opposite conclusions on that merger.

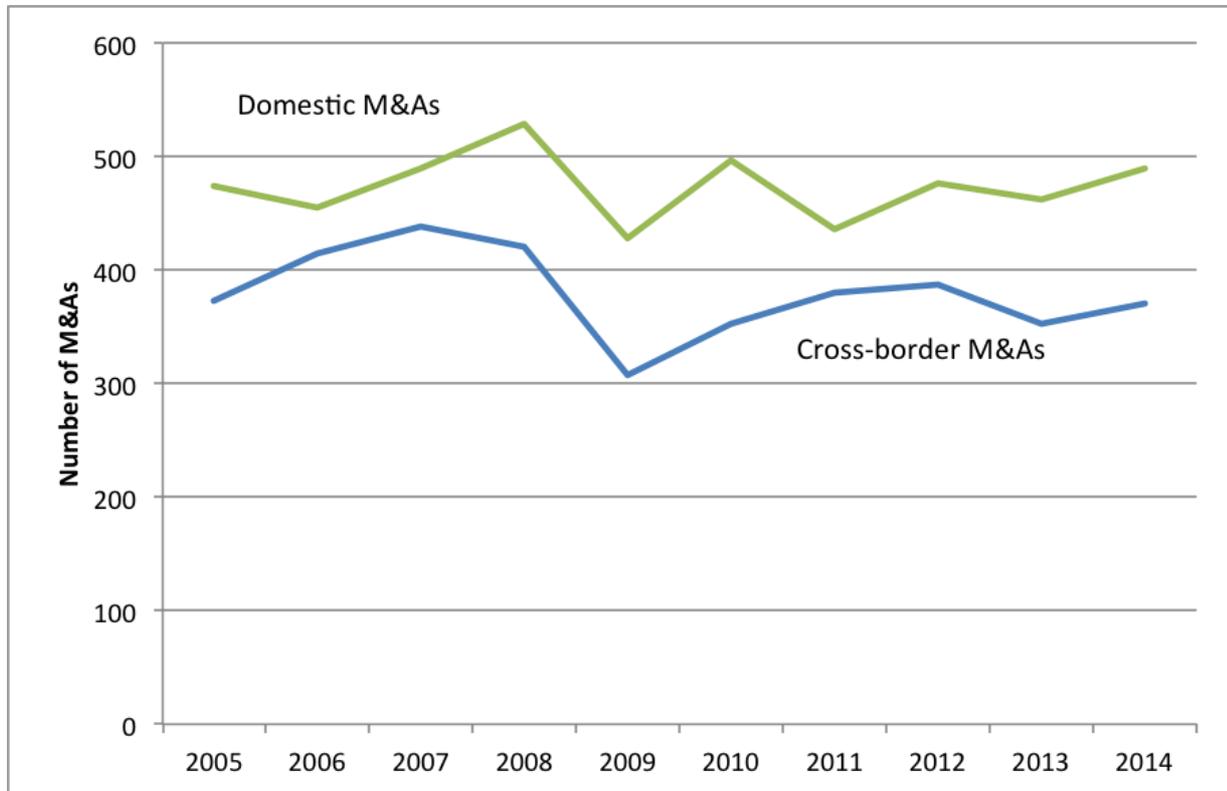
Over the past twenty years, a number of merger cases have exemplified such conflict between national antitrust authorities. In 1997, the merger between aircraft manufacturers McDonnell Douglas and Boeing was cleared by the U.S. Federal Trade Commission (FTC). The EU antitrust authority expressed serious concerns and threatened to block the merger. A trade war was avoided at the last minute after the merging parties agreed to some remedies. In 2000, the attempted joint acquisition of BOC Group by industrial gas suppliers Air Liquide and Air Products received approval from the EU, Canada and Australia, but was subsequently challenged by the FTC. Other prominent examples include the General Electric / Honeywell merger, which was cleared by the U.S. Department of Justice and blocked by the EU Commission in 2001, and the Metlac / Akzo Nobel merger, which was cleared by several antitrust authorities including the German Bundeskartellamt, but blocked by the UK Competition Commission in 2012.

More generally, every year, many mergers involve firms that are active in multiple countries. Figure 1 shows the number of mergers between manufacturing firms where the two parties had joint sales of at least USD one billion before the merger or takeover. We focus on such companies because existing research has shown that large manufacturing firms account for the vast majority of exports in most countries (Bernard, Jensen, Redding, and Schott, 2007; Mayer and Ottaviano, 2008; Fernandes, Freund, and Pierola, 2016). By doing so, we significantly understate the volume of mergers involving internationally active firms since many types of services are increasingly tradable and many smaller manufacturing firms also export.¹ Nevertheless, even when focusing on large manufacturing firms only, our data show that there are close to 1,000 merger and acquisition (M&A) transactions per year, with a total sales volume of the merging firms of over USD five trillion. Almost half of these transactions are accounted for by cross-border M&As and the remainder by mergers between firms from the same country.

Some of the high-profile merger cases mentioned above have led antitrust practitioners to propose the creation of a global antitrust authority. For instance, former U.S. Assistant Attorney General Joel Klein made the following statement: “I have been giving this considerable thought and believe that, [...], we should move in the direction of a Global Competition

¹For example, Armenter and Koren (2015) report that the average sales of U.S. manufacturing firms that export is only USD 36.4 million. Given that the U.S. has a lower export propensity than other countries (Mayer and Ottaviano, 2008), this figure is likely to be even lower elsewhere.

Figure 1: Number of M&As between Manufacturing Firms with Combined Sales above USD 1 billion



Source: Bureau van Dijk Zephyr, authors' calculations.

Notes: The figure shows the yearly worldwide numbers of mergers and acquisitions (M&As) between manufacturing firms with combined sales of more than USD one billion before the merger or takeover. Domestic M&As are transactions where the acquirer and the target are from the same country; cross-border M&As are transactions where the acquirer and target are from different countries.

Initiative, cautiously and on an exploratory basis, but in the end I think such a development is almost inevitable" (Klein, 2000).

One important question that arises when studying the international aspects of merger policy is whether national antitrust authorities are able to enforce, and actually do enforce, competition policy on firms headquartered in foreign countries. Many countries have adopted the *effects doctrine* in international competition law, according to which a national antitrust authority may assert jurisdiction over a merger whenever this merger affects its domestic market (Griffin, 1999). Indeed, as discussed above, important players such as the FTC and the EU Commission did use the implied veto rights over foreign mergers. Smaller countries, on the other hand, are not necessarily able to use such veto rights. Most of the papers surveyed below focus on the no-veto case, but a few others also consider the veto rights case.

Another important question is which criterion antitrust authorities use when evaluating

the costs and benefits of a given merger. While the consensus among industrial organization economists seems to be that the behavior of antitrust authorities can be best approximated by a consumer surplus standard,² much of the literature assumes instead that antitrust authorities aim to maximize aggregate surplus.

This paper surveys the literature on merger policy in open economies. In Section 2, we adopt a reduced-form view on merger policy, which describes a merger as a vector whose components summarize the impact of this merger on market performance in each country. We will see that the correlation between the components of this vector has important consequences for the scope for conflict between antitrust authorities, and for the potential gains from international coordination of merger policies. In Section 3, we take trade policy as given and use standard oligopoly models to study the correlation between the impact of a merger at home and abroad. Section 4 studies the interactions between trade policy and competition policy. Section 5 concludes and discusses empirical evidence.

2 A Reduced-Form Approach to Conflict and International Merger Policy Coordination

Cabral (2003, 2005) and Tay and Willmann (2005) develop a reduced-form approach to study the international aspects of merger policy. There are two countries, 1 and 2. A merger opportunity arises in country 1 with probability λ_1 and in country 2 with complementary probability λ_2 . (For simplicity, there are no cross-border mergers.) The impact of a country- i merger on the antitrust authority's objective function in country j , where j may or may not be equal to i , is a random variable w_j . Vector (w_1, w_2) is jointly drawn from probability distribution μ_i .

The virtue of this reduced-form approach is that, a priori, there is no need to worry about what it is exactly that antitrust authorities maximize. All that matters is the impact of a domestic or foreign merger on the antitrust authority's objective function. Here, welfare can be domestic aggregate surplus, consumer surplus, or a weighted sum of consumer and producer surplus, or any other market performance measure that antitrust authorities might be trying to maximize. However, below we take the impact of a merger on world welfare as being the sum of w_1 and w_2 . For this to be meaningful, we implicitly assume that w_1 and w_2 are measured in the same monetary units (e.g., consumer surplus or aggregate surplus), and

²For instance, Whinston (2007) writes: “[...] enforcement practice in most countries (including the U.S. and the EU) is closest to a consumer surplus standard.”

that, in principle, a country is able to compensate its neighbor for the losses it may suffer.

If countries do not have veto rights over foreign mergers, then a country- i merger goes through if and only if $w_i \geq 0$, regardless of the value of w_j . Therefore, a country- i merger that has a small but positive effect on market performance in country i , and a large and negative effect on market performance in country j would go through.³ This means that there can sometimes be underenforcement of merger control. Similarly, a country- i merger that has a small but negative effect on country i and a large and positive effect on country j will be blocked, i.e., overenforcement is also a possibility.

If, on the other hand, countries do have veto rights, then a merger goes through if and only if $w_1 \geq 0$ and $w_2 \geq 0$. Therefore, a merger that lowers world welfare will never be approved, and underenforcement is no longer an issue. The overenforcement problem, however, becomes more severe because if a domestic merger has a small but negative impact on the foreign country, then it will be blocked, even if it has a large and positive impact on the domestic country. In other words, the flip side of gaining veto rights is that the neighbor also gains veto rights. Therefore, the impact on world welfare of granting or removing veto rights is unclear, and it is easy to construct probability distributions μ_1 and μ_2 such that the underenforcement effect or the overenforcement effect dominates.

An interesting case arises when probability distribution μ_1 puts little mass on events where $w_1 > 0$ and $w_2 < 0$, and probability distribution μ_2 puts little mass on events where $w_2 > 0$ and $w_1 < 0$. When this is the case, a domestic merger is unlikely to lead to underenforcement by the domestic antitrust authority, and veto rights therefore have little effect on merger outcomes and world welfare. In Section 3, we will see that this situation can arise under plausible conditions.

Even in the case where countries would benefit little from acquiring (or giving up) veto rights, there are still gains from coordinating national merger policies, as long as probability distribution μ_i puts sufficient mass on events where $w_i < 0$ and $w_i + w_j > 0$. Such coordination could be achieved by creating a supra-national antitrust authority aiming to maximize world welfare (here: $w_1 + w_2$).

Such a supra-national antitrust authority seems to be difficult to implement in practice, because its decisions would be hard to enforce at the international level. Cabral (2003, 2005) proposes a solution to the enforcement problem by setting up the problem as a repeated game. Cabral assumes that countries have veto rights, and that $\mu_1 = \mu_2$. He focuses on optimal subgame-perfect equilibria in trigger strategies with reversion to the static Nash

³In a Coasian world, country j would be able to offer a monetary compensation to country i to convince it to block the merger. Such Coasian bargaining over merger policy does not seem to happen in practice.

equilibrium, where optimality refers to the maximization of the present discounted value of world welfare.

He finds that there exists a unique pair $(\underline{w}_1, \underline{w}_2)$ such that the optimal trigger-strategy subgame-perfect equilibrium is such that a merger is approved if and only if $w_1 + w_2 \geq 0$, $w_1 \geq -\underline{w}_1$ and $w_2 \geq -\underline{w}_2$, where $\underline{w}_1, \underline{w}_2 \geq 0$. Put differently, the merger is approved if it improves world welfare and if it does not harm the welfare of individual countries too much. Cabral calls \underline{w}_i country i 's concession level: in words, country i is willing to accept a short-run loss in welfare of up to \underline{w}_i in return for country j not blocking a future efficient merger where country j stands to lose. These optimal concession levels are pinned down by the incentive-compatibility constraints, and by maximizing the present discounted value of world welfare.

3 Merger Policy in Open Economies

We now turn to papers that analyze merger policy in open economies more explicitly. In this section, we focus on those papers that take trade costs (and trade policy more generally) as given. The papers in this strand of literature mainly differ along two dimensions. The first dimension relates to the behavior of antitrust authorities: Antitrust authorities have a consumer surplus standard in Breinlich, Nocke, and Schutz (2015), an aggregate surplus standard in Barros and Cabral (1994) and Head and Ries (1997), and follow mechanical rules depending on elasticities and market shares in Neven and Röller (2000, 2003). The second dimension relates to the degree of market integration: In Breinlich, Nocke, and Schutz (2015), firms incur iceberg-type trade costs, consumers' preferences vary across countries, and markets are segmented, so the degree of market integration is relatively low; in the rest of the literature, either markets are unsegmented (Neven and Röller, 2000, 2003), or they are segmented, but there are no trade costs and consumers' preferences do not vary across countries (Barros and Cabral, 1994; Head and Ries, 1997), so markets are relatively well integrated. We will see that these differences have important implications for the scope for conflict between antitrust authorities.

We first discuss the determinants of conflict when antitrust authorities have an aggregate surplus standard and markets are well integrated. In a closed economy framework, Farrell and Shapiro (1990) argue that if a merger is proposed, then this merger has to be jointly profitable for the merging parties. Therefore, a sufficient condition for a merger to improve aggregate surplus is that it does not lower the joint surplus of the non-merging parties (the

sum of consumer surplus and the profits of non-merging firms). The impact of the merger on this joint surplus is called the external effect of the merger. In a homogeneous-goods Cournot framework, Farrell and Shapiro decompose the merger as a sequence of infinitesimal mergers, where, along the sequence, the aggregate quantity changes progressively from the pre-merger equilibrium quantity to the post-merger one. This allows them to use calculus to derive conditions on the market shares of merging and non-merging parties for the merger to have a non-negative external effect.

Barros and Cabral (1994) extend Farrell and Shapiro's analysis to an open economy setting. Suppose first that there is only one market (the domestic market) served by domestic and foreign firms, and consider a domestic merger that does not create synergies. From the point of view of the domestic antitrust authority, the external effect of the merger is the sum of the changes in consumer surplus and producer surplus of the domestic firms that do not take part in the merger. Note that this does not include the change in foreign producer surplus. Barros and Cabral find that the external effect of the merger is more likely to be negative if foreign firms have higher market shares. Intuitively, in the extreme case in which all domestic firms are merging, the external effect of the merger is equal to the change in consumer surplus, which is negative, since there are no synergies. In addition, there tends to be overenforcement of merger policy, because the domestic antitrust authority ignores the positive impact of the merger on foreign producer surplus.

These results can change drastically in the presence of foreign consumers. Suppose that there are no trade costs, and that consumers' preferences are the same in all countries (countries are still allowed to differ in terms of market size). Under these assumptions, country- i firms have the same market shares in all countries. Let s_i be the proportion of total output accounted for by country- i firms. In general, s_i is different from d_i , which denotes the proportion of output consumed by country- i consumers. In addition to the effect discussed above, Barros and Cabral find that, if $d_i < s_i$ (i.e., if country i is a net exporter), then country i 's antitrust authority tends to be biased towards the production side of the economy. It may therefore approve a merger whose total external effect (taking into account foreign producer and consumer surplus) is negative. Assuming that foreign countries have no veto rights over domestic mergers, international differences in consumption and production patterns can therefore also lead to underenforcement of merger policy.

Head and Ries (1997) consider a similar setting, but compute exact aggregate surplus changes, without resorting to Farrell and Shapiro (1990)'s external effect technique. This requires to put more structure on the model by imposing specific functional forms for the

demand function (such as linear or iso-elastic demand). Head and Ries confirm Barros and Cabral (1994)'s insight that a country is unlikely to approve a merger that lowers world welfare if this country has a high enough share in world consumption (parameter d_i).

They then use numerical simulations to argue that, for plausible parameter values, several countries (the U.S., the EU and Japan) have sufficiently high consumption shares, and that they would therefore block global welfare-decreasing mergers, provided that they have jurisdiction.⁴ This leads them to conclude that, since most of the firms that have market power in international markets are headquartered in one of these countries, a merger that reduces world welfare is unlikely to be approved. The flip side of this coin is that these countries may well end up blocking mergers that raise world welfare, i.e., overenforcement may well be a serious issue.

Breinlich, Nocke, and Schutz (2015) study the determinants of conflict between antitrust authorities in an international Cournot oligopoly model with segmented markets, where antitrust authorities have adopted a consumer surplus standard. The impact of a merger between firms located in country i on consumer surplus in country j (where j may or may not be equal to i) can be decomposed into a market power effect and an efficiency effect. As shown by Farrell and Shapiro (1990), this implies the existence of a cutoff marginal cost level \hat{c}_j such that the merger raises consumer surplus in country j if and only if the marginal cost of the merged entity is less than \hat{c}_j .

Since market structures differ across countries, the values of these cutoff marginal cost levels may well vary from one country to the other. This creates scope for conflict between antitrust authorities. Suppose for instance that $\hat{c}_i < \hat{c}_j$ ($j \neq i$). If the post-merger marginal cost falls between thresholds \hat{c}_i and \hat{c}_j , then the merger will be blocked by the domestic antitrust authority, despite the fact that country- j consumers would benefit from it going through. When this is the case, merger control in country i is overenforced from the point of view of country j . If instead $\hat{c}_i > \hat{c}_j$, then there is scope for underenforcement by the domestic antitrust authority: If the merged entity's post-merger marginal cost falls between \hat{c}_j and \hat{c}_i , then the merger is approved in country i even though it harms country- j consumers.

Using the aggregative properties of the Cournot game, Breinlich, Nocke, and Schutz show that the sign of the difference between \hat{c}_i and \hat{c}_j is pinned down by a sufficient statistic that does not depend on the merger under consideration. That conflict statistic is defined as

⁴These results are derived under the assumption that the merger creates no synergies. Synergies make the country where (some of) the merging parties are located more likely to approve the merger. This can restore the possibility that a world welfare-decreasing merger is approved.

follows: $\rho_i = \tau_{ij} \frac{P_i^*}{P_j^*}$, where τ_{ij} denotes the (iceberg-type) trade cost from i to j , and P_i^* (resp. P_j^*) denotes the pre-merger equilibrium Cournot price in country i (resp. j). If $\rho_i > 1$, then for any country- i merger, $\hat{c}_i < \hat{c}_j$. Therefore, there is scope for overenforcement, but underenforcement can never happen. If instead $\rho_i < 1$, then there is scope for underenforcement, but overenforcement can never happen.

Intuitively, if P_i^* is higher than P_j^* , then the country- i market is less competitive than the country- j market. Therefore, the market power effect of a country- i merger is more likely to dominate the efficiency effect in country i than in country j . This leads country i 's antitrust authority to block too many mergers from the point of view of country- j consumers. Likewise, if τ_{ij} is high, then country- i firms tend to have higher market shares at home than they do abroad. Therefore, these firms have more market power at home than abroad, and a country- i merger is more likely to harm consumers in country i than in country j .

Breinlich, Nocke, and Schutz also investigate the impact of demand- and supply-side parameters on the value of their conflict statistics. Among other results, they find that ρ_i is an increasing function of τ_{ij} and τ_{ji} . Therefore, overenforcement is more likely to occur when trade costs are high.

Instead of assuming that antitrust authorities have a consumer surplus standard or an aggregate surplus standard, Neven and Röller (2000, 2003) develop a model in which antitrust authorities follow mechanical rules, based on a market definition test and a market dominance test. There are two countries. The authors make two important assumptions. First, all firms are able to produce and sell in both countries. Second, markets are not segmented and consumers located in country i can travel to country j to make their purchases there, although it is costly for them to do so.

The model does not specify how firms compete, how many firms there are, or what kind of technology firms use. The authors simply assume that, pre-merger, there is an equilibrium price in country 1, and an equilibrium price in country 2. Let ε_i be the price elasticity of demand in country i . Note that, due to the unsegmented markets assumption, this elasticity also includes the demand coming from country- j consumers who travel to country i to make a purchase. Neven and Röller assume that country 1 has less elastic demand: $\varepsilon_1 < \varepsilon_2$. These elasticities will be useful for the market definition test.

The authors assume that countries have veto rights over foreign mergers. Suppose that a merger is announced. If country i asserts jurisdiction over this merger (which does not prevent country j from asserting jurisdiction as well), then this country's antitrust authority makes its decisions in two steps.

The first step is market definition. The antitrust authority uses the SSNIP (Small but Significant and Non-transitory Increase in Price) test. The initial candidate for the relevant market is the country- i market (which, again, may include consumers traveling from country j). The antitrust authority asks whether a hypothetical monopolist would find it profitable to raise its price by $X\%$ in this market, or, equivalently, whether the price elasticity of demand in country i is less than some threshold K . If $\varepsilon_i \leq K$, then the SSNIP test leads the antitrust authority to define the relevant market as the country- i market. If instead $\varepsilon_i > K$, then the antitrust authority needs to widen the relevant market. It therefore includes the country- j market as well, and stops there.

The second step is an assessment of dominance. Let MS_i be the sum of the pre-merger market shares of the merging parties in country i . Let MS_t be the total market share of the merging parties in the combined two-country market. If the relevant market has been defined as the country- i market, then the merger is approved if and only if $MS_i \leq B$, where parameter B is a market dominance threshold. If it has been defined as the two-country market, then the merger is approved if and only if $MS_t \leq B$.

The authors define conflict as a situation in which the antitrust authorities in countries 1 and 2 reach opposite decisions. Since antitrust authorities are not explicitly maximizing anything, this is a positive view of conflict, which says nothing about the domestic consumer surplus or aggregate surplus effects of foreign mergers. The authors distinguish three cases.

Suppose first that $\varepsilon_1 > K$. Intuitively, this means that markets are quite integrated. If a hypothetical monopolist were to attempt to raise the price in country 1 without changing the country-2 price, many country-1 consumers would start traveling to country 2 to purchase the product. In this case, both countries define the two-country market as the relevant market, and, since they use the same market dominance test, no conflict can arise. The authors conclude that conflict is unlikely to arise in global or well-integrated markets.

If instead $\varepsilon_2 < K$, then markets are poorly connected. International arbitrage is not too much of an issue, and a hypothetical monopolist in country i would indeed find it profitable to raise the country- i price, even if the country- j price were to stay constant. Each antitrust authority therefore defines its domestic market as the relevant market. The likelihood of conflict depends on the correlation between the domestic and foreign market shares of the merging parties. If this correlation is positive, then antitrust authorities are likely to reach the same decision. Since one would expect market integration to raise this correlation, it is still the case that better integrated markets tend to experience less conflict.

Last, suppose that $\varepsilon_1 < K < \varepsilon_2$. In this case, the antitrust authority in country 1 defines

the relevant market as the two-country market, whereas the country-2 antitrust authority focuses on its own domestic market. As before, if MS_1 and MS_2 are positively correlated, then MS_1 and MS_t are also positively correlated. Therefore, the antitrust authorities are unlikely to reach conflicting decisions.

What we can take away from this analysis is that, if markets are not segmented and well-integrated, and if antitrust authorities do follow the types of rules that Neven and Röller ascribe to them, then conflict is unlikely to arise.

We close this section by summarizing the main insights from the literature on merger policy in open economies. When antitrust authorities have a consumer surplus standard, the nature of the potential conflict between antitrust authorities, i.e., whether there is overenforcement or underenforcement of merger policy, is strongly influenced by the magnitude of trade costs. When trade costs are high, domestic firms tend to have little market power abroad, and merger policy is therefore likely to be overenforced by the domestic antitrust authority. Industry structure and international differences in consumers' preferences also affect the nature of conflict. For instance, Breinlich, Nocke, and Schutz (2015) find that the domestic antitrust authority is more likely to overenforce merger policy when domestic demand is less elastic than foreign demand.

In principle, these determinants of conflict should also matter in the case where antitrust authorities put some weight not only on consumer surplus but also on firms' profits, but the extant literature has not devoted much attention to them. The main determinants of conflict that have been identified in the case where antitrust authorities have an aggregate surplus standard are international imbalances in consumption and production. Countries that are net exporters (resp. net importers) tend to be biased towards the production (resp. consumption) side of the economy, and are therefore more likely to underenforce (resp. overenforce) merger policy.

The extent to which firms can segment international markets also has a significant impact on the scope for conflict in international merger policy.⁵ Neven and Röller (2000, 2003)

⁵There is a long-standing debate in the international trade literature on whether the segmented markets assumption or the integrated markets assumption best approximates reality. Goldberg and Knetter (1997) conclude their survey of the empirical literature on exchange rates and pricing-to-market with the following statement: "There are many interesting subsidiary issues in the study of international pricing, but the conclusion from this research that ought to affect the way we think is simply this: National markets for goods are better viewed as segmented than integrated." With that said, the assumption of perfect market segmentation may be too extreme, at least for some countries and industries. For instance, the EU has adopted a regional exhaustion regime, which states that the first sale within the EU territory exhausts the original manufacturer's rights to restrict further trade in the common market. This regional exhaustion regime has given rise to substantial flows of parallel imports in the EU (5.5 billion euros in the sole pharmaceutical

show that well-integrated markets are less conducive to conflict, because they lead antitrust authorities to define the relevant market as the world market. It would be interesting to extend Neven and Röller (2000)'s analysis to a more standard setup, in which antitrust authorities maximize an objective function. Breinlich, Nocke, and Schutz (2015) take a step in that direction (see their Footnote 12) under the assumption that antitrust authorities have a consumer surplus standard. They show that, if perfectly competitive arbitrageurs are subject to the same trade costs as manufacturers, i.e., if markets are perfectly integrated, then, either merger policy is overenforced, or there is no scope for conflict. Underenforcement can never arise. We are not aware of any paper studying the impact of the degree of market segmentation when antitrust authorities also put some weight on producer surplus.

4 The Interaction between Merger and Trade Policies

We have seen in the previous section that trade costs and, more generally, the degree of market integration have important effects on the scope for conflict and on the gains from coordinating international merger policy. This raises the question of the interactions between merger policy and trade policy. We now turn to a small literature that addresses the following type of questions: How does trade liberalization affect the design of merger policy? Does trade liberalization induce countries to use merger policy in a beggar-thy-neighbor way to promote national interests at the expense of others? Should we expect domestic merger control to become more lenient after trade liberalization? This literature is closely related, both in terms of research questions but also in terms of analytical tools, to the literature on strategic trade policy (see Brander and Spencer (1985) and Brander (1995) for surveys).

In this literature, governments have access to two instruments: Trade policy and merger policy. Merger policy is modeled in a very stylized way, perhaps more akin to industrial policy: the government either chooses the number of firms (in Richardson (1999), Horn and Levinsohn (2001) and Rysman (2001)'s frameworks with symmetric Cournot competitors), or it chooses how to partition a given set of products into a set of firms (in De Stefano and Rysman (2010)'s framework with asymmetries and horizontally differentiated products). Although these papers do not discuss these issues, the fact that the domestic government cannot affect the number of firms in the foreign country (or the market structure in the foreign

sector in 2012). As expected, such parallel trade has made it more difficult for firms to price discriminate between EU member states: Ganslandt and Maskus (2004) find that, at the end of the 1990's, parallel imports reduced drug prices in Sweden by 12–19%. Nevertheless, price dispersion across EU countries remains quite high (Kyle, 2011).

country) means that antitrust authorities do not have jurisdiction over foreign mergers.

Horn and Levinsohn (2001) develop a model with two symmetric countries, homogeneous-goods Cournot competition, symmetric firms and segmented markets. Government i sets the number of firms located in country i (merger policy) and export subsidies (trade policy) so as to maximize aggregate surplus in country i . Importantly, each firm that is allowed to produce incurs a strictly positive fixed cost. This implies that, in a closed economy setting, governments would face a tradeoff between enhancing competition and exploiting economies of scale.

Horn and Levinsohn study several policy regimes. In what they call the pre-GATT regime, governments choose their merger and trade policies simultaneously and non-cooperatively.⁶ In the GATT regime, export subsidies are forbidden, but governments do not cooperate on merger policy. Finally, in the international cooperation regime, subsidies are banned, and domestic merger policies are delegated to a supra-national antitrust authority maximizing global welfare.

Under the assumption of linear demands, the authors obtain the following results. First, there are more firms in the GATT regime than in the pre-GATT regime. Intuitively, in the pre-GATT regime, governments engage in a subsidy war, in which each government attempts to grant Stackelberg leadership to its firms by subsidizing exports, as has been discussed extensively in the strategic trade literature (Brander and Spencer, 1985). In the GATT regime, export subsidies are no longer allowed so that governments have to resort to another way of granting Stackelberg leadership to their firms. By increasing the number of firms located in its country, a government can credibly commit to selling more at home and abroad, which essentially provides the same benefits as Stackelberg leadership. This suggests that trade liberalization actually leads to tougher merger policies.⁷

Second, there are fewer firms in the international cooperation regime than in the GATT and pre-GATT regimes. The intuition is similar to the one in Barros and Cabral (1994): Domestic governments do not internalize the positive impact of a more concentrated industry structure on the profits of foreign firms. Another way of putting this is that the supra-national antitrust authority ignores profit-stealing motives when setting the number of firms. This

⁶The General Agreement on Tariffs and Trade (GATT) was a multilateral agreement regulating international trade and the predecessor of the World Trade Organisation (WTO). The GATT provisions are still in effect under the WTO and, among other things, prohibit export subsidies and increases in tariffs and trade barriers over and above agreed bounds.

⁷Note, however, that Lerner indices increase following trade liberalization, because pro-competitive export subsidies disappear. This effect dominates the pro-competitive effect of having more firms under the GATT regime.

suggests that, whether or not trade is liberalized, there tends to be overenforcement of merger policy, not underenforcement.⁸

Richardson (1999) studies a similar model, in which governments set import tariffs (instead of export subsidies) to maximize a convex combination of aggregate surplus and producer surplus. Richardson compares the GATT and pre-GATT regimes. (He does not consider the international cooperation case.) He finds that, when both governments only care about producer surplus, trade liberalization usually induces countries to adopt a tougher merger policy, i.e., to choose a higher number of firms. The intuition is similar to the one in Horn and Levinsohn (2001): under trade liberalization, governments can no longer use import tariffs to keep foreign firms out of the domestic market. Given the Cournot assumption, they therefore have incentives to increase the number of firms so as to give Stackelberg leadership to domestic firms and steal market shares from foreign firms.

The picture is more nuanced when both governments maximize aggregate surplus instead of producer surplus. The reason is that, in the pre-GATT regime, the import tariff that is optimally set by the domestic government creates a consumption distortion, which, *ceteris paribus*, induces the domestic government to choose a high number of firms. Trade liberalization somewhat alleviates this consumption distortion, which weakens the incentives to choose a high number of firms. If this effect dominates the Stackelberg effect, then trade liberalization can cause competition policies to become more lenient.⁹

De Stefano and Rysman (2010) relax the assumptions that products are homogeneous, firms are symmetric and competition is in quantities. However, to make their approach tractable, they assume that the firms in both countries under consideration sell only in a third (consuming) country, which makes consumer surplus considerations irrelevant. Here, merger policy consists in partitioning an exogenously given set of products into a set of firms. Trade policy consists in setting a vector of export subsidies (or taxes). Each government chooses a merger policy first, and then a trade policy. Next, firms compete in prices or in quantities. The problem is formally equivalent to a vertical relations setting where competing manufacturers choose their numbers of franchisees, and then an observable two-part tariff for each franchisee (see, for instance, Baye, Crocker, and Ju (1996)).

De Stefano and Rysman compare the GATT and pre-GATT regimes. Consider first the

⁸Note that, since there are fewer firms and no export subsidies, the international cooperation regime is the least competitive one, i.e., the one with the highest Lerner index.

⁹Horn and Levinsohn (2001) also briefly study import tariffs. In their framework, trade liberalization unambiguously leads to tougher merger policies.

GATT regime. If firms compete à la Bertrand, then each country has incentives to assign all products to a single firm (a “national champion” policy). Such a policy is optimal for two reasons. First, it fully internalizes competitive externalities between an exporting country’s products. Second, by strategic complementarity, it raises the prices set by the other country’s firms. The picture is more nuanced under Cournot competition, for reasons that resemble the ‘merger paradox’ (Salant, Switzer, and Reynolds, 1983): The strategic effect of a national champion policy becomes negative (the other country increases its output). In the special case where products are homogeneous, Rysman (2001) shows that both governments choose a fully fragmented industry structure in equilibrium.

Next, consider the pre-GATT regime. De Stefano and Rysman find that, no matter whether firms compete in prices or in quantities, both countries choose a national champion policy in equilibrium. This result is proven in two steps. First, by fine-tuning its profile of export taxes, a country can induce its firms to set any price (or quantity) vector, irrespective of the merger policy this country chose in stage 1. Second, a more concentrated industry structure at home induces the foreign country to choose a softer trade policy (higher export taxes under Bertrand competition, lower export subsidies under Cournot competition), which benefits the home country.

Putting these results together, the following insights obtain. Under Bertrand competition, trade liberalization has no impact on equilibrium merger policies, since both governments use a national champion policy before and after trade liberalization. By contrast, under Cournot competition, trade liberalization induces governments to adopt tougher merger policies. In some cases, they might even find it worthwhile to switch from a national champion policy to a completely fragmented industry structure. These results broadly confirm Horn and Levinsohn (2001)’s insight that merger policy is tougher in the GATT regime than in the pre-GATT regime.

We close this section by highlighting some of the shortcomings of this strand of literature. While the idea of allowing governments to choose directly the number of firms makes the analysis quite tractable, this modeling approach sidesteps a number of difficulties. First, it is firms that decide whether to propose a merger, not an antitrust authority. Although an antitrust authority can block a merger, no antitrust authority can force firms to merge. Second, in principle, firms should be able to choose between different merger partners. This choice depends in turn on the (trade and merger) policy imposed by the authority. Nothing guarantees that the government will be able to induce the right choice of merging partners by simply fine-tuning its trade and merger policy instruments. Third, this approach does not

permit to study the actual design of merger policy. In principle, one could imagine that the government would delegate merger policy decisions to an independent antitrust authority, and assign a certain objective function to this authority. The question would then be what choice of objective function ensures that socially desirable mergers are proposed by the firms and approved by the antitrust authority.

5 Quantitative Evidence and Concluding Remarks

Although the international aspects of merger policy have received substantial interest from theorists, there is surprisingly little empirical evidence on this topic. Breinlich, Nocke, and Schutz (2015) take their model to the data and, under the assumption that demand is linear and firms' productivities are Pareto-distributed, calibrate it to match industry-level data for 160 manufacturing sectors in the U.S. and Canada. This allows them to compute the value of their conflict statistics for both countries in each sector. They find that the value of the Canadian conflict statistic is above unity in all manufacturing sectors. This means that Canada overenforces merger policy in manufacturing. The picture is more nuanced in the U.S. While U.S. antitrust authorities overenforce merger policy in the majority of sectors, there is a significant minority of sectors where they underenforce it.

These results suggest that veto rights matter relatively little in North America, since underenforcement is only a minor issue there. However, it may still be useful to coordinate merger policy to solve the overenforcement problem. While Breinlich, Nocke, and Schutz's conflict statistic is useful to determine the nature of conflict (underenforcement vs. overenforcement), it does not provide information about the magnitude of conflict, and therefore, about the potential gains from merger policy coordination. To go further, Breinlich, Nocke, and Schutz calibrate a version of their quantitative model with a merger formation process to match merger activity data. This allows them to examine the impact of various merger policy changes, such as giving veto rights, or creating a North-American antitrust authority maximizing joint consumer surplus. As expected, veto rights only have a minor impact on North-American consumer surplus. By contrast, the creation of a North-American antitrust authority solves the overenforcement problem, and leads to an overall gain of around USD one billion in North-American consumer surplus per year.

To the best of our knowledge, there is no direct evidence that international price effects of mergers actually vary across countries. One possibility would be to follow a reduced-form approach, as forcefully advocated in Angrist and Pischke (2010), i.e., to focus on a particular

merger, and estimate the price effect of this merger at home and abroad. Another more structural approach would be to apply Nevo (2000)'s merger simulation techniques to an open economy setting. We believe these to be very interesting avenues for future research.

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