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# Trade Openness and Antitrust Law

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# Trade Openness and Antitrust Law\*

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**Abstract.** Openness to international trade and adoption of antitrust laws can both curb anticompetitive behavior. But scholars have long debated the relationship between the two. Some argue that greater trade openness makes antitrust unnecessary, while others contend that antitrust laws are still needed to realize the benefits of trade liberalization. Data limitations have made this debate largely theoretical to date. We study the relationship between trade and antitrust empirically using new data on antitrust laws and enforcement activities. We find that trade openness and stringency of antitrust laws are positively correlated from 1950 to 2010 overall, but the positive correlation disappears in the early 1990s as a large number of new countries adopt antitrust laws. However, we find a positive correlation between trade openness and antitrust enforcement resources and activities for both early and late adopters of antitrust regimes during this period.

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## 1. INTRODUCTION

Increasing exposure to international trade and increasing the stringency of antitrust laws are both ways that countries can curb anticompetitive behavior. For instance, if a country wanted to prevent a domestic manufacturer with monopoly power from charging supracompetitive prices, one solution would be to reduce barriers to foreign firms looking to import into the country. As long as the world price for the goods is lower than the price the domestic manufacturer is charging, import competition would make supracompetitive prices unsustainable. But another solution to the same problem is to adopt an antitrust law that prevents the manufacturer from abusing its dominant position in the market.

Although trade and antitrust can achieve many of the same ends, scholars have long debated whether open economies would still benefit from establishing antitrust regimes. Some scholars have argued that antitrust laws are redundant in the presence of open trade because foreign entrants are sufficient to destabilize cartels, constrain dominant companies, and undermine other anticompetitive practices, thereby keeping market competition in check (see, e.g., Bhagwati 1968; Helpman and Krugman 1989; Blackhurst 1991; Neven and Seabright 1997; Melitz and Ottaviano 2008). In contrast, other scholars have argued that, even with high levels of trade, antitrust laws are needed to ensure that private anticompetitive practices do not replace public barriers to trade and offset gains from trade liberalization (see, e.g., Bond 2004; Motta and Onida 1997; Bartók and Miroudot 2008).<sup>1</sup> However, this debate has been largely theoretical to date.

This is likely because studying this question empirically requires solving two problems. First, it requires having a measure of the stringency of countries' antitrust regimes. Although a number of research projects have collected cross-national data on antitrust policies, these efforts all have limitations that make it difficult to address this question. Second, estimating the effect of trade openness on antitrust policy requires identifying a method that can exogenously estimate countries' trade exposure. This is because measures of trade openness typically express trade as a fraction of the total economy, but antitrust policies can affect the size of the economy, and in turn directly influence the measure of trade openness. Given these obstacles, little is known about the relationship between countries' levels of trade openness and the antitrust laws they adopt.

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<sup>1</sup> Others have suggested that the relationship between trade and at least merger policy is entirely ambiguous, with no reason to expect any particular correlation between the two (Horn and Levinsohn 2001).

We test the relationship between trade openness and antitrust laws while addressing both of these problems. To measure the stringency of antitrust laws, we draw on what we believe to be the most comprehensive dataset on antitrust laws to date. To build the dataset, we identified every country with antitrust law in place by 2010, and then set out to code every antitrust law that those 126 countries had passed since their first antitrust law was adopted. In total, we coded 94 antitrust laws. For each law, we coded 171 pieces of information, including detailed information on the scope of the authority it bestows on the government and the law’s substantive provisions. Using these data, we constructed a new measure of the stringency of countries’ antitrust regimes: the Competition Law Index (the “CLI”). In addition to coding antitrust laws, we also constructed several additional datasets on antitrust regimes—including a dataset antitrust agencies’ resources and enforcement activities between 1990 and 2010—that we use to further probe this question.

To account for the endogenous relationship between antitrust and economic growth, we estimate a series of gravity equations to generate a measure of trade openness that is exogenous to countries’ economic growth. Specifically, we extend a version of a gravity model developed by Ortega and Peri (2014) to predict the value of trade between pairs of countries using information on the geographic relationship between the countries and their relative size. We build on their method by using more extensive trade data to generate predictions for the trade between pairs of countries from 1950 to 2010. By aggregating the total predicted trade for each country in each year, we generate estimates of countries’ total predicted trade.

Our primary econometric specification uses two-stage least squares regression to assess the relationship between trade openness and the stringency of antitrust laws while instrumenting for trade openness with our predicted trade measure. When using panel data from 1950 to 2010, we find that trade openness and antitrust stringency are positively correlated. This overall result holds when using a variety of alternative methods to measure antitrust stringency and trade openness. We then extend our analysis by estimating cross-sectional regressions for individual years. Doing so reveals that the positive correlation between trade openness and antitrust stringency disappears in the early 1990s. We show that this is not because the relationship changed for early adopters (*i.e.*, countries that adopted antitrust regimes prior to 1990), but instead because there is no clear relationship between trade openness and the antitrust policies for the late adopters (*i.e.*, countries that first adopted antitrust regimes in the 1990s). Finally, we extend our analysis by using new data on antitrust enforcement resources and activities from 1990 to 2010 that we

collected by corresponding with 100 antitrust agencies from around the world. Using these data, we find that although there is not a clear correlation between trade openness and antitrust laws from 1990 to 2010, there is a positive correlation between trade openness and greater antitrust enforcement during this time. Moreover, this relationship exists for both early and late adopters of antitrust regimes. One interpretation of this pattern is that countries with low trade exposure may have adopted stringent antitrust laws after 1990 but not necessarily enforced them.

Although we provide new evidence on the relationship between trade openness and antitrust policies, this paper admittedly has several limitations. Notably, our empirical strategy cannot show whether trade openness causes changes in antitrust law; instead, we can only test if there is likely a correlation. Additionally, we do not address whether having both high levels of trade openness and strict antitrust regimes leads to better economic performance. Additionally, our results do not explain why countries with higher trade openness adopt stricter antitrust regimes. Countries might do so because combining trade and antitrust is welfare enhancing, but it is also plausible that countries adopt antitrust regimes to protect their markets from foreign competition as traditional tools for protectionism wane with trade liberalization (c.f. Cremieux and Snyder 2016). But our focus is on documenting the empirical relationship between these two tools of economic regulation—we leave these important related questions to future research.

This paper proceeds as follows. Part 2 outlines the prevalent theories on the relationship between trade openness and antitrust regulation. Part 3 describes the data we have collected to measure antitrust stringency. Part 4 explains the approach we use to estimate trade openness by predicting trade between countries based on their geography and size. Part 5 reports our primary results and a range of robustness tests that examine the overall relationship between trade openness and antitrust stringency. Part 6 conducts a series of cross-sectional regressions that analyze the trends by year. Part 7 explores the relationship between trade openness and antitrust enforcement resources and activities. Part 8 concludes.

## **2. THE RELATIONSHIP BETWEEN TRADE AND ANTITRUST**

We begin by outlining two common theoretical claims about the relationship between trade openness and antitrust law, followed by a brief discussion of the literature that has empirically tested the relationship between these two policies.

## **2.1. Trade and Antitrust as Substitutes**

Many scholars suggest that trade liberalization may make adopting an antitrust regime unnecessary (Bhagwati 1968; Helpman and Krugman 1989; Blackhurst 1991; Neven and Seabright 1997; Melitz and Ottaviano 2008). According to this view, free trade is an effective way to ensure that markets remain competitive because facilitating entry checks market power (Baumol et al. 1982). For example, when an economy is open to trade, monopolists refrain from abusing their market power because low external barriers ensure that competitors can enter the market and contest any such abusive practices. In this way, trade liberalization renders an antitrust intervention into monopolistic practices superfluous. Exports fueled by trade liberalization should also enhance market competition. New opportunities in export markets ensure that more firms can reach an efficient scale of production, which further spurs competition and reduces the need for an antitrust regime (Bartók and Miroudot 2008).

Relying on trade liberalization to safeguard market competition could have several advantages. First, foreign producers must incur certain fixed costs and variable trade costs to enter a new market that domestic producers do not incur. If foreign firms are able to enter and effectively compete even after incurring these costs, they are presumably more efficient and hence may act as an even more effective market discipline than domestic firms (Bartók and Miroudot 2008). Second, choosing free trade over antitrust regulation forgoes the need to rely on government bureaucracies. Many who remain skeptical of government intervention favor free trade and thus prefer imports to discipline anticompetitive behavior. This argument may gain all the more force today considering the complexities associated with antitrust regulators from over 130 countries all applying different rules in an effort to regulate the global marketplace. Finally, although “a non-prohibitive tariff . . . acts as an effective antitrust policy” (Pomfret 1992, 11), an effective antitrust policy does not act as an effective trade policy. For example, if the United States were to impose a 30% tariff on foreign producers today, foreign firms would likely not enter no matter how competitive the market are behind the border. Domestic antitrust laws thus may do little to facilitate market entry in the presence of highly protectionist trade policy.

## **2.2. Trade and Antitrust as Complements**

Alternatively, since both free trade and vigorous antitrust enforcement hurt dominant firms, governments seeking to constrain dominant companies may pursue both policies to the

same end. Hence, there should be a positive relationship between free trade and the use of antitrust. Many scholars, indeed, argue that trade and antitrust are likely to be positively correlated (Bond 2004; Motta and Onida 1997; Bartók and Miroudot 2008; Bradford and Büthe 2012). For instance, Bartók and Miroudot (2008) acknowledge that trade policy and antitrust policy can act as substitutes because both policies destabilize cartels and hence foster competition. However, the authors nevertheless describe trade and competition policy as “mutually reinforcing.” This is, in part, because the benefits from collusion may be greater in the presence of open trade. For example, market integration allows companies to operate across multiple markets, allowing them to extract larger rents as a result (Bond 2004). Such cartels are also harder to detect and prosecute because evidence may be scattered across multiple jurisdictions. This may increase the net benefits from collusion, making anticompetitive behavior more likely in the presence of open trade. This would explain why several international cartels have successfully operated over multiple years and countries, even in periods coinciding with substantial economic openness (Connor 2007).

Governments may thus deliberately strengthen antitrust regulations in the presence of free trade to ensure that private anticompetitive conduct does not undermine gains from trade liberalization. This logic motivated the European Union’s adoption of antitrust. The EU initially adopted antitrust rules to complement efforts to liberalize trade between members. The fear was that, without such laws, private companies could re-create barriers between member states and undermine the functioning of the single market. Antitrust laws were hence needed to ensure that the gains from free trade could be fully realized and preserved. Antitrust and trade policies are also often viewed as complementary because, while trade policy seeks to dismantle public barriers to trade, antitrust removes private barriers. Similarly, while trade liberalization seeks to maximize country’s total surplus, antitrust is more commonly aimed at the maximization of consumer surplus.<sup>2</sup> These differences alone may explain the governments’ willingness to deploy both sets of policies as complementary tools to preserve economic openness and market competition.

Additionally, even if foreign firms are able to enter a market, they may not be able to penetrate the market and effectively compete if the market is tied by exclusive distribution agreements. For example, in the 1980s, the US government complained that, despite the

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<sup>2</sup> However, our coding of the goals of antitrust laws suggest that some countries—including Canada and New Zealand—pursue “total welfare” as opposed to “consumer welfare” through antitrust laws. This suggest that some jurisdictions see the goals of trade and antitrust policy as more overlapping as opposed to distinct yet complementary.

liberalization of trade with Japan, US firms could not compete on the Japanese market in industries such as automobiles or photographic film. According to the critics, local antitrust laws failed to condemn exclusive distribution agreements that prevented US firms from access to retailers and hence to local consumers (Bond 2004; Scherer 1994). This illustrates how trade policies may go only so far in rendering markets competitive.

### **2.3. Trade and Antitrust in Practice**

Only a handful of studies have tested the relationship between trade openness and antitrust empirically. For one, Waked (2010) also finds that trade openness and antitrust enforcement resources are negatively correlated in a sample of developing countries. Additionally, a few studies support the view that trade alone can render markets competitive. These studies generally examine the effects of import penetration on some measure of competition—like market concentration ratios or price-cost mark-up (Bartók and Miroudot 2008)—and find a negative correlation between trade openness and mark-ups (Levinsohn 1993; Roberts and Tybout 1996; Tybout 2001). This implies that higher levels of imports lead to more competition and lower prices.

A few empirical studies also suggest that trade openness and stringent antitrust regimes may be positively correlated. Feinberg (1990) studied the correlation between the reduction of tariffs and antitrust enforcement budgets in the United States, finding a positive association between trade liberalization and antitrust enforcement. Feinberg also finds a comparable association between antitrust fines and trade openness. Horn and Levinsohn (2001) reach a similar result when examining merger policies and trade liberalization. While their results are largely ambiguous, the authors conclude that trade liberalization may lead to stricter antitrust standards. Cremieux and Synder (2016) examine cartel enforcement by the US and EU and find, among other things, that the United States imposes higher fines on foreign firms than domestic firms. If the nationality of firms influences the enforcement of antitrust policy as they suggest, it may follow that antitrust laws are enforced more aggressively in the presence of foreign competition.

## **3. MEASURING ANTITRUST STRINGENCY**

### **3.1. Prior Data Collection**

The biggest hurdle to testing these theories is having the data to do so. Although there have been several prior efforts to produce cross-national measures of antitrust policies (e.g.

Gutmann and Voigt 2014; Petersen 2013; Ma 2011; Buccirossi et al. 2011; Clougherty 2010; Waked 2010; Voigt 2009; Nicholson 2008; Hylton and Deng 2007; Kee and Hoekman 2007), all of the existing measures suffer from at least one major limitation.

First, several of the existing cross-national measures of antitrust law rely on a binary coding of whether antitrust law exists in a given country-year (Gutmann and Voigt 2014; Petersen 2013; Kee and Hoekman 2007). The problem with using a binary coding for our research question is that it disregards the significant variation among these laws. As a result, although it can be used to show whether countries adopt an antitrust law in response to trade openness, it cannot distinguish whether countries adopt more or less stringent regimes based on their exposure to trade.

Second, most datasets that go beyond a binary measure have coded information on only a small sample of countries. For instance, Buccirossi et al. (2011) develops a comprehensive index of countries' antitrust regimes, but do so for just 13 Organisation for Economic Co-operation and Development (OECD) members. Similarly, Clougherty (2010), collect data on the number of merger notifications in 32 countries, Kee and Hoekman (2007) uses a sample of 42 countries, Nicholson (2008) uses a sample of 52 countries, and Voigt (2009) uses a sample of 58 countries. Hylton and Deng (2007) is an exception. In what we believe is the most ambitious previous effort to collect antitrust data, they coded the statutes of 102 countries and produced an index of the overall stringency of national antitrust laws.

Third, most existing data cover a limited number of years. For instance, while Hylton and Deng (2007) develop a comprehensive measure of countries' antitrust regimes, their data only covers 2001-2004. Others collect data for similar periods: Nicholson (2008) for 2003, Voigt (2009) for 1990-2000, Ma (2011) for 1990-2004, and Gutmann and Voigt (2014) for 2004-2010.

### **3.2. Our Data Collection**

Our goal was to comprehensively code every antitrust law every country had ever adopted.<sup>3</sup> To do so, we first identified the jurisdictions that adopted an antitrust law by 2010.<sup>4</sup> Our research identified 126 such countries. For each country, we went back to the first law that it enacted and

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<sup>3</sup> We fully explain the data collection process in Bradford et al. (2018).

<sup>4</sup> We elected to start our data collection in 2010 for practical considerations: we began collecting data several years ago and we selected a data a few years prior so that we could reliably obtain copies of laws that had been passed.

tried to identify every subsequent law it passed until 2010. We included general antitrust laws, relevant sector specific regulations, and other laws (such as criminal laws or constitutions) that contained provisions regulating market competition. Using this approach, we coded 694 antitrust laws in place by the end of 2010.<sup>5</sup>

Figure 1 maps the countries that had an antitrust law in place every ten years from 1960 to 2010. Figure 1 shows that, over the years, antitrust regimes have been adopted in countries around the world, including by democracies and non-democracies and by developed and developing countries alike. In fact, antitrust regimes have become so common that, by 2010, the 126 countries with antitrust laws contributed 95.4% of the world's GDP. Figure 1 also shows that most countries adopted antitrust laws in the last 30 years, with the greatest expansion taking place in the 1990s.

In addition to identifying these laws, we developed a survey instrument to code their content. We built on the coding schemes used by Hylton and Deng (2007) and Nicholson (2008) as a starting point for our coding instrument. But with the advantage of hindsight, we added variables to more thoroughly measure each country's antitrust laws. In total, our survey instrument included 171 entry fields, with questions covering the scope of the antitrust authority, merger control, the abuse of a dominant position, and anti-competitive agreements.

To complete the coding, we recruited and trained a team of law students. We specifically engaged students who were trained in different jurisdictions and possessed relevant language skills. Each law was assigned to two coders for independent review. Both coders followed identical procedures, reaching out for guidance from us and senior coders that had extensive experience in the project, as needed. For countries that had passed multiple laws over time or in the same year, the coders researched the relationship between each law so that we could "annualize" the data and have an accurate picture of the countries antitrust regime in any given year.<sup>6</sup> Once two coders completed coding a country, a third coder completed a discrepancy analysis by reviewing all fields

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<sup>5</sup> We identified 698 laws passed by 2010, but we have not completed the coding of four laws. We were unable to obtain a copy of laws we believe to exist for two countries—Djibuti and Iran—and we have been unable to complete coding of two countries—Faroe Islands and Hungary—because we have not yet identified coders with appropriate language skills. To account for this, all of our regressions include an unreported indicator variable for the country-years where we have identified a law that we have not yet been able to code.

<sup>6</sup> We researched the relationship between laws to understand whether subsequent laws supplemented or replaced prior provisions. For instance, if a country passed a law in 1980 that required merger notification, and then passed a new law in 1990 that did not mention merger notification, we tried to determine whether that was because the new law removed the merger notification requirement or did not mention it because merger notification was already required.

where the original coders provided differing responses, consulting the actual text of the underlying law. The output of the discrepancy analysis produced a final “consensus” response to every field for every law. Countries that did not have a law in a given year were coded as “0” for all variables. We thus created a country-year dataset for all countries in the international state system.

### 3.3. Creating the Competition Law Index

Once we had coded the contents of the world’s antitrust laws, we developed a measure of the stringency of those laws. Following prior research (e.g. Hylton and Deng 2007; Nicholson 2008; Buccirosi et al. 2011), we elected to develop an index that measures the stringency of each country’s antitrust law in a given year. Because we fully introduce the Competition Law Index (“CLI”) that we have developed in Bradford and Chilton (2018), we will only briefly describe it here. The goal of the CLI is to measure the intensity of competition regulation in any given country in any given year. It does so by aggregating the prohibitive elements of the various components of countries’ competition laws. The more types of behaviors the law prohibits or the more extensive remedies the law entails, the higher the CLI. At the same time, the more the law recognizes defenses and exemptions from the law, the lower the CLI. At this point, it is important to stress that the CLI is thus not a measure of the quality of an antitrust regime. Instead of creating a coding of whether regimes have “best practice” antitrust regimes, the CLI simply codes whether countries have provisions that extend or limit the possible scope of antitrust regulation. For instance, some established antitrust jurisdictions also have lower CLI because of their common tendency to include defenses that call agencies to consider pro-competitive effects of the conduct or transaction in question.<sup>7</sup>

The CLI consists of two equally weighted parts: one part captures the **Authority** that a country’s antitrust law conveys and the second part captures the **Substance** of the law. By antitrust **Authority**, we refer to the broader structure of the antitrust regime, including the powers that the law gives to enforce antitrust laws. These provisions determine who can bring antitrust suits and what remedies can be imposed if a violation is found. Authority provisions also define

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<sup>7</sup> See Bradford and Chilton (2018) for a longer justification of the way the CLI is constructed. Section OA1 of the Online Appendix also provides additional information on the CLI index.

whether all industries and enterprise types fall within the scope of the law and whether the law can be applied extraterritorially.

By **Substance** of the law, we refer to rules in three substantive areas: ***Merger Control***, ***Abuse of Dominance***, and ***Anticompetitive Agreements***. ***Merger Control*** refers to provisions regulating the notification of potential mergers, the standards that mergers are reviewed by, and the defenses that firms can advance to argue that the anticompetitive effects of a merger may be offset by benefits the transaction generates. ***Abuse of Dominance*** refers to provisions that determine the various types of conduct that constitute anticompetitive abuses of dominant position. Finally, ***Anticompetitive Agreements*** refer to prohibitions on both horizontal and vertical agreements. This includes regulating common cartel practices like price fixing and market sharing, but also vertical restraints such as resale price maintenance. Each of these three sub-components are weighted equally.

To construct the CLI, for each country-year, countries receive points based on the presence of the variables listed in Table 1. We then equally weigh the Authority and Substance components of the index. After doing so, we normalize all scores to be between 0 and 1. Country-years without an antitrust law in place score as 0, and a country receives the same score for all years that it has the same regime in place. Figure 2 depicts the score for each country in 2010. As Figure 2 shows, there is substantial variation in countries' antitrust regimes as measured by the CLI. For example, Canada and Australia notably have more stringent regimes on the books than the United States. (Although, as we will discuss in Part 5.3, this may be due to the oversized role that the common law plays in regulated antitrust in America.)

Of course, one drawback of an index like the CLI is that it relies on subjective decisions about what variables to include and how to weight them. The decisions we made are based on discussions with leading academic experts and representatives of antitrust authorities and our own judgments. In Part 5.3, however, we test the robustness of our findings using several alternative approaches to measuring the stringency of antitrust regimes.

## 4. MEASURING TRADE OPENNESS

### 4.1. Empirical Approach

The next hurdle when testing whether trade openness is associated with greater antitrust stringency is measuring trade openness. The fundamental difficulty with doing so is that trade openness both causes economic growth and is a consequence of economic growth. Thus, trade may produce economic changes that lead a country to adopt a stringent antitrust regime, but the adoption of an antitrust regime may produce economic changes that result in more trade. In other words, the relationship between trade and antitrust is endogenous.

Fortunately, scholars have developed methods to produce exogenous estimates of countries' openness to trade. The first breakthrough that made this possible is the "gravity equation." The gravity equation was introduced by Tinbergen (1962), and has been part of mainstream macroeconomics since the mid 1990s (see generally Head and Mayer 2014). This equation has proven surprisingly stable across time, between pairs of countries, and using different methodologies (Chaney 2017). The basic insight of gravity models is that the trade between two countries can be predicted by the size of the two countries' economies and the distance between them. That is, bilateral trade is proportional to any two countries' GDP and inversely proportional to their distance. Or more formally:

$$Trade_{A,B} \propto \frac{(GDP_A)^\alpha (GDP_B)^\beta}{(Distance_{AB})^\zeta} \quad (1)$$

Although gravity equations make it possible to predict trade, the standard version of the equation relies on using GDP as an input. Producing an exogenous estimate of trade while using the gravity equation thus required a second breakthrough. This came from Frankel and Romer (1999). Frankel and Romer argue that the gravity equation demonstrates that geography is a powerful predictor of trade, and that geography is also a powerful predictor of a country's income. But although geography can influence a country's wealth, the country's wealth cannot influence its geography. The result is that geographic determinants of wealth can be introduced into the framework of a gravity equation to produce an estimate of expected trade into a country in a given year. Based on this insight, Frankel and Romer estimate countries' predicted trade based on their geography, and then use predicted trade as instrument for actual trade openness. Frankel and

Romer's original implementation has since been criticized for not accounting for all the ways geography can influence growth (Rodriguez and Rodrik 2001; Rodrik et al. 2004), but the basic insight underlying their model remains valid and the approach for predicting trade is still used.

## 4.2. Implementation

To implement this method, we specifically follow the approach developed by Ortega and Peri (2014). Ortega and Peri develop an exogenous instrument for trade to estimate the relationship between countries' openness to trade and migration and those countries' income.<sup>8</sup> They build on Frankel and Romer (1999) and subsequent developments to produce estimates of the bilateral trade between countries in the year 2000, using information on the countries' relevant geography and size. The advantage of these equations is that, after controlling for a country's size, variations in the values of Predicted Trade Shares are driven solely by "the relative position of a country in terms of its geography and cultural coordinates" (Ortega and Peri 2014, 234).

Specifically, Ortega and Peri (2014) use a dataset with observations for pairs of countries and data on the trade and relevant geographic variables for each pair. Using these data, they estimate the following equation to estimate the "Trade Shares" (TSH) that each country receives from every other country:

$$\begin{aligned}
\ln TSH_{cj} = & \gamma_1 \ln(Dist)_{cj} + \gamma_2 \ln(Pop)_c + \gamma_3 \ln(Pop)_j + \gamma_4 \ln(Area)_c + \gamma_5 \ln(Area)_j \\
& + \gamma_6 (Landlocked)_{cj} + \gamma_7 (Border)_{cj} + \gamma_8 \ln(ComLang)_{cj} \\
& + \gamma_9 \ln(ComOffLang)_{cj} + \gamma_{10} \ln(SharedTimeZone)_{cj} + \gamma_{11} \ln(Colony)_{cj} \\
& + \gamma_{12} \ln(OriginCountryHegemony)_{cj} + \gamma_{13} \ln(Dist)_{cj} (Border)_{cj} \\
& + \gamma_{14} \ln(Pop)_c (Border)_{cj} + \gamma_{15} \ln(Pop)_j (Border)_{cj} \\
& + \gamma_{16} \ln(Area)_c (Border)_{cj} + \gamma_{17} \ln(Area)_j (Border)_{cj} \\
& + \gamma_{18} \ln(Landlocked)_c (Border)_{cj}
\end{aligned} \tag{2}$$

The dependent variable *TSH* is the value of the trade (Exports + Imports) between country *c* and county *j* divided by the GDP of country *c*. The equation includes twelve explanatory variables: distance between the countries, population and area of both countries, the number of countries

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<sup>8</sup> We set aside the part of Ortega and Peri (2014) that incorporates migration and focus solely on trade.

that are landlocked, and dummy variables for sharing a border, common language, common official language, shared time zone, colonial history, or prior hegemonic relationship. The equation includes interactions for the geography variables and shared borders.

After estimating the gravity equation, Ortega and Peri calculate the predicted values for each country pair and aggregate them for each country  $c$ . We replicate the specifications used by Ortega and Peri in equation 2. Also following Ortega and Peri, to aggregate the predicted trade shares for each country  $c$ , we define  $Z_{cj}$  as the vector of explanatory variables and  $\gamma$  to be the vector of coefficients in Equation (2). We then aggregate the predicted trade share for country  $c$  is then using the following formula:

$$\widehat{TSH}_c = \sum_{j \neq c} \exp(\hat{\gamma} Z_{cj}) \quad (3)$$

However, Ortega and Peri generate Predicted Trade Shares only for the year 2000. But because we have collected extensive time series data on antitrust laws, we set out to develop a prediction of trade between countries for as long a period as possible. This requires two key changes with the Ortega and Peri approach. First, we use a different source of trade data in order to cover more years. Specifically, our bilateral trade data is based on the Correlates of War Bilateral Trade Dataset and the IMF's Direction of Trade Statistics (DOTs) dataset in order to obtain data on bilateral trade from 1950 to 2010.<sup>9</sup>

Second, we estimate our gravity equation separately for each year from 1950 to 2010. The reason for doing so is that, although the variables used to instrument for trade are primarily time-invariant, the geographic costs of trade have changed over time (Feyrer 2009a, 2009b). Following Badinger and Nidl (2014), we estimate the gravity equation separately for each year allows the coefficients for the instrumental variables to take different values for each year. It is important to note that, although many papers that have used this strategy to estimate trade openness relied exclusively on a single year of cross-sectional data (e.g. Frankel and Romer 1999), others have either pooled observations across years to test the overall relationships (e.g. Cavallo and Frankel

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<sup>9</sup> Despite using both the Correlates of War and IMF DOTs dataset, there are dyad-year observations where the data is missing for various reasons. We also exclude data from Liberia and Tuvalu from our analysis because of extreme fluctuations in their trade data.

2008; Calderón et al. 2007; Badinger and Nidl 2014; Calderón and Kubota 2018) or estimated their regressions separately for multiple years (e.g. Irwin and Tervio 2002). Because the relationship between trade and antitrust appears to have changed over time, we adopt the latter two strategies (which are reported in Parts 5 and 6 respectively).

Despite these two differences, the correlation between our estimates and Ortega and Peri's estimates for the year 2000 is 0.79; and when we exclude observations for countries where missing data led Ortega and Peri to estimate 0 trade shares for a country, the correlation between our estimates is 0.89.<sup>10</sup> To provide a sense of the data, Figure 3 plots our Predicted Trade Shares for 2010 by quintile. Table 2 provides descriptive statistics for the data we use in the gravity equations and the analysis in Parts 5-7.

## 5. PRIMARY ANALYSIS

### 5.1. Estimation Strategy

To estimate whether greater trade openness is associated with increased antitrust stringency, we use a two-stage least square (2SLS) regression. In the first stage, we instrument for Trade Shares (TSH) for country  $c$  in year  $i$  with the Predicted Trade Shares (PTSH) for country  $c$  in year  $i$ . To ensure that our instrumental variable isolates the amount of predicted trade attributable to geography, following Ortega and Peri (2014) our first stage regression also controls for each country's Population and Area. We lag all time-variant variables one year. Our first stage regression takes the following form:

$$TSH_{c,i-1} = \beta_0 + \beta_T PTSH_{c,i-1} + \beta_P \ln Pop_{c,i-1} + \beta_A \ln Area_c + \varepsilon \quad (4)$$

In the second stage, we then estimate the impact of TSH on CLI score, while also controlling for a country's size. The second stage equation is thus:

$$CLI_{c,i} = \beta_0 + \beta_T TSH_{c,i-1} + \beta_P \ln Pop_{c,i-1} + \beta_A \ln Area_c + \varepsilon \quad (5)$$

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<sup>10</sup> Section OA2 of the Online Appendix compares our PTSH estimates to Ortega and Peri's estimates.

## 5.2. Primary Results

Table 3 reports our baseline results. We begin by simply presenting a reduced form pooled-OLS regression that estimates the impact of Predicted Trade Shares on CLI. Column 1 controls for the size of the country (that is, the Population and Area), column 2 introduces region fixed-effects to account for regional differences in trade and antitrust policies, and column 3 introduces a time trend to account for the possibility that there is a secular trend in antitrust stringency.<sup>11</sup> In column 4–6, we use the 2SLS regression strategy discussed in the last section. In these regressions, in the first stage, PTSH is an instrument for TSH.<sup>12</sup>

There are several things worth noting about the regression specifications in Table 3. First, the reason we do not include a wider range of control variables is that trade has previously been shown to impact everything from income (Frankel and Romer 1999) to levels of democracy (Lopez-Cordova and Meissner 2008), and thus many standard control variables would be inappropriate since they are also outcomes of trade exposure. Second, we use region fixed-effects instead of country fixed-effects in part because there is little variance in most countries' CLI scores from year to year, and thus we believe that country fixed-effects are inappropriate. That said, the results reported in columns 3 and 6 are robust to the addition of year and country fixed-effects.

Table 3 suggests that, for countries of the same size, countries where trade makes up a larger share of the economy are also likely to have more stringent antitrust laws. The results attenuate with the addition of the time trend and region fixed-effects, but remain positive and statistically significant. To illustrate these results graphically, Figure 4 presents a binned-scatterplot that shows the relationship of Trade Openness while using the regression specification from column 6 and countries' CLI scores.<sup>13</sup> Figure 4 reveals a positive relationship between predicted trade shares and CLI scores.

The size of the effect is also economically significant. To measure this, we calculated the marginal effects associated with a change in a country's level of trade shares. While holding the

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<sup>11</sup> The time trend we include is not country-specific time trends. Additionally, the results in columns 3 and 6 are robust to using year fixed effects instead of a linear time trend.

<sup>12</sup> We report Kleibergen-Paap F-statistics for weak identification, which all lie above the most demanding critical values reported by Stock and Yogo (2005). We can thus reject the null hypothesis that PTSH is a weak instrument for Trade Openness.

<sup>13</sup> Figure 4 specifically first regresses TSH on PTS (while controlling for population, area, region fixed effects, and time trend), and then plots the predicted values from this regression against the CLI while controlling for the same variables.

other variables at their means, for column 6 in Table 3, moving from the 10% percentile value of TSH (0.16) to the 90% percentile (0.95) is associated with a 0.29 change in the CLI. As a reminder, the CLI is normalized to range from 0 to 1. To put this in perspective, the country with the median CLI score in 2010 is 0.56 (approximately the value for the Ivory Coast). An increase of 0.29 would result in a score of roughly 0.85, which is roughly 80 countries higher on the CLI scale (approximately the value for Estonia).

### 5.3. Robustness Checks

These results are robust to using alternative measures of antitrust policy and trade openness.<sup>14</sup>

***Measuring Antitrust.*** We conduct four tests to ensure that our results are not driven by the way we construct the CLI. First, we create a sub-index for each of the four categories of variables reported in Table 1, and then re-estimate our primary specifications using each of these four sub-indexes as the dependent variable. Second, instead of weighting the variables in Table 1, we simply count the number of provisions each country has in their law in a given year (e.g. if a country scored a “1” for each of the 36 variables, its score would be 36). Third, we use factor analysis of the variables in Table 1 to produce a new weighting scheme driven entirely by the characteristics of the data themselves. Fourth, we create a binary variable for the presence of an antitrust regime by coding all countries with a CLI score of greater than 0 as one. Across all these additional specifications, the results are consistently positive and statistically significant. Additionally, as we will explain in Part 7, our results are also robust to using measures of antitrust enforcement resources and activities instead of the CLI.

***Accounting for the Role of the Judiciary.*** In some countries, judge-made law is a major source of antitrust regulation. In the United States, for example, courts have added numerous rules to the relatively sparse regulation of anticompetitive behavior found in statutes. If there are many countries like the United States, our coding of laws on the books may systematically bias our measure antitrust stringency. To investigate this, we surveyed antitrust experts from around the world about the role that courts play in the development of antitrust law in their country. In the survey, we asked: “In practice, do the courts generate new law by changing the scope of the

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<sup>14</sup> Section 0A3 of the Online Appendix reports the results for this section.

antitrust statutes in [insert country]? Please answer on a scale from 1 (no role) to 5 (extensive role).” We then recruited experts to take the survey by circulating it to contacts we made while collecting antitrust data, attendees at international antitrust conferences, and to members of the Academic Society of Competition Law. In total, we received 166 responses from 86 countries with antitrust regimes.<sup>15</sup> The results of the expert survey suggest that courts play a large or extensive role in the development of antitrust law in just twelve countries (most of which are known for their common law legal traditions).<sup>16</sup> We then re-estimated our baseline specifications while controlling for countries where courts play a large role in the development of antitrust law.<sup>17</sup> When doing so, the coefficients of interest remain substantively similar to our primary results.

***Accounting for Exemptions and Narrow Applications.*** Countries often explicitly stipulate that antitrust laws do not apply uniformly. Instead, the law or a given provision may not apply to a particular industry or enterprise. To account for this, we created a separate dataset of the exemptions in countries’ antitrust laws by re-coding the laws in our dataset to record whether each provision contained any of the following exemptions: (1) General Industry Exemptions (e.g., exempting the telecommunications industry from tying prohibition); (2) Complete Enterprise Type Exemptions (e.g., exempting all state owned enterprises from tying prohibition); (3) Partial Enterprise Type Exemptions (e.g., exempting state owned enterprises from tying prohibition to the extent that they engage in provision of public services); or (4) Narrow Applications (e.g., specifying that the telecommunications industry is the only industry covered by the tying provision). Using these additional, more nuanced data, we recoded the 36 variables comprising the CLI based on the presence of these exemptions. We specifically recoded countries coded as 1 for a given provision in a given year to 0.8 if there was a General Industry Exemption, to 0.8 if there was a Complete Enterprise Type Exemption, to 0.9 if there was a Partial Enterprise Type Exemption, and to 0.1 if there was a Narrow Industry Coverage.<sup>18</sup> The results remain positive and statistically significant while using the Adjusted CLI as the dependent variable.

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<sup>15</sup> For countries with multiple respondents, we averaged the responses.

<sup>16</sup> The twelve countries that received an average score of 4 or higher are: Argentina, Australia, Austria, Germany, Hong Kong, Ireland, Israel, New Zealand, Nicaragua, Spain, United Kingdom, and United States.

<sup>17</sup> When doing so, we control for countries with antitrust regimes where we did not receive a response to our survey.

<sup>18</sup> As previously noted, provisions with Narrow Industry Coverage are recoded from 1 to 0 in our primary specifications to reflect the fact that these laws are not of general applicability.

***Accounting for European Union Law.*** Our research suggests that there are seven regional organizations that in some way regulate their members' antitrust regimes (we discuss these organizations more in Part 6). For five of these organizations, the regional law and members' national laws operate in different spheres. For instance, the Common Market for Eastern and Southern Africa (COMESA) rules only address anticompetitive cross-border conduct and leave individual member states to regulate their domestic markets. But this is not true of the European Union (EU) and the European Economic Area (EEA). Instead, these organizations have antitrust rules that split authority between the member states and the regional organization (e.g., some issues are regulated by national law, some by EU/EEA law, and some by both). To account for this, we coded the EU/EEA competition laws. After doing so, we recoded the CLI scores of EU/EEA members to account for these regional laws. For instance, when constructing the CLI for Germany, we still apply the German national coding for variables where the EU treaty stipulates that member states' laws take precedence. But for variables where the EU law takes precedence, the recoding uses EU law instead of any German coding for the variable. And where EU law allows for enforcement under either German law or EU law, we count any given provision as existing if it can be derived from either German law or EU law. When accounting for antitrust rules in this way, the results remain positive and statistically significant.

***Measuring Trade Openness.*** We also test the robustness of our primary results using two alternative measures of trade openness that rely on countries' policies instead of actual trade flows. First, we use the Sachs-Warner (1995) measure of openness. This is a binary indicator variable for openness, which treats economies as closed if any of the designated conditions hold (including average tariff rates exceeding 40%, non-tariff barriers covering over 40% of imports, and so on).<sup>19</sup> Second, we use data from the KOF Globalization Index (Dreher 2006). We specifically use the KOF Index for economic globalization, which captures policies on trade and investment flows and on trade and capital account restrictions from 1970-2013.<sup>20</sup> When using

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<sup>19</sup> A downside of this measure is that it is only available until 1992—which is particularly problematic for our application because antitrust laws became dramatically more common in the 1990s.

<sup>20</sup> We elected used the KOF economic index as a measure of trade openness because it incorporates coding on policy for an extended period. But since the measure incorporates data on trade and investment flows as well as policies, this measure may suffer from the same endogeneity problems from using a standard measure based on trade to GDP ratios.

these alternative measures of trade openness, we find positive and statistically significant relationships with both measures and CLI scores.

## 6. CROSS-SECTIONAL ANALYSIS

Our analysis so far has used panel data with country-year observations. There are, however, several limitations to this approach. One concern is that there is relatively little year to year variance in countries' antitrust laws. While some countries have passed antitrust laws every few years, other countries have passed one law and never amended it, and others have never passed an antitrust law at all. Another concern is that, although we estimate the gravity model in Equation 2 separately for each year (which allows the predicted trade to change in response to shifts in actual trade flows and the coefficients to take on different values as the geographic costs of trade evolve), the values for the variables included in the regression do not change from year to year. Finally, the relationship between trade openness and antitrust laws may have evolved, and pooling all observations may thus mask considerable variation over time.

We thus next explore the relationship between trade openness and antitrust law using cross-sectional regressions. Figure 5 reports results while sub-setting the data for each of the fifty years from 1961 to 2010.<sup>21</sup> Figure 5 specifically plots the point estimate and 90% confidence interval for the variable TSH using the two-stage least squared regression specification from column 5 of Table 3. Figure 5 reveals that the point estimates were positive for all 31 years from 1961 until 1991, and that the estimates were statistically significant at the 0.1 level or higher in 23 of those years. But the pattern changes after 1991. After that year, the point estimates are either approximately zero, or in a handful of years, slightly negative. In other words, the positive relationship between trade openness and antitrust stringency appears to disappear in the 1990s.

There are several possible explanations for this pattern. For one, countries' exposure to trade may have changed as a result of shocks to the global economy during the 1990s, including: the creation of the WTO, the fall of the Soviet Union and the opening of the eastern bloc, the rise of China's exporting power, and changes to transportation costs and communications technology. This could have changed the relationship between trade openness and antitrust law for even

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<sup>21</sup> The coefficients are also positive in each year 1950 to 1960. We do not report these years, however, because there are extremely large confidence intervals due to the limited number of countries with antitrust laws during this period.

countries with established antitrust agencies. Additionally, the number of countries with antitrust regimes exploded in the 1990s, and it is possible that the countries that adopted regimes during this period may have done so for different reasons than countries that regulated antitrust earlier.

To investigate these explanations, Figure 6 reports the results of regressions estimated on two sub-samples of our data: (1) “Early Adopters” (that is, excluding countries that adopted antitrust law after 1990 from the sample) and (2) “Late Adopters” (that is, excluding countries that adopted antitrust law before 1990 from the sample).<sup>22</sup> In Figure 6, the top panel graphs the results of the same cross-sectional regressions reported in Figure 5, and the bottom panel presents binned-scatterplots created when estimating regression specification from column 6 of Table 3 while pooling all years of data from 1990 to 2010.<sup>23</sup>

The results in column A of Figure 6 suggest that there is still a positive relationship between trade openness and antitrust policies between 1990 and 2010 when excluding countries that adopted antitrust law after 1990. Although the results reported in Panel A are not statistically significant for this sample, the coefficients are positive and the size of the estimates is similar to the estimates from Figure 5 for the years before 1990—they are simply less precisely estimated. And as the bottom panel shows, the correlation is positive overall for this sample. Column B of Figure 6 instead excludes countries that had established antitrust agencies as of 1990. The results in the top and bottom panels suggest that there is not a positive relationship between trade openness and antitrust stringency when excluding the early adopters of antitrust law. Taken together, the results in Figure 6 suggest that the positive correlation between trade openness and antitrust stringency does not disappear after 1990 because of changes in the relationship for jurisdictions with established regimes (i.e. Early Adopters); it disappears because there is not a strong correlation between trade openness and antitrust stringency in jurisdictions that adopted their regimes during this period (i.e. Late Adopters).

The next logical question is why Late Adopters of antitrust law passed statutes with levels of stringency that did not positively correlate with their trade exposure. Perhaps the most obvious explanation is that established jurisdictions like the European Union and the United States began

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<sup>22</sup> Both samples still include countries that did not adopt antitrust law before 2010.

<sup>23</sup> Section OA4 of the Online Appendix recreates Table 3 for each of these samples. The binnedscatter-plots reported in Panel B are based on the specification in column 6 of those results.

to urge developed and developing countries alike to adopt antitrust laws (Fox 1997). The EU, for instance, systematically requires countries to adopt an antitrust law as a condition to signing a trade agreement with the EU or of joining the EU (Hoekman 2002). Countries thus may have adopted an antitrust law after, or as a pre-condition to, signing a Preferential Trade Agreement (PTA) or joining a Regional Organization (RO) (Kronthaler and Stephan 2007), and not for reasons that stem from their levels of trade openness.

We have also collected new data that can be used to preliminarily explore whether the presence of antitrust requirements in PTAs and ROs can help to explain the changing relationship between trade openness and antitrust stringency that began in the 1990s. First, we built a new dataset of antitrust provisions in PTAs. We did so by relying on the Design of Trade Agreements (DESTA) database (Dür et al. 2014).<sup>24</sup> The DESTA team provided us with copies of 596 of the 719 PTAs that they have identified. We developed a survey instrument to code these PTAs, extending a sample of PTAs coded earlier (Bradford and Büthe 2015). Relevantly, we coded whether the PTA contained an obligation for signatories to have or maintain antitrust laws. Through this process, we identified 173 PTAs that contained such an antitrust requirement. Panel A of Figure 7 maps the countries that were signatories of a PTA that contained an antitrust requirement by 2010. As Panel A shows, there was an explosion of PTAs that require the parties to adopt or maintain an antitrust law during the 1990s. In fact, of the 173 PTA with such an antitrust requirement, 161 are from 1991 or later. Moreover, almost every country in the world has signed to a PTA with an antitrust requirement. Notably, although only 126 countries have an antitrust law in place by 2010, 179 countries have signed a PTA that requires them to do so.<sup>25</sup>

Second, we researched ROs that regulate antitrust in some way. The degree of integration facilitated by ROs varies—ranging from the creation of custom unions that establish uniform external tariffs to the creation of common markets that allow for the free flow of capital and labor (Ravenhill 2017). We identified seven ROs that regulated members’ antitrust policies by 2010: the Andean Community, the Caribbean Community (CARICOM), COMESA, the EEA, the EU, the

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<sup>24</sup> More information is available at <https://www.designoftradeagreements.org/>. We thank DESTA for sharing the texts of the PTAs.

<sup>25</sup> This discrepancy may be because the requirements of PTAs are not enforced or because some PTAs have long implementation periods. However, we leave to future research the question of why so many countries do not have antitrust laws despite having signed PTAs requiring them.

Economic Community of West Africa States (ECOWAS), and the West African Economic and Monetary Union (WAEMU). Panel B of Figure 7 maps the countries that are members of these ROs. In total, 80 countries are members of these organizations, 50 of which had domestic antitrust laws in place by 2010. Of those countries, 20 had antitrust regulations prior to 1990, but 30 adopted one between 1990 and 2010.

Table 4 reports regressions testing whether PTAs and ROs may explain the changing relationship between trade openness and antitrust stringency that began in the 1990s for Late Adopters. Panel A includes observations for country-years between 1990 and 2010 where the country has signed a PTA with an antitrust requirement, and Panel B includes observations for the same time period where the country is a member of one of the seven RO listed above.<sup>26</sup> The results for both samples suggest that there is no clear relationship between trade openness and antitrust stringency for these countries. We caution, however, that these results should not be interpreted causally and further research is needed to understand the role that PTAs and ROs have in the adoption of antitrust policies. In fact, although some prior research explores the antitrust provisions of PTAs and ROs (Bradford and Büthe 2015; Sokol 2008), there is limited research exploring how these provisions have translated into actual domestic policies (Hoeffken 2016). Our results suggest that this may be an important avenue for inquiry.

## 7. TRADE OPENNESS & ANTITRUST ENFORCEMENT

The results in Part 6 suggest the stringency of the antitrust laws that many countries adopted after the 1990s did not positively correlated with their trade exposure. Of course, statutes may not accurately capture the stringency of countries' antitrust regimes. Some countries with sparse antitrust laws may aggressively enforce them, while some countries with stringent laws may never pursue a single case. For this reason, although the results in Part 6 suggest that the positive relationship between trade openness and antitrust *laws* breaks disappears after 1990, it does not mean that there was not a positive relationship between trade openness and antitrust *enforcement*.

However, we also built a dataset on antitrust enforcement resources and activities that allows us to answer this question.<sup>27</sup> To do so, because some countries with antitrust laws have not

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<sup>26</sup> Both panels exclude countries that adopted antitrust laws prior to 1990—e.g., Early Adopters—because, instead of being influence by the antitrust requirements of PTAs and ROs, these countries were likely pushing for their inclusion.

<sup>27</sup> We fully explain the data collection process in Bradford et al. (2018).

established agencies to enforce those laws, we first identified jurisdictions with antitrust agencies. For the agencies we identified, we first reviewed publicly available information on their enforcement resources and activities from agency websites and annual reports, resources like the Global Competition Review or “Getting the Deal Through,” and research by organizations like the OECD or UNCTAD. To supplement the publicly available information, we produced questionnaires individually tailored for each agency and contacted the agencies directly to ask for missing information or clarification when publicly available information was conflicting. We typically contacted the agency following an introduction by a personal contact within the agency, international antitrust bar, international legal academia, or an organization such as the UNCTAD or the International Competition Network. In response to these inquiries, 103 individual agencies cooperated with us. In total, we were able to obtain some data from 112 agencies representing 100 jurisdictions (our research suggests that 115 jurisdictions had an agency in 2010).<sup>28</sup>

From this data, we use four variables to measure antitrust resources and enforcements: “Budgets” is the log of the amount of money allocated for an antitrust specific agency divided by the log of countries’ GDP;<sup>29</sup> “Staffsize” is log of the number of employees that work at the antitrust agency;<sup>30</sup> “Investigations” is the log of the number of agency investigations into abuse of dominance and cartels per year; and “Remedies” the log of the number of abuse of dominance and cartel investigations that resulted in remedies.<sup>31</sup> To illustrate the data graphically, Figure 8 plots the values for these four variables for each country as of 2010. Although there is variance between variables, all four variables are positively correlate with countries CLI scores.<sup>32</sup>

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<sup>28</sup> We tried to collect the same data from each jurisdiction, but not all agencies provided all variables or data for all relevant years. In addition, some agencies provided additional or slightly different information than what we requested. Our dataset thus does not have complete coverage for all country-years for which we obtained some data. Moreover, the data are coverage is sparser earlier in the 1990s than in the 2000s. For instance, we are missing budget data for 462 country year observations from 1990 to 1999 and for 334 observations from 2000 to 2010.

<sup>29</sup> When collecting data on budgets, we specifically asked the agencies vested with multiple responsibilities (such as consumer protection in addition to antitrust law) to separate out and report only the budget dedicated to antitrust enforcement. Also, we divide the natural log of the budget by the natural log of the countries budget to account for differences in market size

<sup>30</sup> As with budgets, when collecting data on staff numbers, we specifically asked the agencies vested with multiple responsibilities (such as consumer protection in addition to antitrust law) to separate out and report only the staff dedicated to antitrust enforcement.

<sup>31</sup> We exclude merger data when calculating the number of investigations and remedies because firms’ merger activity may be completely exogenous to the agency. However, the results are robust to including merger data into these variables.

<sup>32</sup> In 2010, the correlations with CLI for these variables are: Budget = 0.47; Staffsize = 0.49; Investigation = 0.38; and Remedies = 0.35.

Table 5 reports regressions using these four variables from 1990 to 2010 as the dependent variable. The regressions largely recreate the specifications from Table 3, but given possible fluctuations in enforcement resources and activities from year-to-year, columns 3 and 6 include country fixed-effects. In Table 5, all of the coefficients for the trade measures are positive and 17 out of 25 of the relationships are statistically significant at the 0.1 level or higher.<sup>33</sup> The results are especially interesting considering the results in Part 6 documenting that the positive relationship between trade openness and the stringency of antitrust laws waned after 1990s. However, Table 5 suggest that actual enforcement resources and activities remained positively correlated with trade exposure during 1990 to 2010. For those that believe that enforcement is a better measure of stringency than law on the books, this may be the strongest evidence yet that increased trade openness is associated with countries adopting and maintaining more stringent antitrust regimes.

To further explore why we still find a positive correlation between trade openness and antitrust enforcement from 1990 to 2010, we recreated our regressions for the two sub-samples from Figure 6. That is, when excluding Late Adopters and when excluding Early Adopters. Figure 9 presents binned-scatterplots using the regression specifications from column 6 of Table 5 for these two sub-samples. The results in Figure 9 suggest the correlations between predicted trade shares and the measures of antitrust enforcement resources and activities are weakly positive. However, although the coefficients of interest are consistently positive when running the full set of regression specifications from Table 4, they are not consistently statistically significant. The results are inconclusive, but are noticeably different than Figure 6. Thus, taken together, the results in Part 6 suggest that Late Adopters may have adopted antitrust laws that did not correspond to their trade openness, but the results in Part 7 suggest that countries with greater exposure to trade may have been more likely to dedicate resources and pursue cases to enforce those laws.

## 8. CONCLUSION

We used new comparative antitrust data to test whether countries with greater trade openness also have more stringent antitrust regimes. When instrumenting for trade openness

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<sup>33</sup> The fact that the results are not consistently statistically significant may be due to measurement error as a result of missing values in the dependent variable. In all regressions, we exclude observations where we were unable to collect data for the dependent variable. However, the results are substantially the same when we include observations for which we were unable to collect the dependent variable while coding their values as 0 and including a dummy variable for observations where the data is missing.

using predicted trade flows, we found a positive and statistically significant relationship between trade openness and countries' antitrust laws. Our results were largely consistent when using alternative methods for measuring antitrust and trade, and when introducing additional datasets that more comprehensively measure countries' antitrust regimes.

We leave several important questions for future research. First, our results do not settle the theoretical debate over whether countries that have trade openness actually benefit from having more stringent antitrust regimes. High levels of trade openness and strict antitrust regimes may complement each other and create more competitive markets, but stringent antitrust regimes may be redundant once a country is exposed to trade. Future research should test the relationship between trade openness and antitrust stringency on market outcomes.

Second, our results do not explore why countries with greater trade openness are likely to have also adopted stricter antitrust regimes. Countries may be pursuing both strategies together in order to promote more competitive markets. However, with increasing trade liberalization, domestic firms may urge the government to employ antitrust policy in ways that allow them to obtain protection from foreign rivals (Guzman 1998; Baumol and Ordover 1985). For instance, Dixit (1984) notes that trade liberalization is commonly thought to invite domestic mergers and limit foreign entry in an effort to help domestic industry withstand competition. Similarly, Bond (2004) argues that large economies that can affect world prices may use trade and antitrust policy strategically to manipulate the terms of trade in their favor.

In addition to these theoretical arguments, there are a few empirical studies that suggest that countries may use antitrust policies to protect domestic firms from foreign competition. For instance, Shughart et al. (1995) study US antitrust enforcement budgets prior to 1981 and find a positive correlation between the level of imports and antitrust enforcement budgets for the DOJ and FTC, which they interpret as evidence of antitrust being leveraged to counter foreign competition. Additionally, Ozden (2005) examines 209 mergers in the EU from 1995 to 1999 involving at least one US firm and finds that more extensive merger review is likely if the target is European or if all U.S. firms in the industry have high market share. This, Ozden argues, signifies a political and economic tendency to protect European firms. Finally, Cremieux and Snyder (2016) studied cartel enforcement by the EU and the US, and found that the United States levies significantly higher fines on foreign firms than domestic firms.

However, others have questioned any systematic use of antitrust law for protectionist purpose, noting that antitrust is a blunt instrument to manipulate trade flows (Bradford 2007). For instance, Bradford, Jackson, and Zytnick (2018) study on EU merger control in 1990-2014 contradicts the finding of Ozden (2005). Using data covering over 5,000 mergers, they find no evidence that the European Commission would intervene more frequently or more extensively in mergers involving foreign acquirers. Thus, the debate on whether the surge in antitrust regimes in the presence of open trade is a sign of countries' steadfast commitment to market competition or, alternatively, economic protectionism moving from traditional trade instruments to antitrust instruments remains unresolved.

These results provide new evidence about the relationship between international trade and antitrust policy. Yet research on the relationship between trade and antitrust should not end here. We hope that our project will spark new empirical investigations about whether protectionism can migrate from trade policy to antitrust policy as a result of trade opening, and on how these two policy tools can best be used to promote competitive markets and economic growth.

## REFERENCES

- Badnger, Harold and Elisabeth Nidl. 2014. "Globalization and Corruption, Revisited." *The World Economy* 37(1): 1424-1440.
- Bartók, Csilla, and Sébastien Miroudot. 2008. "The Interactions Amongst Trade, Investment and Competition Policies." *OECD Trade Policy Papers* no. 60. Paris: OECD Publishing.
- Baumol, William J., and Janusz A. Ordover. 1985. "Use of Antitrust to Subvert Competition." *Journal of Law and Economics* 28:247-265.
- Baumol, William J., John C. Panzar, and Robert D. Willig. 1982. *Contestable Markets and the Theory of Industry Structure*. New York: Harcourt Brace Jovanovich.
- Bhagwati, Jagdish. 1968. "The Theory and Practice of Commercial Policy: Departures from Unified Exchange Rates." *Special Papers in International Economics* no. 8. Princeton: International Finance Section, Princeton University.
- Blackhurst, Richard. 1991. "Trade Policy Is Competition Policy." 253-258 in *Competition and Economic Development*. Paris: OECD.
- Bond, Eric. 2004. "Trade Policy and Competition Policy: Conflict vs. Mutual Support." 241-246 in *The International Handbook of Competition*. Cheltenham, 2nd ed., edited by Manfred Neumann and Jürgen Weigand. Cheltenham: Edward Elgar.
- Bradford, Anu. 2007. "International Antitrust Negotiations and the False Hope of the WTO." *Harvard International Law Journal* 48:383-439.
- Bradford, Anu, and Tim Büthe. 2012. "Law and Politics of Antitrust in Open Economies." Unpublished manuscript. Columbia Law School, December.
- . 2015. "Competition Policy and Free Trade: Antitrust Provisions in PTAs." In *Trade Cooperation: The Purpose, Design and Effects of Preferential Trade Agreements*, edited by Andreas Dür and Manfred Elsig. Cambridge: Cambridge University Press.
- Bradford, Anu, and Adam Chilton. 2018. "Competition Law Around the World from 1889 to 2010: The Competition Law Index." *Journal of Competition Law and Economics* (forthcoming).
- Bradford, Anu, Adam Chilton, Christopher Megaw, and Nathaniel Sokol. 2018. "Competition Gone Global: The Comparative Competition Law and Enforcement Datasets." *Journal of Empirical Legal Studies* (forthcoming).
- Bradford, Anu, Robert J. Jackson, and Jonathon Zytnick. 2018. "Is EU Merger Control Used for Protectionism? An Empirical Analysis." *Journal of Empirical Legal Studies* 15(1): 165-191.

- Buccirosi, Paolo, Lorenzo Ciari, Tomaso Duso, Giancarlo Spagnolo, and Cristiana Vitale. 2011. "Measuring the Deterrence Properties of Competition Policy: The Competition Policy Indexes." *Journal of Competition Law and Economics* 7:165-204.
- Calderón, César, Alberto Chong, and Ernesto Stein. 2007. "Trade Intensity and Business Cycle Synchronization: Are Developing Countries Any Different?" *Journal of International Economics* 71:2-21.
- Calderón, César, and Megumi Kubota. 2018. "Does Higher Openness Cause More Exchange Rate Volatility?" *Journal of International Economics* 110: 176-204.
- Cavallo, E.A., Frankel, J.A., 2008. "Does Openness to Trade Make Countries More Vulnerable to Sudden Stops, or Less? Using Gravity to Establish Causality." *Journal of International Money and Finance* 27(8): 1430-1452.
- Chaney, Thomas. 2017. "The Gravity Equation in International Trade: An Explanation." *Journal of Political Economy* 126(1): 150-177.
- Clougherty, Joseph A. 2010. "Competition Policy Trends and Economic Growth: Cross-National Empirical Evidence." *International Journal of the Economics of Business* 17:111-127.
- Connor, John M. 2007. *Global Price Fixing*. 2nd ed. New York: Springer.
- Cremieux, Pierre, and Edward A. Synder. 2016. "Enforcement of Anticollusion Laws Against Domestic and Foreign Firms." *Journal of Law and Economics* 59(4):775-803.
- Dixit, Avinash K. 1984. "International Trade Policy for Oligopolistic Industries." *Economic Journal* 94(supplement):1-16.
- Dreher, Axel. 2006. "Does Globalization Affect Growth? Evidence from a New Index of Globalization." *Applied Economics* 38:1091-1110.
- Dür, Andreas, Leonardo Baccini, and Manfred Elsig. 2014. "The Design of International Trade Agreements: Introducing a New Database." *Review of International Organizations* 9(3): 353-375.
- Feinberg, Robert M. 1990. "Antitrust Policy and International Trade Liberalization." *World Competition* 14:13-19.
- Frankel, Jeffery A., and David Romer. 1999. "Does Trade Cause Growth?" *American Economic Review* 89:379-399.

- Feyrer, James. 2009a. "Trade and Income: Exploiting Time Series in Geography." Working Paper no. 14910. National Bureau of Economic Research, Cambridge, Mass.
- . 2009b. "Distance, Trade and Income: The 1967 Closing of the Suez Canal as a Natural Experiment." Working Paper no. 15557. National Bureau of Economic Research, Cambridge, Mass.
- Fox, Eleanor M. 1997. "The Central European Nations and the EU Waiting Room-Why Must the Central European Nations Adopt the Competition Law of the European Union?" *Brooklyn Journal of International Law* 23(2): 351-363.
- Gutmann, Jerg, and Stefan Voigt. 2014. "Lending a Hand to the Invisible Hand? Assessing the Effects of Newly Enacted Competition Laws." Unpublished manuscript. University of Hamburg, Institute of Law and Economics, February, <https://papers.ssrn.com/sol3/papers.cfm?abstract-id=2392780>.
- Guzman, Andrew T. 1998. "Is International Antitrust Possible?" *New York University Law Review* 73:1501-1548.
- Head, Keith, and Thierry Mayer. 2014. "Gravity Equations: Workhorse, Toolkit, and Cookbook." In *Handbook of International Economics*, vol. 4, 131-195, edited by Gita Gopinath, Elhanan Helpman, and Kenneth S. Rogoff. Amsterdam: Elsevier.
- Helpman, Elhanan, and Paul Krugman. 1989. *Trade Policy and Market Structure*. Cambridge, Mass.: MIT Press.
- Hoekman, Bernard. 2002. "Competition Policy and Preferential Trade Agreements." Working paper. The International Bank for Reconstruction and Development, Washington, D.C.
- Hoeffken, Jana Ulrike 2016. *Competition Provisions in EU Regional Trade Agreements: Consequences for Domestic Reform in Developing Countries*. The London School of Economics and Political Science. Dissertation.
- Horn, Henrik, and James A. Levinsohn. 2001. "Merger Policies and Trade Liberalisation." *The Economic Journal* 111:244-276.
- Hylton, Keith N., and Fei Deng. 2007. "Antitrust Around the World: An Empirical Analysis of the Scope of Competition Methods and Their Effects." *Antitrust Law Journal* 74:271-341.
- Irwin, Douglas A., and Marko Tervio. 2002. "Does Trade Raise Income? Evidence from the Twentieth Century." *Journal of International Economics* 58:1-18.

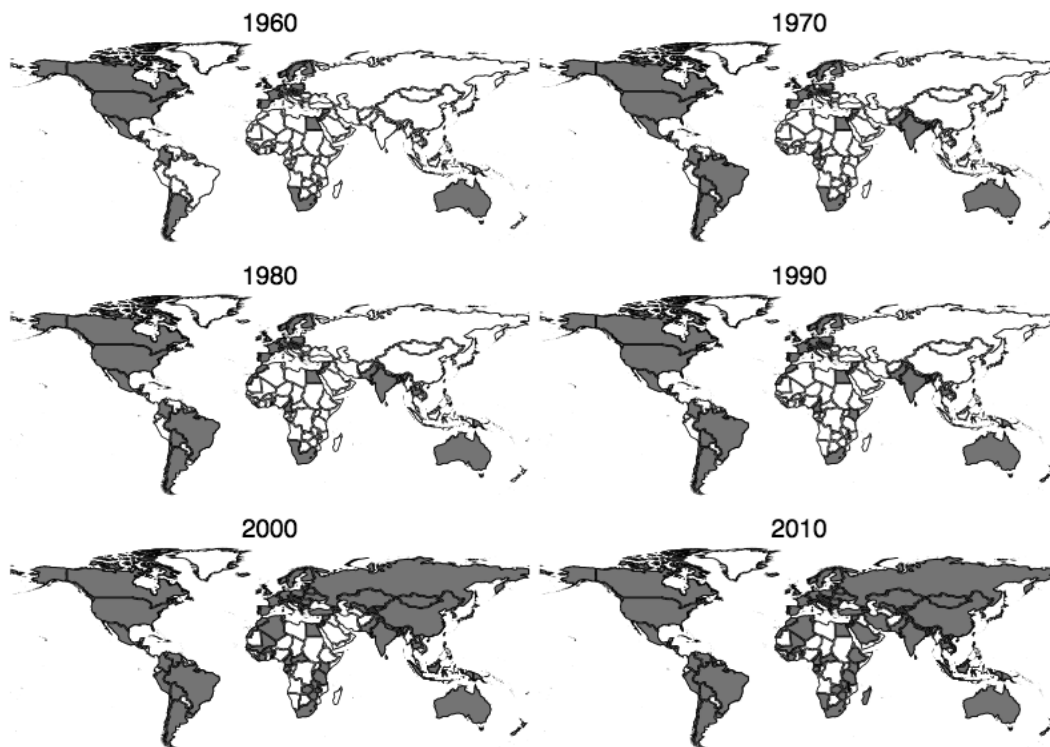
- Kee, Hiau Looi, and Bernard Hoekman. 2007. "Imports, Entry and Competition Law as Market Disciplines." *European Economic Review* 51:831-58.
- Kronthaler, Franz, and Johannes Stephan. 2007. "Factors Accounting for the Enactment of a Competition Law-An Empirical Analysis." *Antitrust Bulletin* 52(2): 137- 168.
- Levinsohn, James A. 1993. "Testing the Imports-As-Market-Discipline Hypothesis." *Journal of International Economics* 35:1-22.
- Lopez-Cordova, Ernesto J., and Christopher M. Meissner. 2008. "The Impact of International Trade on Democracy: A Long-Run Perspective." *World Politics* 60:539-75.
- Ma, Tay-Cheng. 2011. "The Effect of Competition Law Enforcement on Economic Growth." *Journal of Competition Law and Economics* 7:301-334.
- Melitz, Marc, and Giancarlo Ottaviano. 2008. "Market Size, Trade, and Productivity." *The Review of Economic Studies* 75:295-316.
- Motta, Massimo, and Fabrizio Onida. 1997. "Trade Policy and Competition Policy." *Giornale degli Economisti e Annali di Economia* 56:67-97.
- Neven, Damien, and Paul Seabright. 1997. "Trade Liberalization and The Coordination of Competition Policy." In *Competition Policy in the Global Economy: Modalities for Cooperation*, edited by Leonard Waverman, William S. Comanor, and Akira Goto. London: Routledge.
- Nicholson, Michael W. 2008. "An Antitrust Law Index for Empirical Analysis of International Competition Policy." *Journal of Competition Law and Economics* 4:1009-1029.
- Ortega, Franceso, and Giovanni Peri. 2014. "Openness and Income: The Roles of Trade and Migration." *Journal of International Economics* 92:231-241.
- Ozden, Caglar. 2005. "International Dimensions of Competition Policies: European Responses to American Mergers." *Revue Économique* 56:1413-42.
- Petersen, Niels. 2013. "Antitrust Law and The Promotion of Democracy and Economic Growth." *Journal of Competition Law and Economics* 9:593-636.
- Pomfret, Richard. 1992. "International Trade Policy with Imperfect Competition." *Special Papers in International Economics* no. 17, Princeton: International Finance Section, Princeton University.
- Ravenhill, John 2017. "Regional Trade Agreements" 141-73 in *Global Political Economy [5th edition]*, edited by John Ravenhill. Oxford: Oxford University Press.

- Roberts, Mark J., and James R. Tybout, editors. 1996. *Industrial Evolution in Developing Countries: Micro Patterns of Turnover, Productivity, and Market Structure*. New York: Oxford University Press.
- Rodriguez, Francisco, and Dani Rodrik. 2001. "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence." *NBER Macroeconomics Annual* 15:261-338.
- Rodrik, Dani, Arvind Subramanian, and Francisco Trebbi. 2004. "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development." *Journal of Economic Growth* 9:131-165.
- Sachs, Jeffrey D., and Andrew M. Warner. 1995. "Natural Resource Abundance and Economic Growth." Working Paper No. 5398. National Bureau of Economic Research, Cambridge, Mass.
- Scherer, Frederic M. 1994. *Competition Policies for an Integrated World Economy*. Washington, D.C.: Brookings Institution Press.
- Shughart, William F., Jon D. Silverman, and Robert D. Tollison. 1995. "Antitrust Enforcement and Foreign Competition." 179-187 in *The Causes and Consequences of Antitrust: The Public Choice Perspective*, edited by Fred S. McChesney and William F. Shughart. Chicago: University of Chicago Press.
- Sokol, D. Daniel. 2008. "Order Without (Enforceable) Law: Why Countries Enter into Non-Enforceable Competition Policy Chapter in Free Trade Agreements." *Chicago Kent Law Review* 83(1): 231-292.
- Stock, James H., and Motohiro Yogo. 2005. "Testing for Weak Instruments in Linear IV Regression." In *Identification and Inference for Economic Models: Essays in Honor of Thomas J. Rothenberg*, edited by James H. Stock and Donald W. K. Andrews. Cambridge: Cambridge University Press.
- Tinbergen, Jan. 1962. *Shaping the World Economy: Suggestions for an International Economic Policy*. New York: Twentieth Century Fund.
- Tybout, James R. 2001. "Plant- and Firm-Level Evidence on New Trade Theories." Working Paper No. 8418. National Bureau of Economic Research, Cambridge, Mass.
- Voigt, Stefan. 2009. "The Effects of Competition Policy on Development—Cross-Country Evidence Using Four New Indicators." *Journal of Development Studies* 45:1225-1248.

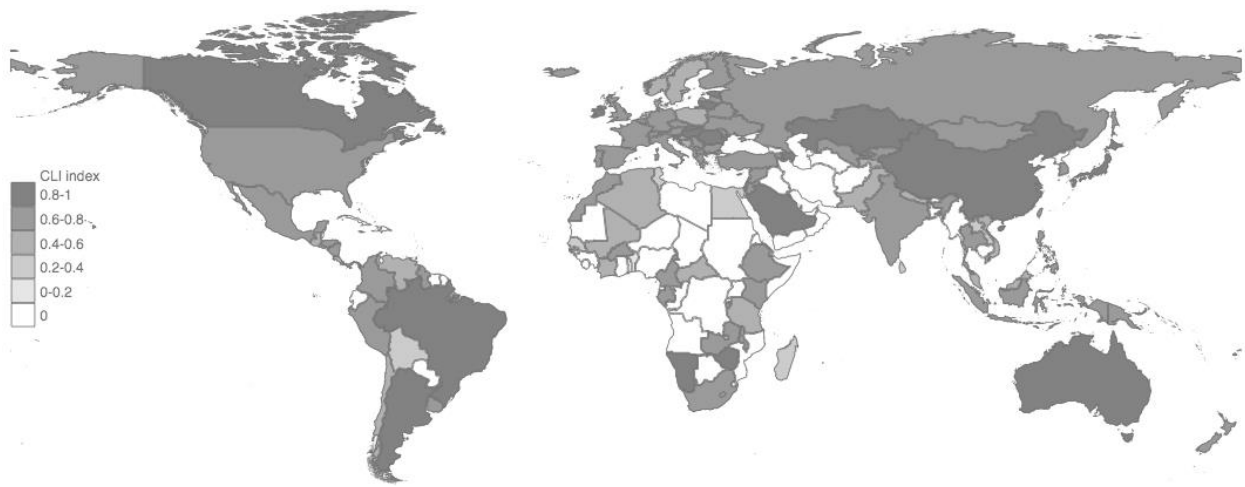
Waked, Dina I. 2010. "Antitrust Enforcement in Developing Countries: Reasons for Enforcement and Non-Enforcement Using Resource-Based Evidence." Unpublished manuscript. Harvard Law School, July, <http://ssrn.com/abstract=1638874>.

## FIGURES & TABLES

Figure 1: Countries with Antitrust Laws, 1960 – 2010



**Figure 2: Competition Law Index (CLI) Score by Country, 2010**



**Figure 3: Predicted Trade Share (PTSH) by Country, 2010**

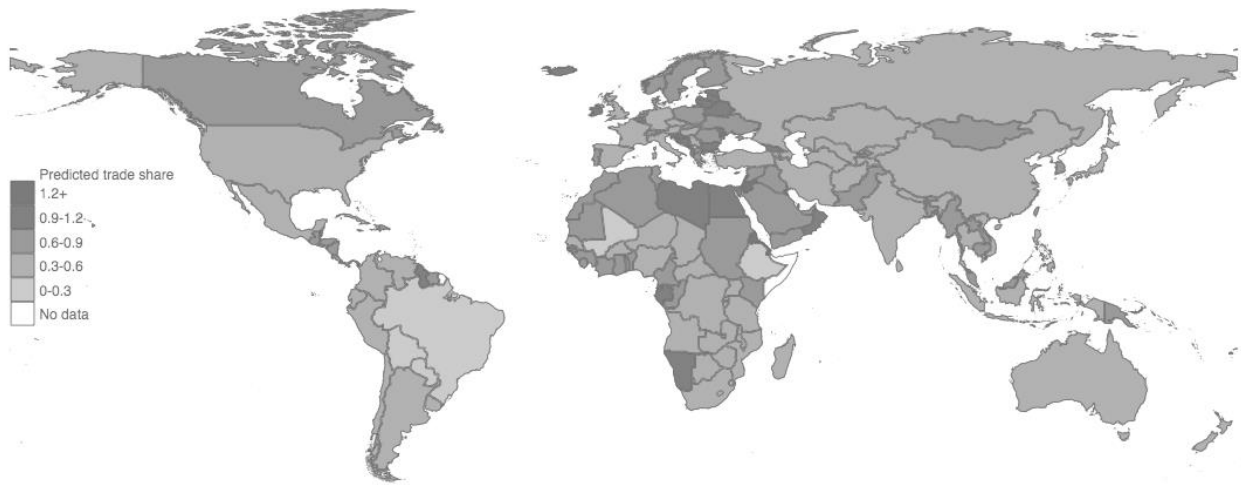


Figure 4: Binned-scatterplot of Predicted Trade and Competition Law Index

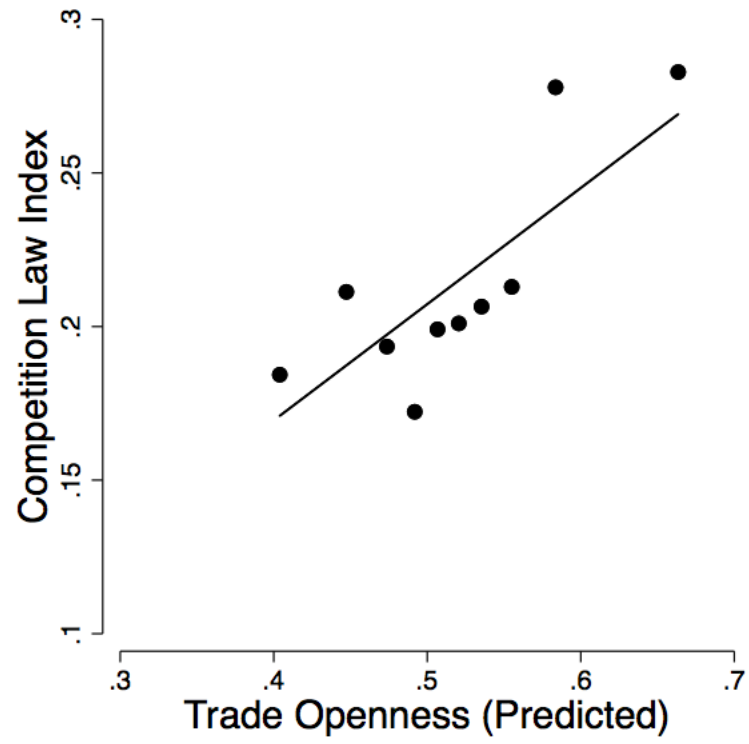


Figure 5: Point Estimates and 90% CI from Cross-Sectional Regressions, 1950-2010

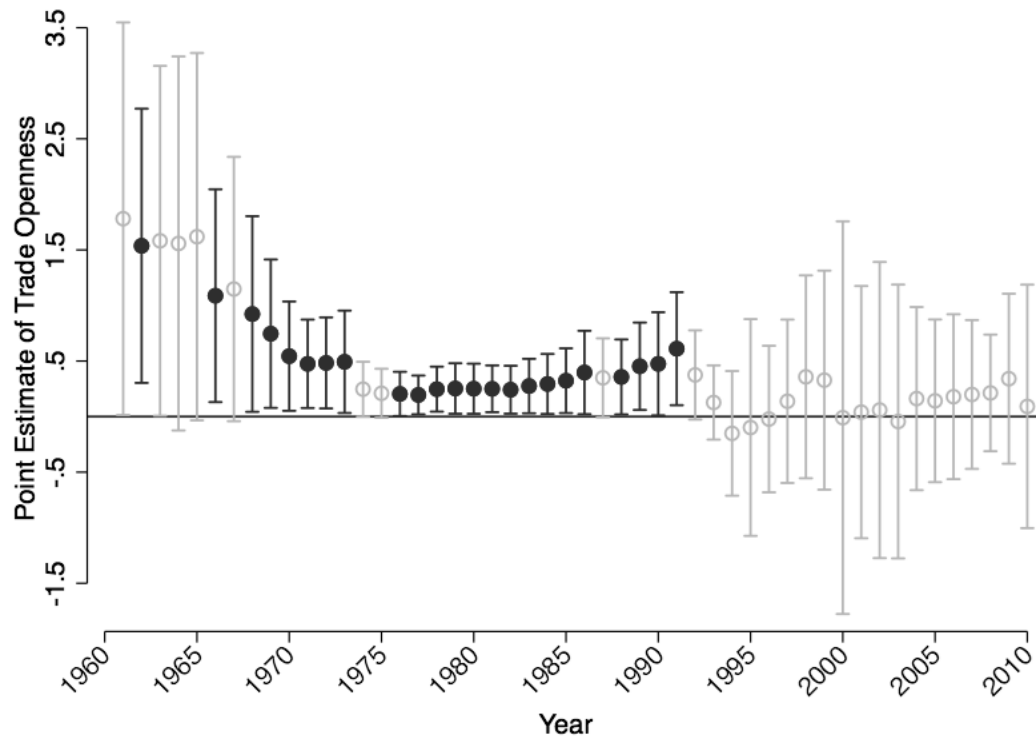


Figure 6: Relationship Between Trade Openness and CLI, 1990-2010

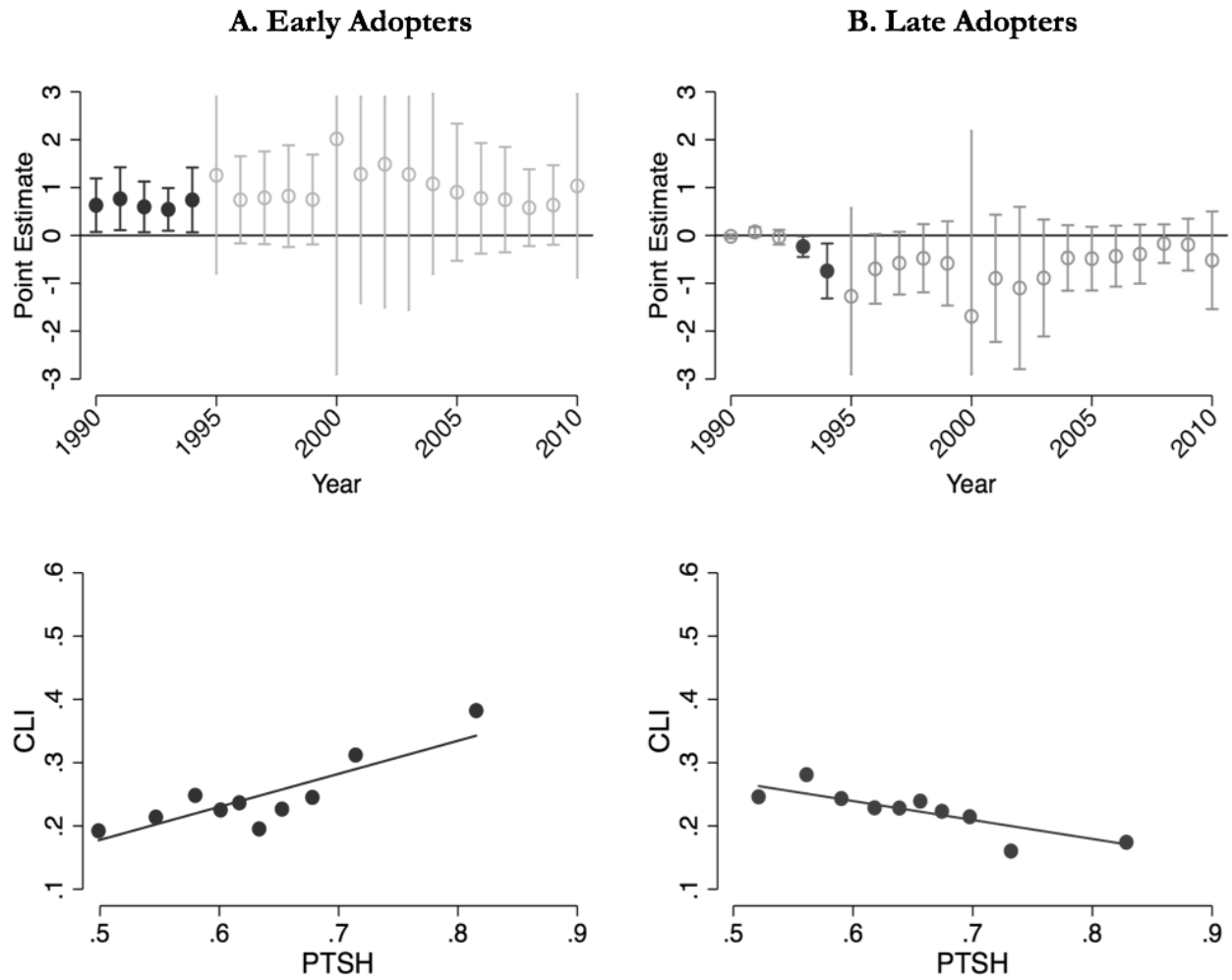


Figure 7: Membership in Regional Groups and PTAs that Require Antitrust Policies

A. Member of PTA



B. Member of Regional Group



**Figure 8: Antitrust Enforcement Resources and Activities by Country for 2010**

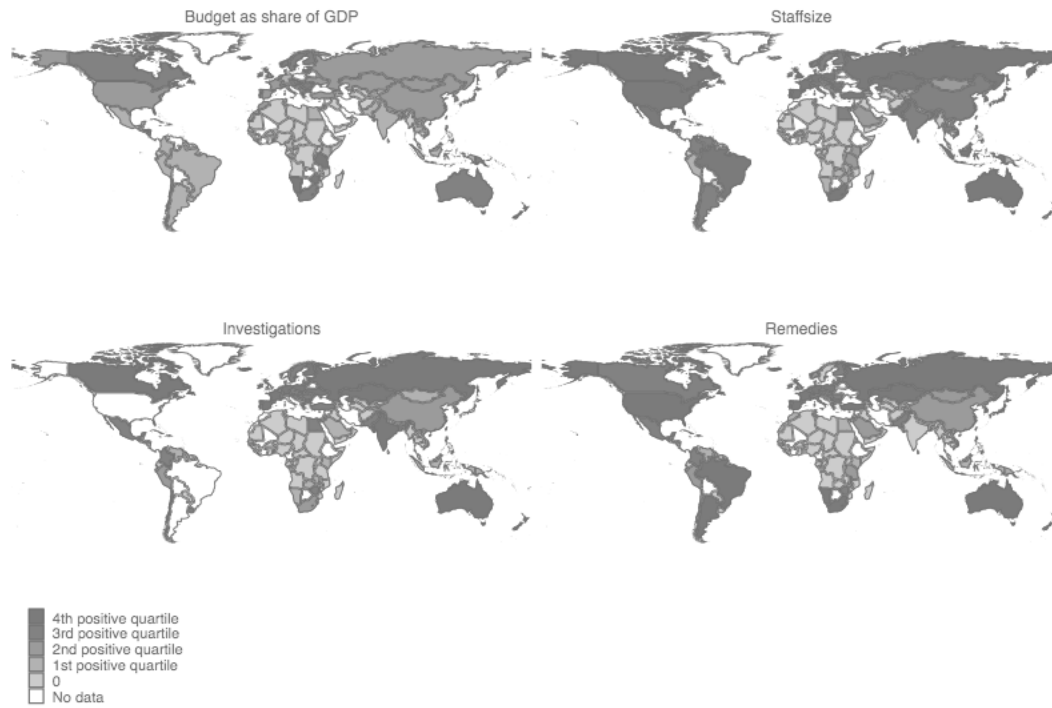
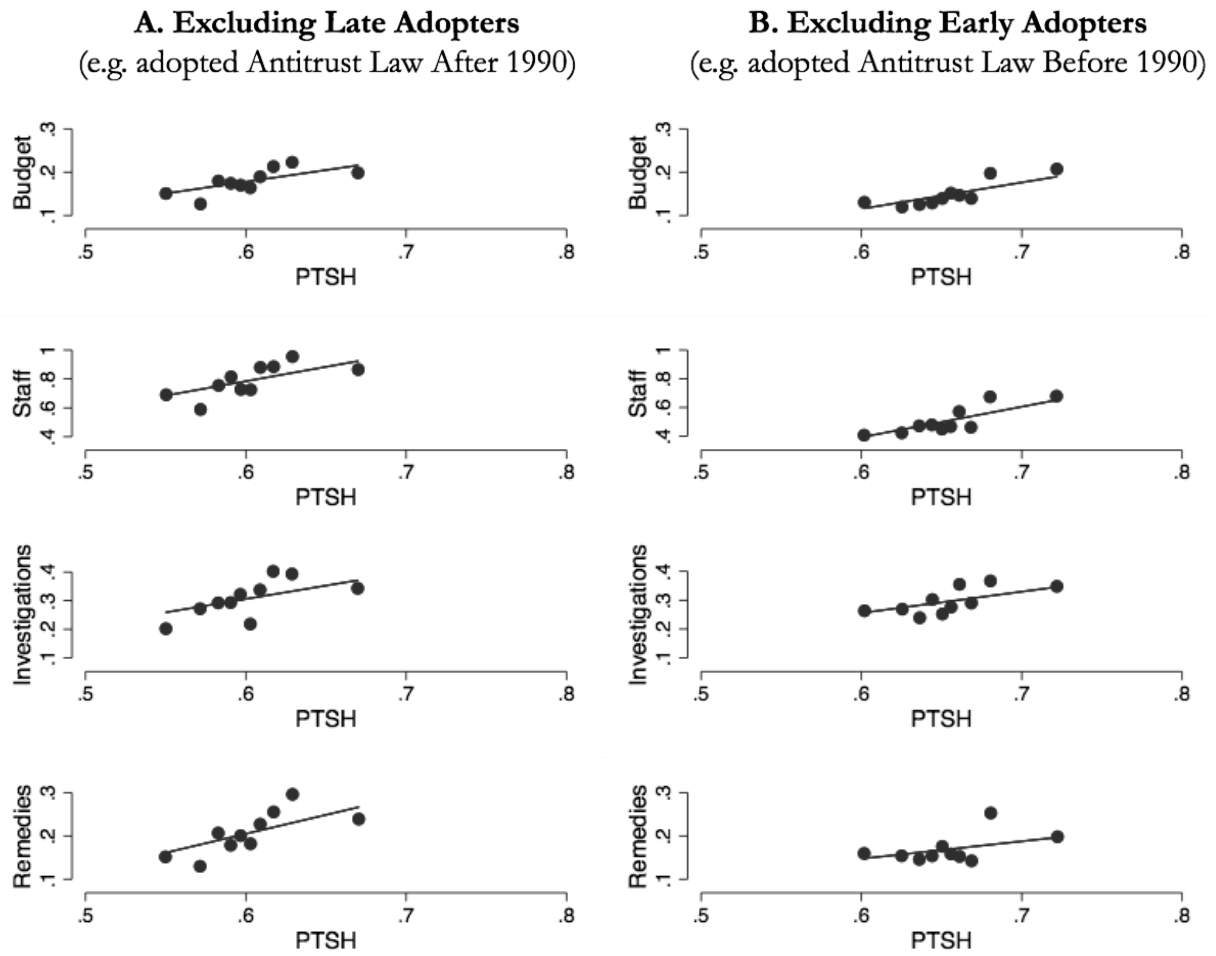


Figure 9: Binned-scatterplot of Predicted Trade and Antitrust Enforcement



**Table 1: Components of the Competition Law Index**

| <b>Authority</b>                        |      | <b>Abuse of Dominance</b>          |      |
|-----------------------------------------|------|------------------------------------|------|
| Private Right of Action                 | 1    | General prohibition                | 2    |
| Fines                                   | 1    | Market Access                      | 0.25 |
| Imprisonment                            | 1    | Tying                              | 0.25 |
| Divestitures                            | 1    | Discounts                          | 0.25 |
| Damages                                 | 1    | Unfair Pricing                     | 0.25 |
| Extraterritoriality                     | 1    | Discriminatory Pricing             | 0.25 |
| Industry Exemptions                     | -0.5 | Predatory Pricing                  | 0.25 |
| Enterprise Exemptions – Categorical     | -0.5 | Retail price Maintenance           | 0.25 |
|                                         |      | Other abusive Acts                 | 0.25 |
|                                         |      | Efficiency Defense                 | -0.5 |
|                                         |      | Public interest Defense            | -0.5 |
| <b>Merger Control</b>                   |      | <b>Anti-Competitive Agreements</b> |      |
| Pre-merger Notification                 | 1    | Price fixing                       | 0.5  |
| Mandatory Notification                  | 1    | Market Sharing                     | 0.5  |
| Substantive Assessment: Economic        | 1    | Output Limitations                 | 0.5  |
| Substantive Assessment: Public Interest | 1    | Bid Rigging                        | 0.5  |
| Efficiency Defense                      | -0.5 | Tying                              | 0.5  |
| Failing Firm Defense                    | -0.5 | Exclusive Dealing                  | 0.5  |
| Public Interest Defense                 | -0.5 | Resale Price Maintenance           | 0.5  |
|                                         |      | Eliminate Competitors              | 0.5  |
|                                         |      | Efficiency Defense                 | -0.5 |
|                                         |      | Public Interest Defense            | -0.5 |

**Table 2: Descriptive Statistics**

|                                                         | N       | Mean     | SD       | Min   | Max       |
|---------------------------------------------------------|---------|----------|----------|-------|-----------|
| <b><u>Gravity Equation Data</u></b>                     |         |          |          |       |           |
| <i>Country-level Characteristics</i>                    |         |          |          |       |           |
| Population of Origin Country (millions)                 | 10,063  | 29.10    | 109.91   | 0.01  | 1,371.22  |
| Population of Destination Country (millions)            | 10,750  | 27.92    | 106.66   | 0.00  | 1,371.22  |
| Area of Origin Country (thousand km <sup>2</sup> )      | 10,063  | 744.81   | 1,874.62 | 0.02  | 22,275.98 |
| Area of Destination Country (thousand km <sup>2</sup> ) | 10,750  | 776.34   | 2,137.85 | 0.02  | 22,275.98 |
| <i>Dyad-level Characteristics</i>                       |         |          |          |       |           |
| Population-weighted distance (km)                       | 855,954 | 8,009.86 | 4,470.91 | 60.77 | 19,781.39 |
| Landlocked origin + landlocked destination              | 855,954 | 0.34     | 0.53     | 0     | 2         |
| Time zone difference                                    | 855,954 | 4.67     | 3.40     | 0     | 12        |
| Origin and destination are contiguous                   | 855,954 | 0.02     | --       | 0     | 1         |
| Formerly in a colonial relationship                     | 855,954 | 0.01     | --       | 0     | 1         |
| Origin is/was hegemon of destination                    | 855,954 | 0.01     | --       | 0     | 1         |
| Common language spoken by >9% of pop.                   | 855,954 | 0.15     | --       | 0     | 1         |
| Common official language                                | 855,954 | 0.17     | --       | 0     | 1         |
| <b><u>Primary Regression Data</u></b>                   |         |          |          |       |           |
| Competition Law Index                                   | 9,070   | 0.19     | 0.29     | 0     | 1         |
| PTSH                                                    | 7,973   | 0.54     | 0.29     | 0.04  | 2.19      |
| Trade Openness                                          | 8,162   | 0.51     | 0.40     | 0.00  | 6.33      |
| Population (ln)                                         | 8,823   | 2.16     | 1.40     | 0.01  | 7.20      |
| Area (ln)                                               | 9,020   | 11.83    | 2.34     | 3.09  | 16.92     |
| <b><u>Antitrust Enforcement Data</u></b>                |         |          |          |       |           |
| Budget / GDP                                            | 9,005   | 0.09     | 0.32     | 0     | 1.61      |
| Staff Size (ln)                                         | 9,070   | 0.35     | 1.20     | 0     | 7.81      |
| Investigations (ln)                                     | 9,070   | 0.17     | 0.72     | 0     | 8.11      |
| Remedies (ln)                                           | 9,070   | 0.10     | 0.49     | 0     | 7.41      |

**Table 3: Trade Openness and Antitrust Stringency – Baseline Results**

|                                                               | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|---------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                               | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
|                                                               |                     |                     |                     | <b>Second Stage</b> |                     |                     |
| PTSH                                                          | 0.313***<br>(0.055) | 0.334***<br>(0.050) | 0.136**<br>(0.060)  |                     |                     |                     |
| Trade Openness                                                |                     |                     |                     | 0.624***<br>(0.126) | 0.672***<br>(0.130) | 0.378*<br>(0.193)   |
| Population (ln)                                               | 0.098***<br>(0.019) | 0.095***<br>(0.017) | 0.071***<br>(0.018) | 0.107***<br>(0.023) | 0.115***<br>(0.021) | 0.088***<br>(0.021) |
| Area (ln)                                                     | 0.006<br>(0.010)    | 0.015*<br>(0.009)   | 0.018**<br>(0.009)  | 0.027<br>(0.017)    | 0.032**<br>(0.016)  | 0.027**<br>(0.013)  |
|                                                               |                     |                     |                     | <b>First Stage</b>  |                     |                     |
| PTSH                                                          |                     |                     |                     | 0.501***<br>(0.063) | 0.496***<br>(0.065) | 0.358***<br>(0.078) |
| Population (ln)                                               |                     |                     |                     | -0.014<br>(0.021)   | -0.030<br>(0.019)   | -0.046**<br>(0.020) |
| Area (ln)                                                     |                     |                     |                     | -0.034*<br>(0.018)  | -0.025<br>(0.018)   | -0.023<br>(0.018)   |
| Region Dummies                                                | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                    | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| Observations                                                  | 7,973               | 7,973               | 7,973               | 7,970               | 7,970               | 7,970               |
| R-squared                                                     | 0.212               | 0.335               | 0.390               | -0.197              | -0.166              | 0.222               |
| KP weak idenf. F. Test                                        | --                  | --                  | --                  | 63.803              | 58.906              | 21.280              |
| -- Dependent Variable is the Competition Law Index            |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                             |                     |                     |                     |                     |                     |                     |

**Table 4: Trade Openness and Antitrust Stringency – PTAs and ROs**

|                                                                                                                                                                              | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                                                                                                                                              | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| A: Dependent Variable = Competition Law Index<br>Sample = Country is a member of the PTA with Antitrust Requirement<br>Excluding Countries with Antitrust Laws Prior to 1990 |                     |                     |                     |                     |                     |                     |
| PTSH                                                                                                                                                                         | 0.167*              | -0.043              | -0.104              |                     |                     |                     |
|                                                                                                                                                                              | (0.092)             | (0.068)             | (0.071)             |                     |                     |                     |
| Trade Openness                                                                                                                                                               |                     |                     |                     | 0.380**             | -0.112              | -0.329              |
|                                                                                                                                                                              |                     |                     |                     | (0.181)             | (0.193)             | (0.294)             |
| B: Dependent Variable = Competition Law Index<br>Sample = Country is a member of the RO with Antitrust Requirement<br>Excluding Countries with Antitrust Laws Prior to 1990  |                     |                     |                     |                     |                     |                     |
| PTSH                                                                                                                                                                         | 0.055               | -0.064              | -0.227**            |                     |                     |                     |
|                                                                                                                                                                              | (0.112)             | (0.116)             | (0.094)             |                     |                     |                     |
| Trade Openness                                                                                                                                                               |                     |                     |                     | 0.098               | -0.137              | -0.580*             |
|                                                                                                                                                                              |                     |                     |                     | (0.187)             | (0.269)             | (0.348)             |
| Controls                                                                                                                                                                     | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) |
| Region Dummies                                                                                                                                                               | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                                                                                                                                   | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| First-stage Instrument                                                                                                                                                       | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Dependent variables are from Antitrust Enforcement Dataset.                                                                                                               |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses                                                                                                                |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                                                                                                                                            |                     |                     |                     |                     |                     |                     |

**Table 5: Trade Openness and Antitrust Enforcement Resources & Activities**

|                                                                                                     | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|-----------------------------------------------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                                                                     | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| <b>A: Dependent Variable = <math>\log(\text{Agency Budget (USD)}) / \log(\text{rGDP})</math></b>    |                     |                     |                     |                     |                     |                     |
| PTSH                                                                                                | 0.379***<br>(0.085) | 0.192**<br>(0.084)  | 0.208***<br>(0.072) |                     |                     |                     |
| Trade Openness                                                                                      |                     |                     |                     | 1.065***<br>(0.314) | 0.671**<br>(0.329)  | 1.791<br>(1.145)    |
| <b>B: Dependent Variable = <math>\log(\text{Agency Staff})</math></b>                               |                     |                     |                     |                     |                     |                     |
| PTSH                                                                                                | 1.240***<br>(0.292) | 0.601**<br>(0.281)  | 0.757***<br>(0.242) |                     |                     |                     |
| Trade Openness                                                                                      |                     |                     |                     | 3.487***<br>(1.002) | 2.089**<br>(1.034)  | 6.484<br>(4.082)    |
| <b>C: Dependent Variable = <math>\text{Log}(\text{Antitrust Investigations w/o mergers})</math></b> |                     |                     |                     |                     |                     |                     |
| PTSH                                                                                                | 0.718***<br>(0.180) | 0.372**<br>(0.173)  | 0.219<br>(0.207)    |                     |                     |                     |
| Trade Openness                                                                                      |                     |                     |                     | 2.020***<br>(0.626) | 1.300*<br>(0.660)   | 1.892<br>(1.967)    |
| <b>D: Dependent Variable = <math>\text{Log}(\text{Antitrust Remedies w/o mergers})</math></b>       |                     |                     |                     |                     |                     |                     |
| PTSH                                                                                                | 0.311***<br>(0.114) | 0.096<br>(0.108)    | 0.211*<br>(0.109)   |                     |                     |                     |
| Trade Openness                                                                                      |                     |                     |                     | 0.866***<br>(0.331) | 0.331<br>(0.363)    | 1.802<br>(1.254)    |
| Controls                                                                                            | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) |
| Region Dummies                                                                                      | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                                                          | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| Country Fixed Effects                                                                               | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| First-stage Instrument                                                                              | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Dependent variables are from Antitrust Enforcement Dataset.                                      |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses                                       |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                                                                   |                     |                     |                     |                     |                     |                     |

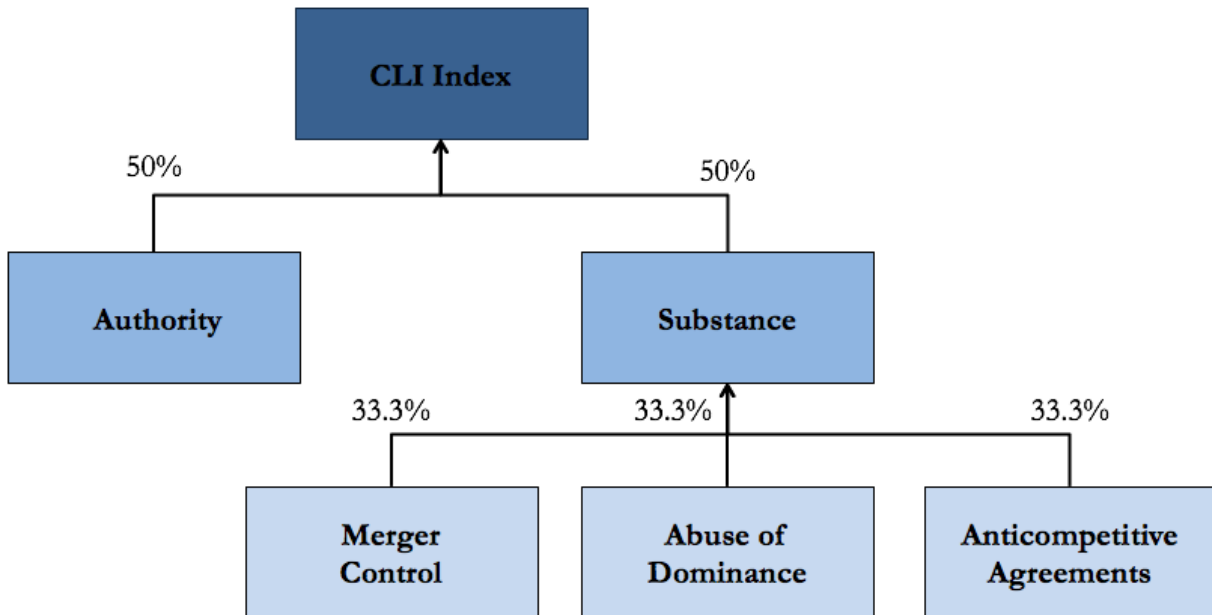
# **Trade Openness and Antitrust Law**

## **ONLINE APPENDIX**

This online appendix reports four pieces of information: Section OA1 provides additional information on the Construction of the Competition Law Index; Section OA2 provides additional Information on the estimation of predicted Trade Shares; Section OA3 presents unreported results from Part 5 of the paper (i.e. “Primary Results”); Section OA4 presents unreported results from Part 6 of the Paper (i.e. “Cross-Sectional Analysis”); Section OA5 of the paper presents unreported results from Part 7 of the Paper (i.e. “Antitrust Enforcement”).

## OA1. ADDITIONAL INFORMATION ON THE COMPETITION LAW INDEX

Figure 0A1: Weighting of the Components of Competition Law Index



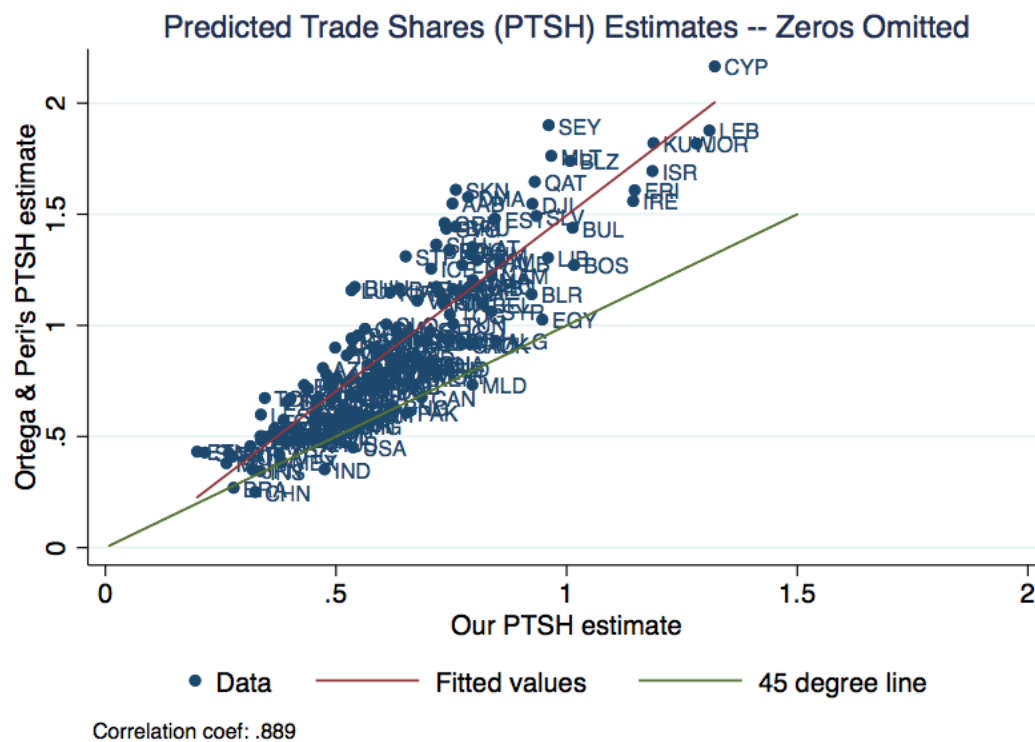
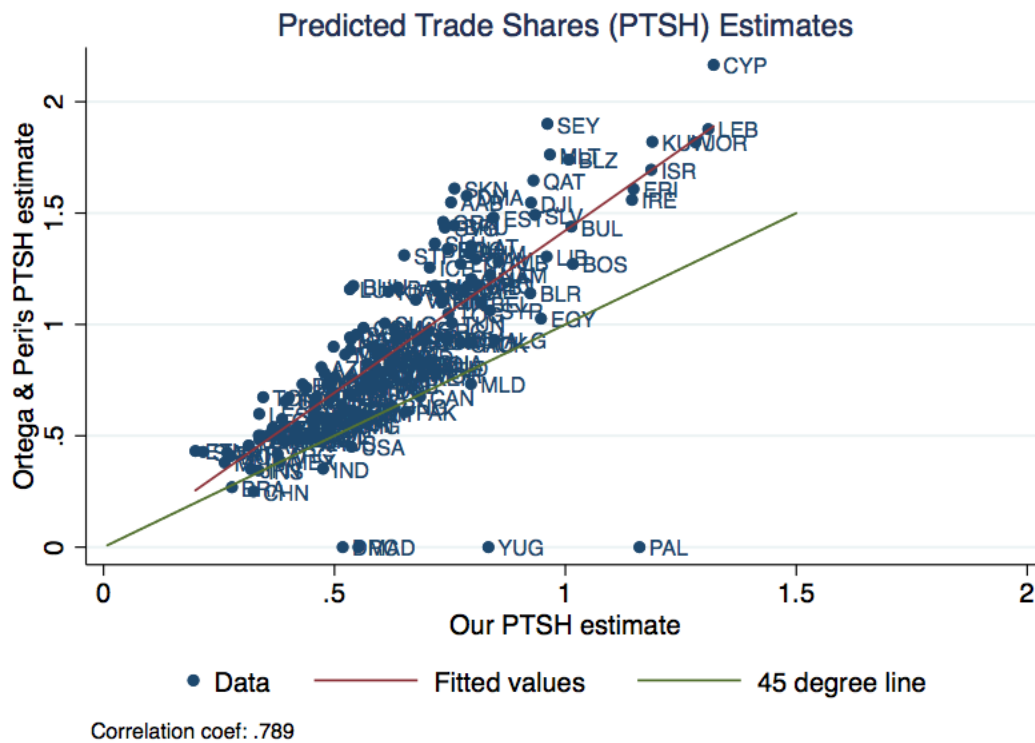
**Table 0A1: Definition of Variables Included in the Competition Law Index**

| <b>Antitrust Law Index</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Authority</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Private right of action             | This variable indicates whether private parties are entitled to file lawsuits to seek remedies.                                                                                                                                                                                                                                                                                                                                                                                                  |
| Fines                               | This variable indicates whether the law provides for fines as a remedy for violating the law.                                                                                                                                                                                                                                                                                                                                                                                                    |
| Imprisonment                        | This variable indicates whether the law provides for imprisonment as a punishment for violating provisions of the law.                                                                                                                                                                                                                                                                                                                                                                           |
| Divestitures                        | This variable indicates whether the law allows for divestitures as a remedy. These may entail 1) selling of assets or division of the company as a remedy for a non-merger-related antitrust violations or 2) for the merger control authority to make the approval of a merger conditional on divestiture (or allow it to force divestiture if the firms proceed with the merger without it).                                                                                                   |
| Damages                             | This variable indicates whether the law allows injured parties to obtain damages. Remedies available for third parties may include either monetary damages or injunctions.                                                                                                                                                                                                                                                                                                                       |
| Extraterritoriality                 | This variable indicates whether the law applies extraterritorially (i.e., it applies to foreign companies and citizens as long as the activity has some effect in the country applying its law).                                                                                                                                                                                                                                                                                                 |
| Industry exemptions                 | This variable indicates whether any industries or economic sectors or types of economic activities are excluded from the application of this antitrust law.                                                                                                                                                                                                                                                                                                                                      |
| Enterprise Exemptions – categorical | <p>This variable indicates whether this law categorically or completely exempts any of the following categories of enterprises from the application of this law categorically (i.e., completely as opposed to partially or conditionally):</p> <ul style="list-style-type: none"> <li>- export cartels</li> <li>- state-owned enterprises</li> <li>- state-operated or state-designated trading companies</li> <li>- designated monopolies</li> <li>- other categories of enterprises</li> </ul> |
| <b>Substantive Prohibitions</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Mergers                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Pre-merger notification             | This variable identifies whether the law provides for a pre-notification of mergers (i.e., where the notification must take place before the closing).                                                                                                                                                                                                                                                                                                                                           |

|                                         |                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mandatory notification                  | This variable indicates if the law provides for a mandatory merger notification.                                                                                                                                                                                                                                     |
| Substantive assessment: economic        | This variable identifies whether the law directs the agency to consider the effect of the merger on market competition, such as anti-competitive consequences for the structure of the market or possible barriers to entry or, alternatively, the resulting dominant position or market share of the merged entity. |
| Substantive assessment: public interest | This variable identifies whether the law grants the agency the power to prohibit a merger if the merger runs contrary to public interest.                                                                                                                                                                            |
| Efficiency defense                      | This variable identifies whether an otherwise impermissible merger may be allowed if it will contribute sufficiently to economic efficiency.                                                                                                                                                                         |
| Failing firm defense                    | This variable identifies whether an otherwise impermissible merger may be allowed if it prevents a business failure.                                                                                                                                                                                                 |
| Public interest defense                 | This variable identifies whether an otherwise impermissible merger may be allowed because it is in the public interest.                                                                                                                                                                                              |
| <b>Abuse of Dominance</b>               |                                                                                                                                                                                                                                                                                                                      |
| General prohibition                     | This variable identifies if the law prohibits the abuse of a dominant position, either generically or by specifying actions that would constitute an impermissible abuse of a dominant position.                                                                                                                     |
| Market Access                           | This variable identifies if the law prohibits a dominant firm from limiting the supply of goods to the market or from restricting sales to certain purchasers or consumers (refusal to supply).                                                                                                                      |
| Tying                                   | This variable identifies if the law prohibits a dominant firm from conditioning the sale of products or services on the sale or acquisition of another product or service that is not directly connected (tying).                                                                                                    |
| Discounts                               | This variable identifies if the law prohibits a dominant firm from offering discounts that incentivizes the buyer to deal exclusively or predominantly with the dominant firm (loyalty discounts).                                                                                                                   |
| Unfair pricing                          | This variable identifies if the law prohibits a dominant firm from taking advantage of its dominant position when setting its prices (unfair pricing).                                                                                                                                                               |
| Discriminatory pricing                  | This variable identifies if the law prohibits a dominant firm from imposing different prices for the same goods or services for different customers (discriminatory pricing).                                                                                                                                        |
| Predatory pricing                       | This variable identifies if the law prohibits a dominant firm from engaging in predatory pricing.                                                                                                                                                                                                                    |
| Resale Price Maintenance                | This variable identifies if the law prohibits a dominant firm from setting the price at which retailers will ultimately sell their product to consumers (resale price maintenance).                                                                                                                                  |

|                            |                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Other abusive acts         | This variable identifies if the law prohibits a dominant firm from engaging in any acts—other than those specified in the preceding questions—as constituting an impermissible abuse of a dominant position, or indicates that the acts that are specified in the law do not constitute a comprehensive list of impermissible acts. |
| Efficiency defense         | This variable indicates if an otherwise impermissible act by a dominant company is excused if it substantially contributes to economic efficiency.                                                                                                                                                                                  |
| Public interest defense    | This variable indicates if an otherwise impermissible act by a dominant company is allowed if it contributes significantly to the public good.                                                                                                                                                                                      |
| Anticompetitive agreements |                                                                                                                                                                                                                                                                                                                                     |
| Price fixing               | This variable identifies whether the law prohibits attempts to set the market price for a products (price fixing).                                                                                                                                                                                                                  |
| Market sharing             | This variable identifies whether the law prohibits agreements to divide or allocate the market by a particular geographic, demographic, price- or otherwise-defined characteristic (market sharing).                                                                                                                                |
| Output limitations         | This variable identifies whether the law prohibits agreements to limit the overall rate of production or amount of products made available to the market (output restraint).                                                                                                                                                        |
| Bid rigging                | This variable identifies whether the law prohibits agreements not to bid on a tender for a certain product or to bid at or above a certain price (bid rigging).                                                                                                                                                                     |
| Tying                      | This variable identifies whether the law prohibits companies from conditioning contracts on buying additional products that are not directly connected to the product that is the subject of the contract.                                                                                                                          |
| Exclusive dealing          | This variable identifies whether the law prohibits agreements not to sell/buy their products to/from certain other companies or groups of companies.                                                                                                                                                                                |
| Resale price maintenance   | This variable identifies whether the law prohibits producers setting the price at which retailers will ultimately sell the product to consumers.                                                                                                                                                                                    |
| Efficiency defense         | This variable identifies whether the law allows for an impermissible practice if it contributes significantly to economic efficiency.                                                                                                                                                                                               |
| Public interest defense    | This variable identifies whether the law allows for an impermissible practice if it contributes significantly to the public good.                                                                                                                                                                                                   |

Figure OA2. Comparing Our Predicted Trade Share Estimates to Ortega & Peri (2014) for 2000



### 0A3. Unreported Results from Part 5.3 – Robustness Checks

**Table 0A2: Trade Openness and Antitrust Stringency – Results for Sub-Indexes**

|                                                                     | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|---------------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                                     | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| <b>A: Dependent Variable = Authority Sub-Index</b>                  |                     |                     |                     |                     |                     |                     |
| PTSH                                                                | 0.241***<br>(0.048) | 0.260***<br>(0.044) | 0.127**<br>(0.055)  |                     |                     |                     |
| Trade Openness                                                      |                     |                     |                     | 0.481***<br>(0.107) | 0.524***<br>(0.110) | 0.354**<br>(0.178)  |
| <b>B: Dependent Variable = Merger Sub-Index</b>                     |                     |                     |                     |                     |                     |                     |
| PTSH                                                                | 0.282***<br>(0.045) | 0.286***<br>(0.042) | 0.114**<br>(0.044)  |                     |                     |                     |
| Trade Openness                                                      |                     |                     |                     | 0.563***<br>(0.106) | 0.576***<br>(0.112) | 0.317**<br>(0.147)  |
| <b>C: Dependent Variable = Dominance Sub-Index</b>                  |                     |                     |                     |                     |                     |                     |
| PTSH                                                                | 0.311***<br>(0.060) | 0.333***<br>(0.054) | 0.075<br>(0.063)    |                     |                     |                     |
| Trade Openness                                                      |                     |                     |                     | 0.620***<br>(0.134) | 0.671***<br>(0.138) | 0.208<br>(0.189)    |
| <b>D: Dependent Variable = Anticompetitive Agreements Sub-Index</b> |                     |                     |                     |                     |                     |                     |
| PTSH                                                                | 0.211***<br>(0.038) | 0.227***<br>(0.038) | 0.084*<br>(0.047)   |                     |                     |                     |
| Trade Openness                                                      |                     |                     |                     | 0.421***<br>(0.085) | 0.458***<br>(0.092) | 0.233<br>(0.142)    |
| Controls                                                            | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) |
| Regional Dummies                                                    | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                          | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| First-stage Instrument                                              | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Dependent variables are from Antitrust Enforcement Dataset.      |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses       |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                                   |                     |                     |                     |                     |                     |                     |

**Table OA3: Alternative Ways of Measuring Antitrust Stringency**

|                                                                            | Reduced Form         |                      |                     | 2SLS                 |                      |                     |
|----------------------------------------------------------------------------|----------------------|----------------------|---------------------|----------------------|----------------------|---------------------|
|                                                                            | (1)                  | (2)                  | (3)                 | (4)                  | (5)                  | (6)                 |
| <b>A: Dependent Variable = Count of Antitrust Laws</b>                     |                      |                      |                     |                      |                      |                     |
| PTSH                                                                       | 10.596***<br>(1.666) | 10.967***<br>(1.465) | 3.806**<br>(1.701)  |                      |                      |                     |
| Trade Openness                                                             |                      |                      |                     | 21.136***<br>(3.894) | 22.090***<br>(4.026) | 10.611*<br>(5.560)  |
| <b>B: Dependent Variable = Result of Factor Analysis of Antitrust Laws</b> |                      |                      |                     |                      |                      |                     |
| PTSH                                                                       | 3.429***<br>(0.531)  | 3.503***<br>(0.496)  | 0.859<br>(0.526)    |                      |                      |                     |
| Trade Openness                                                             |                      |                      |                     | 6.840***<br>(1.241)  | 7.056***<br>(1.310)  | 2.395<br>(1.630)    |
| <b>C: Dependent Variable = Dummy for Antitrust Law</b>                     |                      |                      |                     |                      |                      |                     |
| PTSH                                                                       | 0.358***<br>(0.087)  | 0.398***<br>(0.071)  | 0.182*<br>(0.097)   |                      |                      |                     |
| Trade Openness                                                             |                      |                      |                     | 0.714***<br>(0.186)  | 0.802***<br>(0.179)  | 0.506*<br>(0.300)   |
| Controls                                                                   | Pop(ln)<br>Area(ln)  | Pop(ln)<br>Area(ln)  | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln)  | Pop(ln)<br>Area(ln)  | Pop(ln)<br>Area(ln) |
| Regional Dummies                                                           | No                   | Yes                  | Yes                 | No                   | Yes                  | Yes                 |
| Time Trend                                                                 | No                   | No                   | Yes                 | No                   | No                   | Yes                 |
| First-stage Instrument                                                     | --                   | --                   | --                  | PTSH                 | PTSH                 | PTSH                |
| -- Robust standard errors clustered by country in parentheses              |                      |                      |                     |                      |                      |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                                          |                      |                      |                     |                      |                      |                     |

**Table OA4: Controlling for Countries with Courts That Play a Major Role**

|                                                               | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|---------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                               | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| PTSH                                                          | 0.273***<br>(0.047) | 0.284***<br>(0.046) | 0.106**<br>(0.048)  |                     |                     |                     |
| Trade Openness                                                |                     |                     |                     | 0.544***<br>(0.103) | 0.564***<br>(0.111) | 0.284**<br>(0.141)  |
| Population (ln)                                               | 0.095***<br>(0.017) | 0.087***<br>(0.016) | 0.066***<br>(0.017) | 0.102***<br>(0.020) | 0.103***<br>(0.019) | 0.078***<br>(0.019) |
| Area (ln)                                                     | -0.000<br>(0.008)   | 0.010<br>(0.008)    | 0.013<br>(0.008)    | 0.018<br>(0.014)    | 0.023*<br>(0.014)   | 0.019*<br>(0.011)   |
| Courts Major Role                                             | 0.317***<br>(0.050) | 0.228***<br>(0.053) | 0.255***<br>(0.057) | 0.364***<br>(0.054) | 0.301***<br>(0.070) | 0.286***<br>(0.065) |
| Regional Dummies                                              | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                    | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| Observations                                                  | 7,973               | 7,973               | 7,973               | 7,970               | 7,970               | 7,970               |
| R-squared                                                     | 0.372               | 0.456               | 0.500               | 0.092               | 0.132               | 0.419               |
| First-stage Instrument                                        | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Dependent Variable is the Competition Law Index            |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                             |                     |                     |                     |                     |                     |                     |

**Table OA5: Dropping Countries with Courts That Play a Major Role**

|                                                               | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|---------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                               | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| PTSH                                                          | 0.255***<br>(0.049) | 0.260***<br>(0.048) | 0.082*<br>(0.049)   |                     |                     |                     |
| Trade Openness                                                |                     |                     |                     | 0.492***<br>(0.099) | 0.505***<br>(0.109) | 0.211<br>(0.134)    |
| Population (ln)                                               | 0.092***<br>(0.018) | 0.086***<br>(0.017) | 0.065***<br>(0.018) | 0.097***<br>(0.021) | 0.100***<br>(0.020) | 0.074***<br>(0.019) |
| Area (ln)                                                     | -0.001<br>(0.009)   | 0.008<br>(0.008)    | 0.011<br>(0.008)    | 0.016<br>(0.014)    | 0.020<br>(0.014)    | 0.016<br>(0.010)    |
| Regional Dummies                                              | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                    | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| Observations                                                  | 7,353               | 7,353               | 7,353               | 7,350               | 7,350               | 7,350               |
| R-squared                                                     | 0.312               | 0.406               | 0.452               | 0.037               | 0.103               | 0.396               |
| First-stage Instrument                                        | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Dependent Variable is the Competition Law Index            |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                             |                     |                     |                     |                     |                     |                     |

**Table OA6: Adjusting Competition Law Index for Exemptions / Narrow Applications**

|                                                               | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|---------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                               | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| PTSH                                                          | 0.150***<br>(0.031) | 0.169***<br>(0.030) | 0.056*<br>(0.031)   |                     |                     |                     |
| Trade Openness                                                |                     |                     |                     | 0.299***<br>(0.064) | 0.341***<br>(0.071) | 0.156*<br>(0.091)   |
| Population (ln)                                               | 0.026***<br>(0.009) | 0.031***<br>(0.010) | 0.018*<br>(0.009)   | 0.030***<br>(0.011) | 0.041***<br>(0.011) | 0.025**<br>(0.011)  |
| Area (ln)                                                     | 0.011*<br>(0.006)   | 0.013**<br>(0.005)  | 0.015***<br>(0.005) | 0.021**<br>(0.009)  | 0.021**<br>(0.009)  | 0.018***<br>(0.006) |
| Regional Dummies                                              | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                    | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| Observations                                                  | 7,973               | 7,973               | 7,973               | 7,970               | 7,970               | 7,970               |
| R-squared                                                     | 0.074               | 0.137               | 0.179               | --                  | --                  | 0.107               |
| First-stage Instrument                                        | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Dependent Variable is the Adjusted Competition Law Index   |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                             |                     |                     |                     |                     |                     |                     |

**Table OA7: Adjusting Competition Law Index for EU / EEA Law**

|                                                               | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|---------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                               | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| PTSH                                                          | 0.301***<br>(0.056) | 0.321***<br>(0.049) | 0.128**<br>(0.060)  |                     |                     |                     |
| Trade Openness                                                |                     |                     |                     | 0.600***<br>(0.125) | 0.672***<br>(0.131) | 0.357*<br>(0.192)   |
| Population (ln)                                               | 0.101***<br>(0.019) | 0.097***<br>(0.017) | 0.074***<br>(0.018) | 0.109***<br>(0.023) | 0.115***<br>(0.021) | 0.090***<br>(0.021) |
| Area (ln)                                                     | 0.003<br>(0.010)    | 0.013<br>(0.009)    | 0.016*<br>(0.009)   | 0.024<br>(0.017)    | 0.032**<br>(0.016)  | 0.025**<br>(0.012)  |
| Regional Dummies                                              | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                    | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| Observations                                                  | 7,973               | 7,973               | 7,973               | 7,970               | 7,970               | 7,970               |
| R-squared                                                     | 0.211               | 0.347               | 0.399               | --                  | --                  | 0.251               |
| First-stage Instrument                                        | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Dependent Variable is the Adjusted Competition Law Index   |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                             |                     |                     |                     |                     |                     |                     |

**Table OA8: Alternative Ways of Measures of Trade Openness**

|                                                               | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
|---------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Sachs Warner                                                  | 0.168***<br>(0.033) | 0.128***<br>(0.034) | 0.116***<br>(0.036) |                     |                     |                     |
| Econ. Globalization                                           |                     |                     |                     | 0.008***<br>(0.001) | 0.007***<br>(0.001) | 0.004***<br>(0.001) |
| Population (ln)                                               | 0.063***<br>(0.023) | 0.076***<br>(0.023) | 0.069***<br>(0.025) | 0.099***<br>(0.018) | 0.100***<br>(0.018) | 0.081***<br>(0.019) |
| Area (ln)                                                     | 0.006<br>(0.014)    | -0.001<br>(0.012)   | 0.003<br>(0.012)    | 0.006<br>(0.011)    | 0.006<br>(0.010)    | 0.011<br>(0.010)    |
| Regional Dummies                                              | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                    | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| Observations                                                  | 3,889               | 3,889               | 3,889               | 5,820               | 5,820               | 5,820               |
| R-squared                                                     | 0.241               | 0.317               | 0.328               | 0.328               | 0.368               | 0.421               |
| -- Dependent Variable is the Competition Law Index            |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                             |                     |                     |                     |                     |                     |                     |

#### OA4. Unreported Results from Part 6 – Cross-Sectional Analysis

**Table OA9: Regression Results for Early and Late Adopters**

|                                                                       | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|-----------------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                                       | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| <b>A: Dependent Variable = CLI</b>                                    |                     |                     |                     |                     |                     |                     |
| <b>Sample = Country-Years 1990 to 2010</b>                            |                     |                     |                     |                     |                     |                     |
| <b>Excluding Countries That Adopted Antitrust Regimes after 1990</b>  |                     |                     |                     |                     |                     |                     |
| PTSH                                                                  | 0.132<br>(0.102)    | 0.186**<br>(0.089)  | 0.183*<br>(0.095)   |                     |                     |                     |
| Trade Openness                                                        |                     |                     |                     | 0.408<br>(0.344)    | 0.543*<br>(0.330)   | 0.674<br>(0.470)    |
| <b>B: Dependent Variable = CLI</b>                                    |                     |                     |                     |                     |                     |                     |
| <b>Sample = Country-Years 1990 to 2010</b>                            |                     |                     |                     |                     |                     |                     |
| <b>Excluding Countries That Adopted Antitrust Regimes Before 1990</b> |                     |                     |                     |                     |                     |                     |
| PTSH                                                                  | 0.124*<br>(0.070)   | -0.022<br>(0.053)   | -0.116**<br>(0.057) |                     |                     |                     |
| Trade Openness                                                        |                     |                     |                     | 0.285*<br>(0.147)   | -0.058<br>(0.142)   | -0.368<br>(0.235)   |
| Controls                                                              | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) |
| Regional Dummies                                                      | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                            | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| First-stage Instrument                                                | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Robust standard errors clustered by country in parentheses         |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                                     |                     |                     |                     |                     |                     |                     |

# OA5. Unreported Results from Part 7 – Antitrust Enforcement

**Table OA10: Antitrust Enforcement Excluding Late Adopters**

|                                                                          | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|--------------------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                                          | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| <b>A: Dependent Variable = log(Agency Budget (USD)) / log(rGDP)</b>      |                     |                     |                     |                     |                     |                     |
| PTSH                                                                     | 0.301***<br>(0.115) | 0.171<br>(0.115)    | 0.182**<br>(0.079)  |                     |                     |                     |
| Trade Openness                                                           |                     |                     |                     | 0.892*<br>(0.466)   | 0.644<br>(0.526)    | 1.410<br>(1.151)    |
| <b>B: Dependent Variable = log(Agency Staff)</b>                         |                     |                     |                     |                     |                     |                     |
| PTSH                                                                     | 0.965**<br>(0.396)  | 0.476<br>(0.398)    | 0.669**<br>(0.268)  |                     |                     |                     |
| Trade Openness                                                           |                     |                     |                     | 2.849*<br>(1.450)   | 1.761<br>(1.587)    | 5.121<br>(4.069)    |
| <b>C: Dependent Variable = Log(Antitrust Investigations w/o mergers)</b> |                     |                     |                     |                     |                     |                     |
| PTSH                                                                     | 0.626***<br>(0.233) | 0.372<br>(0.232)    | 0.314<br>(0.277)    |                     |                     |                     |
| Trade Openness                                                           |                     |                     |                     | 1.853*<br>(0.942)   | 1.389<br>(1.050)    | 2.400<br>(2.658)    |
| <b>D: Dependent Variable = Log(Antitrust Remedies w/o mergers)</b>       |                     |                     |                     |                     |                     |                     |
| PTSH                                                                     | 0.190<br>(0.141)    | 0.041<br>(0.143)    | 0.296**<br>(0.136)  |                     |                     |                     |
| Trade Openness                                                           |                     |                     |                     | 0.559<br>(0.445)    | 0.154<br>(0.527)    | 2.261<br>(1.826)    |
| Controls                                                                 | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) |
| Region Dummies                                                           | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                               | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| Country Fixed Effects                                                    | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| First-stage Instrument                                                   | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Dependent variables are from Antitrust Enforcement Dataset.           |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses            |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                                        |                     |                     |                     |                     |                     |                     |

**Table OA11: Antitrust Enforcement Excluding Early Adopters**

|                                                                          | Reduced Form        |                     |                     | 2SLS                |                     |                     |
|--------------------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                                          | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
| <b>A: Dependent Variable = log(Agency Budget (USD)) / log(rGDP)</b>      |                     |                     |                     |                     |                     |                     |
| PTSH                                                                     | 0.254***<br>(0.076) | 0.123*<br>(0.072)   | 0.205***<br>(0.076) |                     |                     |                     |
| Trade Openness                                                           |                     |                     |                     | 0.572***<br>(0.173) | 0.323*<br>(0.178)   | 1.756<br>(1.331)    |
| <b>B: Dependent Variable = log(Agency Staff)</b>                         |                     |                     |                     |                     |                     |                     |
| PTSH                                                                     | 0.802***<br>(0.243) | 0.395*<br>(0.220)   | 0.716***<br>(0.221) |                     |                     |                     |
| Trade Openness                                                           |                     |                     |                     | 1.808***<br>(0.535) | 1.037*<br>(0.533)   | 6.115<br>(4.467)    |
| <b>C: Dependent Variable = Log(Antitrust Investigations w/o mergers)</b> |                     |                     |                     |                     |                     |                     |
| PTSH                                                                     | 0.462***<br>(0.163) | 0.236<br>(0.150)    | 0.248*<br>(0.144)   |                     |                     |                     |
| Trade Openness                                                           |                     |                     |                     | 1.042***<br>(0.357) | 0.619*<br>(0.367)   | 2.139<br>(1.733)    |
| <b>D: Dependent Variable = Log(Antitrust Remedies w/o mergers)</b>       |                     |                     |                     |                     |                     |                     |
| PTSH                                                                     | 0.228**<br>(0.098)  | 0.082<br>(0.086)    | 0.137<br>(0.089)    |                     |                     |                     |
| Trade Openness                                                           |                     |                     |                     | 0.516**<br>(0.208)  | 0.216<br>(0.210)    | 1.156<br>(0.988)    |
| Controls                                                                 | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) | Pop(ln)<br>Area(ln) |
| Region Dummies                                                           | No                  | Yes                 | Yes                 | No                  | Yes                 | Yes                 |
| Time Trend                                                               | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| Country Fixed Effects                                                    | No                  | No                  | Yes                 | No                  | No                  | Yes                 |
| First-stage Instrument                                                   | --                  | --                  | --                  | PTSH                | PTSH                | PTSH                |
| -- Dependent variables are from Antitrust Enforcement Dataset.           |                     |                     |                     |                     |                     |                     |
| -- Robust standard errors clustered by country in parentheses            |                     |                     |                     |                     |                     |                     |
| -- *** p<0.01, ** p<0.05, * p<0.1                                        |                     |                     |                     |                     |                     |                     |