

# Competition Law and Regulations: Productivity impacts in Latin American manufacturing firms

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## Abstract<sup>1</sup>

This paper investigates the effects of competition laws and regulations on manufacturing firms' productivity in Latin American countries (LACs), addressing a gap in existing research. Leveraging firm-level panel data from the World Bank Enterprise Surveys across 14 LACs and competition law indicators from the Comparative Competition Law initiative, the study employs total factor productivity (TFP) measures to analyze the effects of competition laws on manufacturing productivity through key mediators: firm size, distance to the frontier, and broader institutional arrangements. Utilizing various empirical methodologies that address potential biases, the findings reveal a nuanced relationship between competition law stringency, enforcement practices, and productivity outcomes across different industries and countries. Results reveal heterogeneous effects of competition law and enforcement on productivity, with certain aspects showing a positive relationship with productivity, particularly when controlling for firm size, while stronger enforcement measures weaken the positive association between competition law and productivity, potentially due to increased compliance costs and legal uncertainty. The study suggests a need for policymakers to strike a balance between regulatory stringency and enforcement in competition to avoid stifling innovation and hindering productivity growth, particularly in industries nearing technological frontiers. Accounting for industry-specific factors is essential for fostering fair competition and market efficiency without unduly burdening businesses.

**JEL classifications:** K21, L11, O54

**Keywords:** Competition law and regulations, Firm productivity, Enforcement, LAC

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## 1. Introduction

Indicators that aim to measure the different and wide array of competition regulations in different countries/regions suggest that such regulations may effectively impose a higher burden on business in Latin America than they do elsewhere. For instance, the economy-wide product market regulation (PMR) indicators produced by the Organization for Economic Cooperation and Development (OECD) show that Non-OECD Latin American countries (Argentina, Brazil, Colombia, Costa Rica) have higher overall PMR than the rest of OECD countries in the PMR dataset (including two OECD LACs, Chile, Mexico), as discussed in Vitale et al. (2020). These indicators measure the regulatory barriers to firm entry and competition in a broad range of key policy areas, from licensing and public procurement to governance of State-Owned Enterprises (SOEs), price controls, evaluation of new regulations, and foreign trade. A drawback of the PMR for the LAC countries, however, is that these indicators are *de jure* ones: they reflect the status of the existing laws and regulations but do not capture their level of enforcement. More recently, the Comparative Competition Law (CCL) initiative, led by the Law Schools of Columbia University and the University of Chicago, has collected data on competition law around the world and has addressed the issue of enforcement (Bradford et al., 2019).

A major issue in LAC may be precisely the lack of enforcement and/or compliance with laws and regulations, as some countries (and sectors/groups within them) in the region have been characterized by a widespread informality (Loayza, 2018)—the latter understood as the set of firms, workers, and activities that work outside the legal and regulatory frames (Loayza, 2016). Some authors suggest that a heavier regulatory burden, particularly in product and labor markets, reduces growth and induces informality; that is, informality is a channel through which regulations affect economic growth, and Latin America has precisely been also characterized by low productivity (Loayza, Oviedo, and Servén, 2005). According to these authors these effects are, however, mitigated as the overall institutional framework improves.

Lack of institutions and policies to foster competition, or lack of enforcement therein, may lead to weak competition. In turn, weak competition can be behind low productivity, which is often reflected in high concentration, as entry barriers can protect activities with little future growth potential at the cost of new dynamic and productive ones (Sorsa, Arnold and Garda, 2019). Moreover, not only does weak competition create rents and lower labor share in value added worsening income distribution, but higher prices for consumers may also disproportionately affect

low-income households, hence the importance of studying competition law and regulations in developing countries such as those in LAC.

Despite the importance of analyzing the relations between competition regulations, enforcement and firm performance, little research has been done on Latin America. Only a few studies have addressed competition regulation in LAC, albeit focusing on the status of product market regulations (notably the reports produced by the OECD: both Vitale et al., 2022, and OECD, 2022, for Brazil, and country notes for Brazil, Chile, Colombia, Costa Rica, and Mexico). Other studies have addressed a plethora of regulations that exist in LAC and their impact on economic aspects such as informality and labor markets (e.g., David, Pienknagura and Roldos, 2020; Levy, 2018). No study has yet dealt with the connections between competition law and regulations and economic outcomes, such as productivity, in LAC.

Research that links competition regulations and productivity points to three key channels that may explain the effect of such regulations on productivity (e.g., Bourlès et al., 2013). The first is through fostering innovation, whereby early studies indicated a negative relation between competition and innovation in line with the creative-destruction Schumpeterian view (e.g., Romer, 1990), but subsequent studies—sometimes called neo-Schumpeterian—indicated positive or bell-shaped effects of competition on innovation (e.g., Aghion et al., 2001). A second channel is technology adoption, because barriers to competition may have negative effects on technology adoption (e.g., Parente and Prescott, 1999). A final channel is reallocation across heterogeneous firms, which has played a key role in both the neo-Schumpeterian approaches and the theories that emphasize the positive impacts of low market frictions and competitive pressures on reallocation from low- to high-productivity firms (e.g., Melitz, 2003). Empirical studies that focus on the latter channel have exploited the growing availability of firm-level data.

Our research contributes to this literature by analyzing the effects of competition laws and regulations on firms' productivity in LACs. We exploit the country, industry, and firm-size dimensions that may help account for differences in productivity performance. We take advantage of a natural experiment, the wave of competition laws, also called antitrust laws and regulations, that were enacted in some LAC countries in the 2000s in order to identify productivity effects (see Table A1 in Appendix 1). We use a twofold approach. First, we apply a standard difference-in-difference regression that exploits the natural experiment of a recent wave of competition laws in some LACs and availability of panel data at the firm level. Secondly, we adapt an approach that

uses industry- and/or firm-level data in a panel setting and exploits industry and/or firm dynamics to identify productivity effects of changes in regulatory framework (e.g., Nicoletti, Scarpetta and Lane, 2003; Buccirossi et al., 2013; Haltiwanger, Scarpetta and Schweiger, 2014).

Furthermore, our research contributes to the literature on competition regulation and productivity effects by: i) discussing antitrust laws and enforcement indicators as they relate to productivity effects on firms in LAC, pointing to heterogeneity in policy setting across countries in the Latin American region; ii) analyzing TFP productivity by firms' characteristics, during episodes of enactment of competition regulations and laws in LAC; iii) analyzing the impacts on productivity of antitrust legislation adoption in the 2000s and their implications for LAC manufacturing efficiency and economic policy in LACs; and iv) discussing policy implications of antitrust laws and regulations and their enforcement in LACs. It is worth emphasizing that the paper additionally discusses a comprehensive coding of antitrust laws in LAC, which has not been previously undertaken. While this is a by-product, it could well serve as the basis for further research.

The main findings reveal a nuanced relationship between competition law stringency, enforcement practices, and productivity outcomes across different industries and countries. There are heterogeneous effects of competition law and enforcement on productivity, with certain aspects showing a positive relationship with productivity, particularly when controlling for firm size, while stronger enforcement measures weaken the positive association between competition law and productivity, potentially due to increased compliance costs and legal uncertainty. The findings suggest a need for policymakers to strike a balance between regulatory stringency and enforcement in competition to avoid stifling innovation and hindering productivity growth, particularly in industries nearing technological frontiers.

The rest of this paper is organized as follows. Section 2 offers a context on competition law and regulations enacted in LACs and the goals stated in such laws, up to year 2010. It also offers some evidence of such legislation after 2010. Section 3 summarizes the relevant literature on competition regulation and firms' productivity performance. Section 4 presents the firm-level dataset used and discusses stylized facts about the measure of productivity used in the estimations and about the correlation between competition regulation measures and productivity in LAC, highlighting the role of industry and size, by country or group of LAC countries. Section 5 introduces the approach applied in the econometric estimations. Section 6 discusses the results for

the benchmark model, the policy-augmented specifications of the productivity equations, and the robustness tests. Section 7 concludes, discusses policy implications and offers venues for future research.

## **2. Competition Law and Regulations in LAC: Coding of a Comprehensive Set of Legislative Data**

Antitrust or competition law and regulations have a long history in some countries, particularly developed countries in Europe, the United States, and Canada. The United Kingdom, for example, enacted a Statute of Monopolies in 1623, and in 1809 Canada enacted what is considered to be the world’s first comprehensive competition statute (Bradford et al., 2018). The United States enacted the Sherman Antitrust Act in 1890. Although the first antitrust law enacted in LAC was Argentina’s Law 11.210 1923, the records in the Comparative Competition Law Dataset (CCLD), indicate that Law 11.210 does not state a generic competition goal.<sup>2</sup> More importantly, most LACs did not follow suit with antitrust legislation at that time. Mexico, the second country in LAC to enact some type of antitrust legislation, did so in 1927, but again with no specifically stated generic competition goal. The lack of widespread adoption of competition law in LAC, however, changed in the 1990s and the 2000s.

This paper discusses comprehensive coding of the competition laws in LAC up to 2010 undertaken by the CCL initiative, presenting data on competition law enactment, competition goal (if any) of the law, and other goals of such laws in Tables A1, A2, and A3, respectively, in Appendix 1. Tables A1 and A2 show that competition legislation sees widespread enactment in almost every LAC in the 1990s and in the 2000s. Notice that it was more common that a generic goal of competition was stated in such laws and regulations in the 2000s than in those of the 1990s. Also in the 2000s, competition law was less likely to target a specific sector (such as telecom) than it was the case in the 1990s legislation. Note that, even until 2010, several LACs had not enacted any competition law (notably, Ecuador and Paraguay) or did not participate in the 2000s wave of competition regulation enactment (Argentina and Venezuela).

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<sup>2</sup> Even if a country enacted a competition regulation with a generic competition goal stated in the law, that law might be specific to a sector or a group of sectors—the so-called Narrow Industry Coverage in the CCL dataset. See, for instance, the case of Bolivia’s Law 1600 of 1994 for sectorial regulation systems, which aimed to regulate service sectors to ensure these sectors operate efficiently, contribute to the development of the economy, and provide access of such services to all Bolivians (see columns “generic goal” and “generic goal stated, text” in Table A2).

As to why competition laws were enacted in LAC at a large scale during the 1990s and 2000s, an analogy may help explain these events. Hay (1985) attributed an augmented interest in competition policy in the United States and Western Europe to the surge in inflation triggered by the OPEC oil price increase in the early 1970s and to the inability or unwillingness of their governments to tackle OPEC directly—instead seeking alternative culprits and results. In LAC, some countries were embracing, or were starting to embrace, trade openness and were fulfilling WTO commitments in late 1990s and 2000s, which implied an emphasis on competition and competition policy.<sup>3</sup> Note that the latter has a broader connotation than a competition law. For some countries, more domestic market competition may have been achieved through trade liberalization; for others, through the adoption of competition laws; and, for others, through both.

When comparing the effects of trade liberalization and domestic regulation on price-cost margins (a measure of concentration or lack of competition) in many countries, Hoekman, Kee, and Olarreaga (2001) find that domestic entry regulation matters the most for large countries, whereas trade liberalization is more important for small countries.<sup>4</sup> These authors also note that *competition policy* refers to the multi-faceted national laws, rules and regulations that affect the market structure and the conduct of firms in the domestic economy, and thus a competition policy is a much broader concept than competition or antitrust law. Nonetheless, a key instrument of such competition policy is a competition law, and entry regulation has often been described as one of the most important components of a national competition policy.

The CCLD data suggest that competition or antitrust laws and regulations have proliferated across the globe over the past three decades, including even more recently in LACs. That proliferation raises the aforementioned question of what are the effects of the 2000s-wave of competition laws on LAC's market outcomes, such as firms' productivity.

It is also important to note that there may be other goals beyond the generic goal of competition in a competition law. Table A3 in Appendix 1 further presents data on goals stated in the competition laws—other than the generic goal of competition. The most frequently stated goals

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<sup>3</sup> Trade Policy Reviews (TPRs) available at the WTO website show that for many LACs competition policy was amongst their commitments with the WTO in the 1990s and 2000s.

<sup>4</sup> Note that, building up on these results of the significant impact that trade policies may have on competition in domestic markets and their efficiency (and other reasons, such as lack of enforcement of national laws), it has been said that the best competition policy is free trade. However, even if trade were perfectly free there could remain room for competition policies as new issues and institutions would be called for (Motta and Onida, 1997). For example, mergers collusions (or abuse of dominance) that might involve foreign firms and that call for national institutions to oversee, surveil and coordinate different actors (e.g., firms) to ensure that competition really applies and works.

are (usually stated together): consumer welfare and efficiency (Costa Rica 2008, Dominican Republic 2008, El Salvador 2004/6, Honduras 2005/6/7, Nicaragua 2006/7, Panama 2006/7/9, Peru 2008, Uruguay 2007), or might just be consumer welfare (Bolivia 2008, Brazil 2007) or only efficiency (Mexico 2006).<sup>5</sup> Worldwide, consumer welfare and efficiency are the most frequently stated goals in the competition laws, found in 40 percent and 31 percent of countries, respectively, in 2010 (Bradford et al., 2019).

As Bradford et al. (2019) point out, exemptions in the competition laws may be prevalent and significant: 68 percent of jurisdictions have at least one exemption in their laws in a given year, and exemptions often “tell an important story about the political economy underlying a law, indicating which companies or industries enjoy special privileges or protection by their governments” (Bradford et al., 2019, p. 11).<sup>6</sup> In a related account, Becker (1983) presents a theory of competition (for political favors) that combines the view of governments correcting market failures (e.g., monopoly) with the view that they do so favoring the politically powerful. In our

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<sup>5</sup> Other goals that might be stated in the competition laws of LACs include: “development” (Costa Rica 2008, Honduras 2005/6), “industrial policy” (Costa Rica 2008), “total welfare” (Costa Rica 2008). Colombia’s Law 590 of 2000 has provisions issued to “promote the development of micro, small and medium-sized businesses (Table A3).

<sup>6</sup> A possibility when enacting a competition law or regulation is that the legislation might be for all but with some exemptions. A concern is that carving out certain industries from the scope of the competition law may be creating less competition and/or a worse environment for productivity. Thus, it is important to gauge the extent to which the competition law and regulations have narrow industry coverage and/or exemptions. The CCL dataset helps us in gathering such information, because this dataset “...coded separately *for any given coded provision of the competition law* whether the provision exempts certain industries or categories of enterprises for all or part of the country’s competition law... in...four kinds of exemptions or narrow applications: Complete Category Exemptions, Partial Category Exemptions, Narrow Industry Coverage, or General Industry Exemptions. The difference between *complete* and *partial* category exemption is that the former exempts certain enterprise types—say, state monopolies—altogether from competition law, whereas the latter exempts them only partially, such as only when they perform certain public functions. *Narrow industry coverage* refers to sectoral regulations where some industry is brought within the scope of competition law even when the rest of the economy would remain unregulated. *General industry exemption* does the opposite by carving out certain industries from the scope of the law while leaving the law applicable to others.” (Bradford and Chilton, 2018, p. 21). We tabulate the exemptions as well as the narrow industry coverage in our sample of 14 LACs. The results show:

(i) General Industry Exemptions: only Mexico and Panama applied industry exemptions in the initial year (2005/2005) and these country and Bolivia applied industry exemptions in the final year (2009/2010) under study.

(ii) Complete and partial category exemptions are out of the scope of our study, given that they focus on state monopolies, state-owned or state-operated enterprises, or export cartels. Notice that there is a category of “other,” but we have no further information to assess whether such exemptions may matter or not for our study.

(iii) Narrow industry coverage is classified by industry as follows: “Energy” (present in Bolivia and Guatemala in 2005/2006; Bolivia, Guatemala, and Mexico in 2009/2010); “Telecom” (Bolivia and Honduras in 2005; Bolivia and Mexico in 2009/2020); “Transport” (Bolivia in 2005/2006; Bolivia and Mexico in 2009/2020); “Insurance” (none); “Agriculture” (none); and “Other” (present in Bolivia in 2005/2006 and in 2009/2020).

According to these tabulations, there is no widespread prevalence of exemptions, nor is there widespread narrow coverage in the competition legislation across LAC countries in our sample, but there is prevalence of such exemptions in some countries, notably Bolivia and Mexico.

study, **we argue that the effects of competition law on productivity may differ by firms' size.** These effects **can also be influenced by how countries' distance from a technological frontier.** Thus, large firms are not only more likely to be politically favored, but also may be expected to be closer to the frontier, and the latter may imply a negative productivity effect of more competition.

Productivity effects may also be determined by exemptions that generally large firms, or politically strong firms/sectors, may have. To capture such effects, our study moves beyond the binary indicator (1/0) of the enactment or in place (or not) of a competition law, which might be suitable for some applications, such as a before-and-after scenario in a difference-in-difference analysis. The binary variable does not account for variation in the nature of countries' competition law, the intensity of their enforcement, or their institutional arrangements, and there may be great variation in such nature as well as in the content of competition exemption and institutions across countries and time (as already seen at a glance, in Tables A2 and A3). Thus, Bradford and Chilton (2018) introduce the Competition Law Index (CLI) that aims to capture some of the nuances found in competition laws.

The CLI measures the intensity or stringency of competition regulation from 1889 to 2010, for 123 of 126 countries that had a competition law in place by 2010. This is an index calculated with two types of variables deemed key for a competition law by the experts of the CCL initiative: i) variables that aim to capture provisions on the *authority* granted to regulated competition, in other words, provisions on who can enforce the laws and the limits of their applications, such as remedies or private litigation; and ii) variables that apply to the *substance* of the law, that is, the substantive rules regarding competition: merger control, abuse of dominance, and anticompetitive agreements.

The CCL team created a coding of the elements of countries' competition law to construct the CLI based on previous work by Hilton and Deng (2007) and Nicholson (2008). The coding implemented by the CCL team to construct the CLI and the process to obtain the data required are explained in Bradford and Chilton (2018) and Bradford et al. (2019), respectively. Here, we only highlight two aspects on the index construction. First, the CCL guideline to assign points to later compute the index is: "The more types of behaviors the law prohibits or the more extensive remedies the law entails, the higher the CLI. ... the more defenses and exemptions the law provides, the lower the CLI." (Bradford and Chilton, 2018, p. 3).

Second, after the points are assigned for all the provisions corresponding to Authority and to Substance of the laws, the overall scores are calculated, ranging from 0 to 24.<sup>7</sup> Then these scores are normalized so that they range from 0 to 1, whereby “0” implies that a country does not have any competition statute in a given year, and “1” that a country has the most stringent legal regime in place.

Regarding the interpretation of the CLIs, it is important to note that:

*“The CLI is not meant to serve as a ranking of competition laws in terms of quality, appropriateness, or effectiveness. Instead, the CLI suggests that holding enforcement levels equal, firms face higher regulatory risk when countries have wider-ranging competition laws. As a result, higher values of the CLI are associated with higher regulatory risk, but higher values of the CLI are not necessarily associated with “better” competition laws”* (Bradford and Chilton, 2018, p. 1, footnote 4).

Figure A1 in Appendix 2 shows the different types of CLIs for our sample of LACs with a competition law, as well as those for the United States, the United Kingdom, Canada, and Spain for year 2010. That is, we have the overall CLI, and the CLIs for the two types of categories: Authority and Substance, and the (substance) subindices for merger control, abuse of dominance, and anticompetitive agreements. Argentina stands out for having values of CLIs that are all close to one, while Brazil, Colombia, and Uruguay are similarly notable but with lower values of CLIs than Argentina. These high values of CLIs suggest that there is a higher regulatory risk in these countries than in the rest of our LACs. In contrast, Bolivia and Guatemala show the lowest CLIs amongst our country sample, suggesting that their competition regulation implies a lower regulatory risk than that of other LACs. The CLIs for the United States, the United Kingdom, Canada, and Spain are included as a reference given their longer history in competition law and regulation.

Both the range of values amongst the different types of CLIs and the average stringency of regulatory risk vary, as shown by the size of the boxes and the solid line within each box, respectively, in Figure A2 in Appendix 2. The subindices for merger control and the CLI

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<sup>7</sup> When combining the two categories, Authority and Substance, into one index, the CCL team weights their components in a way that ensures a 50 percent weight from authority provisions and 50 percent weight from those in substance. Given that authority may yield up to 6 points in total, the weights imply that such points are doubled. Bradford and Chilton (2018) explain that the goal in doing so is to make competition authority provisions equally as important as substantive provisions.

exemptions show both the larger variance amongst all types of CLIs. The nature of the substance matter being addressed (for the case of the merger control index) and the way the index is constructed (for CLI exemptions) may explain their greater variation.<sup>8</sup> The two subindices that show the higher mean stringency of the competition laws in our LACs are those that represent abuse of dominance and anticompetitive agreements. The overall CLI shows that 50 percent of our observations are between 0.78 and 0.57, with an average of 0.65 (and a median of 0.64), and a minimum value of 0.30 (Bolivia) and a maximum overall CLI value of 0.94 (Argentina).

Finally, for the sake of completion, we note that there is yet another possible further adjustment made available by the CCL team. This possible adjustment aims to account for regional antitrust regimes. This is the case of CLI data for the Andean Community (CAN, by its acronym in Spanish, which includes Bolivia, Colombia, Ecuador, and Peru) for years 2005 to 2010. Throughout this period, however, each CLI has the same value. Thus, for instance, the overall CLI for the CAN is 0.471. We do not use these CAN CLIs.

We focus our analysis on the years 2005 and 2010 due to the availability of both a comprehensive information on competition law from the CCL database up to 2010, provided by the tremendous effort of the CCL initiative, and firm-level data provided by the World Bank Enterprise Surveys, the latter available only for years between 2005 and 2010 in a suitable panel format. There are, of course, more competition laws and regulations for some LACs in earlier years (before 2005) and later years (after 2010).<sup>9</sup> We have shown, however, that significant widespread enactment of the competition laws and regulations happened in the period under analysis (2005-

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<sup>8</sup> As previously discussed in this section, because some countries (Bolivia, Mexico or countries in Central America) frequently have exemptions for provisions in their antitrust regimes, having an adjusted CLI might be important for LAC (note also that there may be different types of exemptions in the provisions of a law). For Bradford and Chilton (2018), however, the CLI adjusted (for exemptions) is not their preferred index for two reasons: i) The overall CLI is simpler and already captures multiple elements, thus they hesitate to introduce further nuance; and ii) the adjusted CLIs is highly sensitive to a multiplier they use in their calculation, assigned to their narrow application or the exemption.

<sup>9</sup> Regarding what has transpired in the LAC concerning competition laws after 2010, we note the following: Ecuador enacted her first competition law in 2011, and the corresponding regulations in 2012 (although in 2009 this country allowed the national application of Decision 608 of CAN). Argentina enacted a New Competition Defense Law, Law 27442 of 2018. Mexico published a Federal Economic Competition Law effective May 23, 2014, with reforms afterwards (e.g., reform of May 20, 2021). Paraguay enacted the Competition Defense Law, Law 4956 of 2013, its rules through Decree 1490 of 2014, and later some reforms with Decree 3488 of 2020. Uruguay amended Law 18.159 of July 20, 2007 (published July 30, 2007) relating to the defense of free competition in commerce, with Law 19.833 of 2019. This country also enacted a modification of Decree 404/007, regulating Law 18.159, with the Decree 194 of 2020.

2010), thus demonstrating that this period offers a natural experiment to analyze the productivity effects of the competition law in LACs.

### **3. Literature Review**

Whether competition spurs productivity—and if so, how—has long been regarded as a central question to economics. Moreover, to the extent that competition can be influenced by policy, that is not just an academic debate. Holmes and Schmitz (2010) point to two key steps in the study of such issues: i) defining what is meant by a change in competition; and ii) given that we find productivity changes, understanding the mechanisms through which competition impacts productivity. Both are challenging issues. These authors review the literature that has examined industries experiencing dramatic changes in their competitive environment and find that increases in competition lead to increases in industry productivity. Plants that survived increases in competition were typically found to have large productivity gains, and these gains often accounted for the majority of overall industry gains.

The review of Holmes and Schmitz highlights findings that point to changes in incentives to invest and innovate associated to changes in productivity when there is more competition. They also point out a remaining challenge: understanding the X-efficiency or within-plant productivity gains following increased competition (aka “the channels”), noting that no model has been accepted as a workhorse model to address such issues.

Granted, competition regulation/law by itself may be challenged (and be a challenge to implement) if antitrust regulations are used to subvert competition, a subject usually discussed in the context of industrialized nations (e.g., Baumol and Ordover, 1985, for the United States), and if enforcement is absent or if there is poor enforcement, the latter usually discussed in the context of LACs.

Not long ago, literature surveys pointed out the lack of empirical evidence on productivity and competition regulation (Bartelsman and Doms, 2000; Syverson, 2011). After purposeful and continuous efforts to collect data on product market regulation by the OECD, such studies—albeit focused on OECD countries—have emerged. Indeed, the empirical estimation of the effects of competition regulations on productivity started in the early 2000s with the availability of the then-new dataset on product market regulation for OECD countries. Those analyses have found how product market regulations and productivity growth may be in practice connected. For instance,

Nicoletti, Scarpetta and Lane (2003) highlight that productivity gains from competition are greater the further from the technological leader a manufacturing industry in a given country is. These authors also discuss issues of: i) ownership and performance (given the assumptions that for efficiency private ownership is superior, and arm's length regulation—instead of direct control—reduces the risk of regulatory failure in network industries (energy, transport, telecommunications); ii) competition and management practices; and iii) how product market competition may also affect dynamic efficiency via incentives to innovate—that is, the bell-shaped relation between innovation and competition, previously mentioned in the introduction. The empirical estimations in Nicoletti, Scarpetta and Lane (2003) reveal links between performance and some of the policy determinants of product market competition instead of looking for correlations between performance and proxies for product market competition (such as concentration indices, mark-up estimates, measures of trade openness, etc.). These authors explain how their approach lessens measurement problems, and that, over reasonable lapses of time, policies can be assumed to be exogenous, especially to multifactor productivity outcomes (their measure of productivity) that are usually reported with lags.

Given the goal of the antitrust law of promoting competition, the causal link between the regulatory framework and efficiency goes through the effect of the former on market competition (Buccirossi et al., 2013). In other words, competition laws may improve productivity by facilitating reallocation across heterogeneous firms (less efficient firms go out, more efficient come in) and promoting cost-reduction investment by incumbent firms. Empirical studies that focus on the reallocation channel have exploited the growing availability of firm-level data. Research that estimates reallocation and productivity predicts precisely that, in addition to technology and market driven factors (such as prices), the institutional and regulatory framework in which firms operate has an impact on the pace of that reallocation (e.g., for job reallocation and productivity see Mortensen and Pissarides, 1994; and, Hopenhayn & Rogerson, 1993) and that restrictions that dampen the reallocation process in turn dampen productivity (Buccirossi, et al., 2013).

Other approaches take advantage of recent availability of data on competition regulation in upstream industries—at least for OECD countries—that allow for identification of productivity impacts in downstream industries, some in a panel of countries setting (e.g., Bourlès et al., 2013) and others in static cross-country analyses or single-country studies. The use of panel data, also followed in our research, allows controlling for unobservable issues that can be a source of

estimation bias. With a panel of countries, Bourlès et al., (2013) concluded that anticompetitive regulations in upstream industries curb productivity growth downstream, with nonlinear effects that depend on distance to the frontier—along with the neo-Schumpeterian framework. Their identification strategy is based on difference-in-difference approach (a variant of Rajan and Zingales, 1998) that exploits information on the use of intermediate inputs from the regulated upstream industries: the impact of upstream regulations on downstream productivity should be growing with the intensity of use of such intermediate inputs. Unfortunately, the data on upstream industry regulation available for the majority of LAC are still scant. In fact, there remains a lack of empirical evidence on productivity and competition regulation among developing countries in general, despite the widespread enactment of antitrust regulations since the 2000s.

Recent availability of data on productivity for LAC, with a homogenized estimation framework (the World Bank’s Enterprise Surveys, or WBES) allow us to analyze the productivity effects of competition laws at the firm level and in a panel-data setting.

Moreover, surveys on the productivity effects of competition highlight the use of firm-level data because several interesting questions can be addressed effectively only with microdata (Bartelsman and Doms, 2000). They include i) whether, and how, changes in antitrust enforcement or deregulation of markets change interactions in the market, reduce entry and exit barriers, and alter incentives to invest in new production capacity; ii) some identification issues that can be addressed with longitudinal firm-level data; and iii) the large amount of heterogeneity in productivity across firms, whereby the framework of firm behavior helps to explain this variation.

Finally, we highlight two key lessons from the analysis of productivity effects of competition regulation from Bartelsman and Doms’s review on productivity and micro-level data: “Quantifying the importance of various factors behind productivity growth, such as changes in the regulatory environment or changes in technology, is a difficult task and has been only partially successful...” and “...any regulations that inhibit resource reallocation can have detrimental effects on productivity growth.” (Bartelsman and Doms, 2000: 571).

## **4. Data and Stylized Facts about Productivity and its Correlation with Competition Regulations in LAC**

### ***4.1 Firm-level Data Source***

This study relies on firm-level data derived from the World Bank Enterprise Surveys (WBES, available at <https://www.enterprisesurveys.org>). The WBES collects data on firm characteristics and firm performance, and on a broad range of business environment topics, including access to finance, corruption, infrastructure, crime, regulations, and competition. This dataset was collected for 2006 and 2010 and constructed as a two-year panel for 14 Latin American and Caribbean economies: Argentina, Bolivia, Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay.<sup>10</sup> The universe consists of the formal private-sector economy in manufacturing and service industries. However, the large majority of the samples comes from manufacturing and its sampling design includes stratification (World Bank, 2009). Only firms with five or more employees are included, and firms with 100 percent state ownership are excluded. Only registered firms are included, and registration is defined as registration for taxation purposes.<sup>11</sup> LAC is the first region to be surveyed using a global methodology over multiple periods, in a panel setting.

### ***4.2 Productivity Measures: Descriptive Statistics***

Our variable of interest is total factor productivity (TFP) of the firm. The variable is obtained from Francis et al. (2020), who provide two estimates of TFP at the firm level: one based on a Cobb-Douglas function and the other one using the more flexible Translog function.<sup>12</sup> Evidence is found in favor of using the flexible Translog specification, and hence this is the one we rely on. The specification comes in two variants depending on whether the dependent variable is the value added (VAKL) or the gross output per firm (YKLM). Sales (Y), employment (L), capital stock

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<sup>10</sup> The following LAC countries are not included: Costa Rica and Dominican Republic, for which panel data are not available, and Venezuela and Brazil, for which complete data on productivity are not available. Moreover, for Brazil, the panel covers the 2003-2009 years pair, which departs from the 2006-2010 pair for all the other countries.

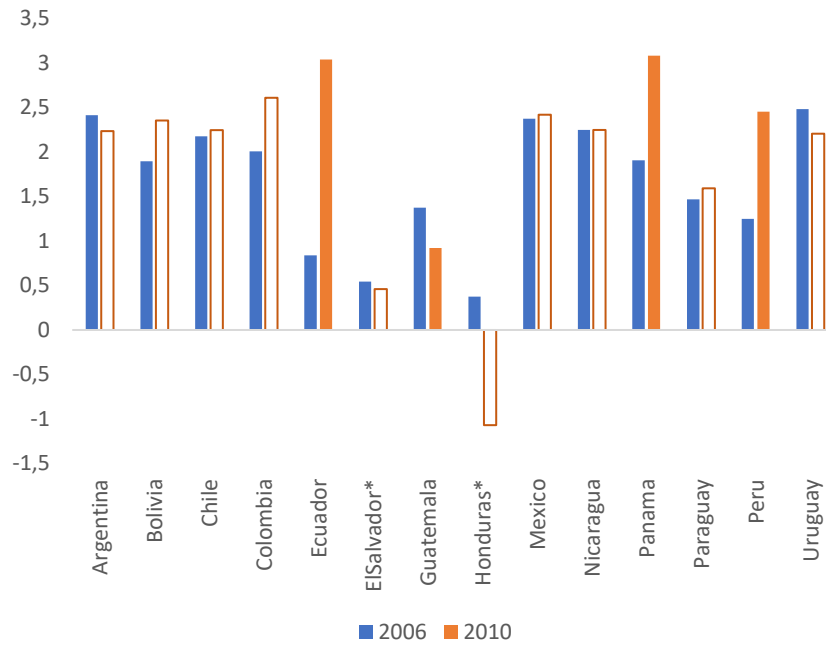
<sup>11</sup> However, the WBES has collected data on LAC informal firms for some countries in some years, in separate surveys.

<sup>12</sup> It is critical to note that the Cobb-Douglas estimation assumes a constant elasticity of output, which implies that a firm's elasticity to capital output does not depend on its use of labor, which may be unrealistic. That is why estimations are done separately for each industry at the two-digit ISIC code over pooled economies. Given that the assumption of constant elasticities of output for all inputs seem too stringent, then a Translog specification, which does not impose such restrictions, is used. Note that the estimations in Francis et al. (2020) assume that the production function, either Cobb-Douglas or Translog, is sector-specific but common across countries.

(K), and intermediate inputs (M) are used from the survey question to enter the estimation. It should be outlined that the two measures, despite measuring TFP, are fundamentally different. The TFP measure based on gross output considers the total output produced by the firm, including intermediate inputs. It reflects overall efficiency in production, considering the entire production process from inputs to final output. On the other hand, the TFP measure based on value added considers only the value added by the firm, excluding intermediate inputs. It focuses on the efficiency of transforming inputs into final output. Hence, we rely on the latter as our metric. The figures are residual numbers, which means that they do not have a measurement unit and hence should be observed only through their changes either over time or across various categories (e.g., various industry branches, different firm sizes). The estimates are available only for manufacturing firms. All estimates take into consideration the survey design for the WBES by incorporating both stratification and probability (survey) weight information.

In absolute value, the TFP measure (averaged across firms and countries) has a weighted average value of 2.18 (using survey weights), a median of 2.01, and a span between -3.78 and 8.91. Average values by country are shown on Figure 1. There is notable heterogeneity in the average TFP across LAC countries, with some countries clearly standing out with an average TFP significantly higher than that of others. For example, Ecuador and Panama have the highest TFP, while El Salvador and Honduras are positioned on the other end. Observed between the two years, TFP increased in most countries (or at worst stalled), with the exception of the lowest-positioned countries, which experienced significant reductions in growth or even declines.

**Figure 1. Total Factor Productivity for LAC Countries, 2006 and 2010**



*Source:* Authors' calculations based on data from WBES and Francis et al. (2020).

*Note:* Empty bars signify statistical insignificance of the difference in the total factor productivity between the two years. The countries noted with a star (\*) have small sample sizes, but we leave them for completeness of the sample.

For LAC as a region, TFP increased between 2006 and 2010. The simple regression which controls for firm-level fixed effects reveals that the increase in TFP has been 0.36 points, representing about 27 percent of the standard deviation.

Table 1 presents the differences in TFP across a few observable characteristics of firms and their geography. For example, firms in all country groupings are more productive than those in Central America (the reference group in this particular set of estimations). Firm size matters for productivity, as small firms are less productive than both medium and large firms, with no clear difference existing between the latter two. Firms' industry does not differentiate productivity levels. The location within the country vis-à-vis the capital city suggests that firms in the capital are more productive. Likewise, when the firm belonged to a larger holding, and when it used foreign technology, it achieved higher total factor productivity. Whether the firm exported or not, does not matter.

**Table 1. Difference in Total Factor Productivity across Characteristics for LAC as a Region**

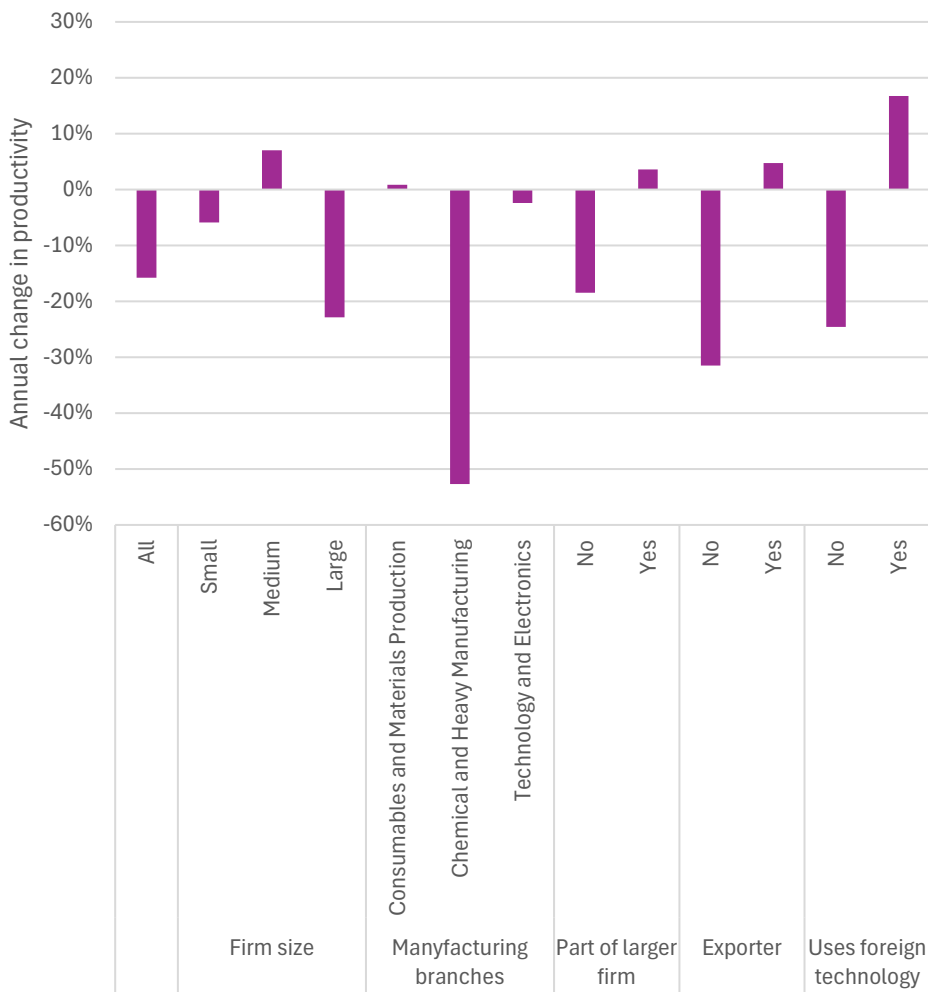
		TFP
<b>Region (ref. Central America)</b>	Andean Comm.	0.323** (0.160)
	Mercosur	0.450** (0.182)
	Argentina	0.581*** (0.166)
	Chile	0.603*** (0.160)
	Mexico	0.986*** (0.204)
	<b>Firm size (ref. = Small)</b>	Medium
	Large	0.213** (0.086)
<b>Industry group (ref. = Consumables and Materials Production)</b>	Chemical and Heavy Manufacturing	0.0654 (0.056)
	Technology and Electronics	-0.0246 (0.156)
<b>Location (ref. = Capital city)</b>	City with population over 1 million – other than capital	0.0481 (0.131)
	Over 250,000 to 1million	-0.431** (0.190)
	50,000 to 250,000	-0.615*** (0.180)
	Less than 50,000 population	1.245** (0.559)
	<b>Is the firm a part of a larger company?</b>	Yes
<b>Does the firm export?</b>	No	-0.0602 (0.061)
<b>Does the firm use foreign technology</b>	Yes	0.292*** (0.097)

*Source:* Authors' calculations based on data from WBES and Francis et al. (2020).

*Note:* The grouping of manufacturing branches is given in Table A4 in Appendix 1.

For the entire region, TFP declined by 15.8 percent (Figure 2), but growth performance was not even. Some categories exhibit negative changes in productivity, with significant declines in large firms, chemicals and heavy manufacturing, and non-exporting firms. However, firms that use foreign technology and medium firms show positive productivity changes, which may signify that these entities benefit from access to advanced technologies, economies of scale, and possibly more efficient processes.

**Figure 2. Changes in TFP between Years, across Observable Characteristics**



Source: Authors' elaboration using data from WBES and TFP measures by Francis et al. (2020).

### 4.3 Competition Regulations and Productivity in LAC

As stated in previous sections, the dataset on competition regulations in LAC comes from the indicators of competitive law and regulations (<https://comparativecompetitionlaw.org/>; see Bradford et al., 2019). The Comparative Competition Law initiative provides a series of datasets with information on key aspects of antitrust legislation such as the year of the coding, the goal of the legislation, exemptions and specific industry application, and an index that measures the stringency of competition regulation: the Competition Law Index, CLI, (see Bradford and Chilton, 2018), the details of which were presented in Section 2. Note that in our analysis we rely on the three further variants of the index: CLI – Authority, CLI – Substance, and CLI – Exemptions.

The CCL initiative also offers the Comparative Competition *Enforcement* Dataset, with data on competition agencies' resources and activities in 100 jurisdictions between 1990 and 2010. Information on goals, exemption and specific-industry applications, as well as enforcement, are key to understanding the potential effects of the antitrust legislation. In addition to the CLI overall and the CLI adjusted by exemptions (that both incorporate data on provisions and activities related to enforcement, such as the Authority to enforce the law), the CCL initiative offers an 1/0 enforcement indicator that points to such enforcement efforts. We do not use this dummy as it does not provide information on the stringency of enforcement efforts. In addition to the CCL data, we use data on judiciary quality from the Economic Freedom of the World (EFW) dataset to adjust the CLIs –as a complementary data to account for enforcement (see Gwartney et al., 2005).<sup>13</sup>

Figure 3 shows correlations between the intensity of antitrust law and regulations (measured by the CLI overall index) and the productivity measure (VAKL) found in Francis et al. (2020). Recall that the CLI index ranges from 0 to 1, with higher values indicating higher regulatory stringency, though higher values of the CLI are not necessarily associated with “better” competition laws. It is interesting to note that the simple correlations between these two types of indicators, one of productivity, and the other of intensity of competition, are negative (albeit small) in the first year 2006, suggesting that higher regulatory stringency is on average related to lower TFP, while their correlation turns positive in the subsequent year 2010.

Recall that Table A1 (in Appendix 1) shows that, during the period between 2006 and 2010, several LACs registered (new or first-time) antitrust laws and regulations. A negative correlation between productivity and competition in 2006, whereby more stringent antitrust laws was related to less productivity, in an environment where the region lacked an extensive regulatory framework, may suggest that some regulation in that sense was needed. The positive correlation observed between productivity and competition in 2010—that is, a more stringent competitive regulations are associated with more productivity—in a year after a period (between 2006 and 2010) when several LAC countries have been issuing competitive laws and regulations suggest that such

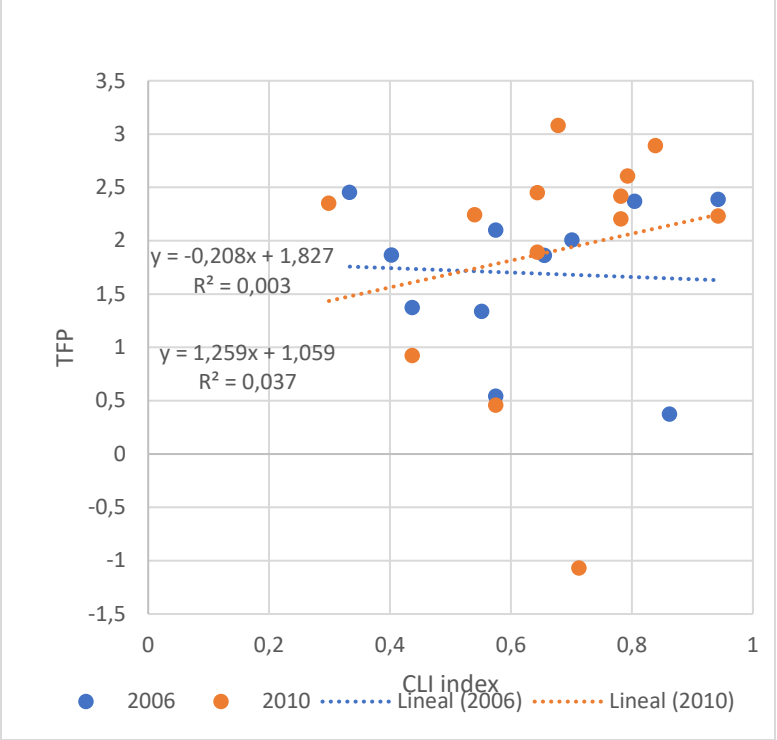
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<sup>13</sup> Indeed, the enactment of a competition law and regulations by itself, if not enforced, has no impact. Enforcement is a multifaceted and complex concept to measure. The CLIs include provisions and activities that matter for (but are not the only aspects of) enforcement. The CLIs do so by including, for instance, data on provisions and activities for authority to enforce competition law. However, the CLIs do not include broader institutional arrangements that “...can reveal important aspects of the actual operation of the law and influence the overall de facto stringency of the competition law regime.” (Bradford et al., 2019: 17).

By interacting the CLIs, each at a time, with the EFW variables (while controlling for each of the EFW variables used, each at a time) we aim to capture those important aspects of the enforcement of the competition law.

regulations may be associated with positive and significant effects on productivity. The issue is to demonstrate that such a relation is more than just a correlation and that causality can be attributed to the competition laws and regulations of that positive TFP effect—more importantly, that growth in TFP (that is, over time, not just in a given year) can be the result of the enactment, enforcement and fulfillment of competition laws and regulations.

**Figure 3. TFP and Competition Law Index (CLI overall), for LACs, Correlations in 2006 and 2010**



*Source:* Authors’ calculations based on data from WBES, Francis et al. (2020), and the CCL dataset.

**5. Empirical Strategy**

In this section we develop our empirical strategy for the analysis of the productivity effects of antitrust laws and regulations enacted in the 2000s in our panel sample of LAC manufacturing firms. This strategy is developed based on the following results discussed in the previous section: i) a suggested significant effect of the antitrust laws and regulations on productivity in the period under study, ii) a significant share of the total variance in productivity observed in the data

explained by size, and iii) in particular, large firms show larger negative changes in productivity. The latter result is consistent with the literature which highlights that productivity gains from competition are greater the further from the technological leader a manufacturing industry in a given country is (assuming that large firms are closer to the leader than other firms are).

**Basic model.** We start our analysis by estimating the direct link between competition law and TFP growth in country  $c$ , firm  $i$ , at time  $t$ . Given that we only have two years, we drop the time index. Given the TFP data available, we start our analysis with a baseline specification using only TFP manufacturing:

$$(1) \text{tfp}_{c,i,t} = \alpha_1 + \alpha_2 \text{REG}_{c,t} + \sum \beta_j X'_{c,i,t} + \gamma_{c,i} + \gamma_t + \varepsilon_{c,i,t}$$

where  $\text{tfp}_{c,i,t}$  is the TFP for firm  $i$  in country  $c$  at time  $t$ ;  $\text{REG}_{c,t}$  is the indicator of the competition laws and regulations, which comes in two forms: i) as a dummy variable taking a value of “1” for the country  $c$  which in period  $t$  had in force such laws, and “0” otherwise; and ii) as the CLI index of intensity or stringency of competition, in country  $c$  in year  $t$ .  $X'_{c,i,t}$  is a vector of observable characteristics at the firm level: the firm’s size, firm’s age, firm manufacturing group (consumables, chemicals, technology), whether the firm is a part of a larger group, whether it is an exporter or not, and whether it uses foreign technology. Unobserved heterogeneity is modeled by means of an error term with a combined country-firm specific fixed-effect ( $\gamma_{c,i}$ ), that accounts for the time-invariant unobserved heterogeneity, and the time dummies ( $\gamma_t$ ) control for common macroeconomic shocks that may affect TFP growth in all countries at the same time.<sup>14</sup>  $\varepsilon_{c,i,t}$  is the idiosyncratic error, which is assumed to be well-behaved.

**Size.** In estimation (1), we regress the firm-level TFP measure on a country-level competition law index measure. This may pose a technical difficulty, given that the latter is invariant at the firm level, which may result in large standard error of the estimate and hence insignificant results. We overcome this problem by relying on firm’s size before we introduce all descriptive variables, through multiplying the competition law variable with the log of the firm’s size expressed as number of workers which is a continuous variable. This has another advantage, as it helps us

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<sup>14</sup> It is important to note that in the 2000s and early 2010s some LAC countries embarked on a series of reforms (not just antitrust) as a result of their commitments with the WTO.

answer the question of whether larger firms are more or less productive compared to smaller firms when all face stronger competition regulation. The adjusted equation (1) has the following form:

$$(2) \quad tfp_{c,i,t} = \alpha_1 + \alpha_2 REG_{c,t} + \alpha_3 REG_{c,t} * lsize_{c,i,t} + \sum \beta_j X'_{c,i,t} + \gamma_{c,i} + \gamma_t + \varepsilon_{c,i,t}$$

**Regulations and enforcement.** To control for possible differing degrees of enforcement in the antitrust legislation and to account for the importance of institutional arrangements, we adjust our regulatory CLI variables following the adjustment borrowed from Haltiwanger et al. (2014) with some alterations, as follows:

$$(2') \quad REGadj_{c,t} = \frac{EFW\ index_{c,t}}{10} REG_{c,t}$$

where  $EFW\ index_{c,t}$  corresponds to one-at-a-time of the following indicators from the EFW dataset introduced in Section 4.3:

- **Judicial Independence:** This indicator measures the extent to which the judiciary operates independently from other branches of the government.
- **Impartial Courts:** Impartial courts gauge the degree to which the judiciary is free from bias or external pressures, ensuring fair and just adjudication.
- **Legal System and Property Rights - No Gender Adjustment:** This indicator provides an overview of how well a country's legal framework protects property rights and ensures a conducive environment for economic activities, without specifically addressing gender-related legal distinctions.

The equation is hence as follows:

$$(3) \quad tfp_{c,i,t} = \alpha_1 + \alpha_2 REGadj_{c,t} + \alpha_3 REGadj_{c,t} * lsize_{c,i,t} + \alpha_4 EFWindex_{c,t} + \sum \beta_j X'_{c,i,t} + \gamma_{c,i} + \gamma_t + \varepsilon_{c,i,t}$$

**The role of technology: distance to the frontier (DTF).** The literature stresses that regulations may lead to a catch-up to best practice, whereby productivity growth in a given country depends on this ability to keep up with growth in the country with the highest level of productivity (the productivity leader) through innovation or technology transfers (Aghion and Howitt, 2005). Such literature has also stressed the role of institutions in promoting (or hindering) firm competition and/or entry of new firms in raising (or deterring) incentives to enhance productivity (Aghion and

Griffith, 2005). Thus, we also control from how distant from the technological frontier (the United States being the leader) a given country is, in the following specification:

$$(4) \quad tfp_{c,i,t} = \alpha_1 + \alpha_2 REG_{c,t} + \alpha_3 DTF_{c,t} + \alpha_4 REG_{c,t} * DTF_{c,t} + \alpha_5 lsize + \alpha_6 REG_{c,t} * lsize_{c,i,t} + \alpha_7 REG_{c,t} * lsize_{c,i,t} * DTF_{c,t} + \alpha_8 EFIndex_{c,t} + \sum \beta_j X'_{c,i,t} + \gamma_{c,i} + \gamma_t + \varepsilon_{c,i,t}$$

$$(4') \quad tfp_{c,i,t} = \alpha_1 + \alpha_2 REGadj_{c,t} + \alpha_3 DTF_{c,t} + \alpha_4 REGadj_{c,t} * DTF_{c,t} + \alpha_5 lsize + \alpha_6 REGadj_{c,t} * lsize_{c,i,t} + \alpha_7 REGadj_{c,t} * lsize_{c,i,t} * DTF_{c,t} + \alpha_8 EFIndex_{c,t} + \sum \beta_j X'_{c,i,t} + \gamma_{c,i} + \gamma_t + \varepsilon_{c,i,t}$$

where  $DTF_{c,t}$  is the “productivity gap,” which is measured as the ratio of the level of productivity in each country relative to that of the productive leader, i.e., the United States. For example, if  $DTF_{c,t}=0.9$ , it implies that the country is at a productivity level which is 90 percent of that of the United States. The distance to the frontier is obtained from the Penn World Table international comparisons of production, income and prices 10.0, TFP level at current PPPs (United States=1) for the years 2005 and 2009. Note that we also complement equation (4) with the  $REGadj_{c,t}$ , defined in (2'), as shown in equation (4').

**Identification issues.** The challenge in an estimation of causality effects between competition law and TFP hinges on the ability to account for any potential source of endogeneity of our key policy variable. At the country-level aggregates, endogeneity may arise from omitted variable bias, two-way causality, and measurement errors. As is known, endogeneity may render our OLS estimates biased and/or inconsistent.

As in Buccirossi et al. (2013), we think that the two-way causality is not a major problem in our estimations. Our policy variable, the indicator of antitrust laws or the CLIs, aggregates several competition law characteristics that are unlikely to promptly respond to changes in TFP growth, even the version of the CLI that captures some relevant enforcement aspects such as human and financial resources. Moreover, as pointed out by these authors, certain regulations are slow to evolve and react independently of specific and short-run changes in market outcomes or efficiency indicators.

The concern about measurement errors, at least of some type, is reduced because we use harmonized data on productivity, which has been estimated with a survey data that is collected with the same methodology. Similarly for the policy variable based on CLIs.

Nonetheless, the major source of concern is omitted variables bias. The exclusion of some regulations may lead to omitted variable bias, insofar as regulations tend to be highly correlated (Haltiwanger et al., 2014). For instance, countries that impose some regulation on mergers may also impose some regulation in some goods and services markets. The panel data allow us to control for time-invariant unobserved individual heterogeneity at the firm-country level using fixed effects. Similarly, we control for common shocks that may affect productivity applying time fixed effects. But there still may be time-varying unobserved heterogeneity, such as that arising from other competition-enhancing policies, that is, other policies correlated with antitrust laws that might affect TFP levels or growth rates. Among the most relevant policies affecting competition are product market regulation, liberalization, and privatization, and trade openness. We control for trade openness; however, the lack of data prevents us from controlling for product market liberalization, privatization and product market regulation.<sup>15</sup> The latter should be less of a concern in our study to the extent that our sample comprises firms in manufacturing industries rather than services –as manufacturing industries are less prone to be a target of PMR. In contrast to services, manufacturing should be more affected by competition law than PMR. Services, in general, are subject to strong sector-specific product market regulations (e.g., price control, entry regulation, and state ownership) which play a more important role in service industries than competition law in determining competition in services and therefore their productivity outcomes (Buccirossi et al., 2013). Moreover, to the extent that product market regulation clashes with competition policy, the latter will be less effective in industries where more restrictive product market regulation prevails (Buccirossi et al., 2013; Nicoletti, Scarpetta and Lane, 2003).

If any omitted variable bias may be present, we follow an instrumental variable (IV) approach. The endeavor to find suitable instruments may be difficult, given that a valid instrument needs to satisfy two criteria: first, it needs to be correlated with the endogenous regressor, in this case the Competition Law; and second, it must not correlate with shocks to productivity, except

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<sup>15</sup> Note that there may be other types of regulations, such as labor market regulations –and in LAC countries labor market regulations have been characterized by its high cost (for example, strict rules of hiring and firing)– that may also affect productivity (e.g., Haltiwanger, Scarpetta, & Schweiger, 2014). There is also evidence that regulations in labor market and in product market tend to be correlated across countries (e.g., Nicoletti & Scarpetta, 2005).

through the CLI policy variable. We rely on the following set of instruments, derived from the EFW database, which we believe satisfy the two criteria:

- **Regulatory Burden:** This indicator assesses the extent of regulatory burden imposed on businesses within a country. It considers the regulatory framework that businesses need to navigate and evaluates the overall burden of regulations on economic freedom.
- **Impartial Public Administration:** This indicator measures the impartiality of public administration. It assesses whether public administration functions in a fair and unbiased manner, free from undue influence or favoritism, which is crucial for ensuring a level playing field for businesses.
- **Business Permits:** This indicator specifically focuses on the regulations related to obtaining business permits. It assesses the ease or difficulty of obtaining necessary permits for starting or conducting business activities, reflecting on bureaucratic processes and potential hurdles.
- **Freedom to enter markets and compete:** This indicator evaluates the freedom businesses have to enter markets and compete with others. It considers barriers to entry, restrictions on competition, and other factors that may impact the ability of businesses to operate freely within the marketplace.

These are “regulatory” types of variables. These instruments capture various facets of the legal and regulatory environment, reflecting key components of the institutional framework within which businesses operate. Their relevance lies in their association with regulatory conditions that businesses face, making them plausible determinants of variations in the competition law framework. Importantly, these instruments are assumed to be excludable from productivity shocks, ensuring that any observed correlation between them and productivity operates solely through their impact on the competition law indicator. This strategic selection aims to fulfill the essential criteria for instrumental variables, enhancing the robustness of the analysis and contributing to a more accurate estimation of the relationship between competition law and productivity. In any case, we apply standard statistical tests to examine instruments’ excludability.

**Estimation method.** To estimate equations (1) to (4), we employ a simple OLS with fixed effects. To instrument the potentially endogenous variables, we rely on the IV/GMM estimation of the fixed-effects and first-differences panel data models with possibly endogenous regressors.

## 6. Empirical Results

### 6.1 The Basic Model

The estimates of the basic model (1) are given in Table 2. This table presents the results for the two basic representations of the competition law: as a dummy and as an index. We first include the competition variable only, then its product with firm's size, then both along the firm's size, and then adding all other descriptive variables. Countries that introduce some form of competition laws in the later period exhibit higher productivity, as both the coefficient on the dummy and its interaction term with size are positive and significant, although only in the regressions without controls. However, this is not the case when the overall Competition Law Index is used. Actually, the full specification remains quite robust in that countries which introduced antitrust laws or higher regulatory risk, reflected in higher CLI, exert a positive relationship with the TFP –again only in the regressions without controls.

**Table 2. Baseline Results Using CLI Overall**

<i>Dependent variable: TFP</i>								
	<b>Dummy on competition law</b>				<b>Index on competition law</b>			
<b>Competition law</b>	0.226**		0.0826	0.347	0.357		0.273	-0.549
	(0.114)		(0.229)	(0.232)	(0.428)		(0.846)	(0.793)
<b>Competition law * Size</b>		0.0599**	0.0424	0.052		0.088	0.0298	0.349
		(0.029)	(0.058)	(0.058)		(0.098)	(0.265)	(0.264)
<b>Log size</b>			0.0266	-0.0132			0.0317	-0.22
			(0.098)	(0.101)			(0.197)	(0.191)
<b>Firm's age in years</b>				-0.0068				-0.0054
				(0.005)				(0.004)
<b>Firm is part of larger firm</b>				-0.205				-0.162
				(0.144)				(0.146)
<b>Firm does not export</b>				-0.0282				-0.0261
				(0.144)				(0.145)
<b>Firm uses foreign technology</b>				0.0861				0.09
				(0.171)				(0.170)
<b>Chemical and Heavy Manuf. (ref. = Consumables)</b>				0.193				0.123
				(0.274)				(0.268)
<b>Technology and Electronics (ref. = Consumables)</b>				0.428				0.236
				(0.436)				(0.436)
<b>Year dummy (2010 = 1)</b>	0.203**	0.213**	0.195**	-0.0462	0.350***	0.347***	0.344***	0.307***
	(0.092)	(0.086)	(0.092)	(0.083)	(0.061)	(0.061)	(0.062)	(0.066)

<b>Constant</b>	1.945*** (0.027)	1.943*** (0.028)	1.850*** (0.344)	2.143*** (0.401)	1.724*** (0.260)	1.752*** (0.211)	1.599** (0.628)	2.429*** (0.585)
<b>Observations</b>	2,254	2,253	2,253	2,152	2,254	2,253	2,253	2,152
<b>R-squared</b>	0.059	0.06	0.06	0.069	0.055	0.055	0.055	0.049
<b>Number of cpanelid</b>	1,489	1,489	1,489	1,429	1,489	1,489	1,489	1,429

Source: Authors' calculations.

\*, \*\* and \*\*\* refer to statistical significance at the 10, 5 and 1% level, respectively. Robust standard errors provided in parentheses.

To delve deeper into the notion that different aspects of the competition regulation may be relevant for productivity rather than the competition law framework in its aggregate, Table 3 presents the results (the full specification) using the CLI authority, CLI substance, and CLI exemptions, as per their descriptions earlier. Results remain generally consistent; i.e., competition law remains insignificant for firms' productivity. An exception is the *authority* aspects of the competition law, which is significant and positively related to productivity when considering the variation in firm's size (Table 3, first column), suggesting that while larger firms are less productive on average, the competition law framework attenuates this effect.<sup>16</sup>

It is critical to note that we acknowledge the possibility that the general insignificance of how certain types of competition law indicators (notably, the overall CLI, or the CLI exemption) relate with firm productivity could be influenced by factors like the size of our sample, the type of competition information contained by the indicator, or the fact that competition indices are available at the country level, while our dependent variable is at the firm level.

**Table 3. Baseline Results for CLI Subindices**

VARIABLES	<i>Dependent variable: TFP</i>		
	CLI authority	CLI substance	CLI exemptions
<b>Competition law</b>	-0.659 (0.806)	-0.813 (0.903)	-0.469 (0.872)
<b>Competition law * Size</b>	0.590** (0.252)	-0.27 (0.277)	0.231 (0.250)
<b>Log size</b>	-0.366** (0.182)	0.2 (0.208)	-0.107 (0.194)
<b>Firm's age in years</b>	-0.00516 (0.004)	-0.0055 (0.004)	-0.00564 (0.004)
<b>Firm is part of larger firm</b>	-0.143 (0.146)	-0.198 (0.146)	-0.159 (0.148)
<b>Firm does not export</b>	-0.0331	-0.00421	-0.0275

<sup>16</sup> But when we use CLI substance, and when we use CLI authority both the coefficient on the dummy and its interaction term with size are significant, again, only in the regressions without controls. These results are not shown in Table 3 but are available upon request.

	(0.143)	(0.144)	(0.144)
<b>Firm uses foreign technology</b>	0.0827	0.0993	0.0896
	(0.169)	(0.169)	(0.170)
<b>Chemical and Heavy Manuf. (ref. = Consumables)</b>	0.138	0.125	0.125
	(0.263)	(0.271)	(0.269)
<b>Technology and Electronics (ref. = Consumables)</b>	0.157	0.28	0.239
	(0.435)	(0.435)	(0.444)
<b>Year dummy (2010 = 1)</b>	0.261***	0.373***	0.336***
	(0.065)	(0.064)	(0.059)
<b>Constant</b>	2.532***	2.616***	2.292***
	(0.583)	(0.691)	(0.666)
<b>Observations</b>	2,152	2,152	2,152
<b>R-squared</b>	0.06	0.054	0.048
<b>Number of cpanelid</b>	1,429	1,429	1,429

**Source:** Authors' calculations.  
Note: \*, \*\* and \*\*\* refer to statistical significance at the 10, 5 and 1% level, respectively. Robust standard errors provided in parentheses.

The insignificance of competition law indicators in relation to firm productivity, as observed in the estimates, may be driven by the gap between the law on paper and the law in practice, particularly regarding institutional arrangements that may influence the stringency/enforcement of the competition law. While competition laws and regulations are designed to enhance market efficiency, their impact on firm-level productivity relies heavily on how effectively they are enforced and the presence of institutions conducive to that. This discrepancy between the formal legal framework and actual enforcement as well as differences in broader institutional features may explain why competition law indicators, such as the overall Competition Law Index (CLI overall), do not show a strong relationship with productivity outcomes. Consequently, the observed insignificance may be more reflective of institution challenges rather than the inadequacy of the laws themselves. To address this issue, we next control for broader institutional enforcement features to better capture the practical implementation of competition laws and its impact on productivity.

While doing so, we continue to highlight the potential and important channels that the literature points to when studying productivity effects of competition: firm size and distance to the frontier. Hence, we continue to use both (interacted, separate and together, with the competition policy variable in turn analyzed) as a source of variation to capture the competition effects on productivity.

## 6.2 Competition Law Enforcement

When competition law *enforcement*, captured by broader institutional features of the EFW indicators, is included in the regression (Table 4) the CLI coefficients become significant and negative. This suggests that **stronger enforcement weakens the positive role of competition law for productivity**. This finding could have several explanations. First, if the focus of enforcement is primarily on deterrence through punitive measures (fines, penalties), it may lead to a cautious business environment. Firms, fearing legal consequences, might become overly conservative and refrain from aggressive competitive strategies, which could have otherwise driven productivity improvements. Second, stringent enforcement may impose high compliance costs on businesses. If companies have to allocate significant resources to ensure compliance with complex competition regulations, it might divert attention and resources away from productive and innovative activities. This can hinder overall productivity. Third, overly aggressive enforcement actions or frequent changes in enforcement priorities may create legal uncertainty. Businesses might find it challenging to navigate an unpredictable regulatory landscape, leading to a reluctance to invest in long-term productivity-enhancing strategies. Fourth, strong enforcement might inadvertently favor larger, well-established firms that have the resources to navigate and influence regulatory processes, as we find a significant coefficient for the cross product between the competition law (enforced by institutions as captured by the EFW indicators) and firm size. However, this may result in reduced market dynamism, as smaller competitors may face higher entry barriers, limiting the positive impact of competition on productivity. Fifth, if institutional arrangements for enforcement disproportionately target certain industries or firms, it may create distortions in competition. In such cases, industries facing stringent enforcement might experience a slowdown in productivity growth compared to those facing less regulatory scrutiny. Finally, in environments with historically weak competition culture, sudden and/or forceful enforcement might be perceived as a disruptive shock. Companies may struggle to adapt to a more competitive landscape, initially leading to a dip in productivity.

A second notable result is that, when the enforced competition law is adjusted for size, the coefficient of this interaction term is positive and significant, though only in the case when competition index is observed through its *authority* component (again as in Table 3). This suggests that, **for larger firms, the negative effect of competition law, when considered through enforcement lens, weakens**. Recall that the authority component of the competition law refers to

the provisions on who can enforce the laws and the limits of their applications, such as remedies or private litigation. So, for the larger firms, more stringent competition law enforced within the limits of authorities provides for a better competitive environment, in which larger firms are less cautious than smaller firms in pursuing their competitive strategies and/or could better handle the costs of compliance with complex competition regulations.

**Table 4. Results with CLI Adjusted for Institutional Aspects of Enforcement**

<i>Dependent variable: TFP</i>			
	<i>Judicial independence</i>	<i>Impartial courts</i>	<i>Legal system</i>
	<b>CL dummy</b>		
<b>Competition law adj.</b>	0.372	-0.159	0.372
	(0.354)	(0.384)	(0.371)
<b>Competition law adj.* Size</b>	0.0792	0.0485	0.0825
	(0.091)	(0.097)	(0.093)
	<b>CLI overall</b>		
<b>Competition law adj.</b>	-1.679	-2.595*	-2.12
	(1.294)	(1.406)	(1.489)
<b>Competition law adj.* Size</b>	0.369	0.672	0.741
	(0.435)	(0.475)	(0.497)
	<b>CLI authority</b>		
<b>Competition law adj.</b>	-2.582*	-2.867*	-2.557*
	(1.373)	(1.490)	(1.547)
<b>Competition law adj.* Size</b>	0.868*	1.096**	1.229**
	(0.469)	(0.498)	(0.477)
	<b>CLI substance</b>		
<b>Competition law adj.</b>	-1.402	-3.436**	-1.873
	(1.375)	(1.510)	(1.623)
<b>Competition law adj.* Size</b>	-0.239	0.0493	-0.32
	(0.417)	(0.467)	(0.499)
	<b>CLI exemptions</b>		
<b>Competition law adj.</b>	-2.319*	-1.741	-1.954
	(1.393)	(1.491)	(1.554)
<b>Competition law adj.* Size</b>	0.393	0.505	0.558
	(0.428)	(0.454)	(0.446)

*Source:* Authors' calculations.

*Note:* \*, \*\* and \*\*\* refer to statistical significance at the 10, 5 and 1% level, respectively.

Robust standard errors provided in parentheses. The estimations are based on the full equation (3), hence including firm size and the other descriptive variables, firm, country and time fixed effect, but these are not show due to space.

### **6.3 Distance to the Technological Frontier (DTF)**

Table 5 presents the results, which control for how far each included country from the technological frontier is, the latter represented through the United States' TFP. The first thing to

note is that our results are now distilled: in most of the specifications, the relationship between competition law and productivity becomes significant and positive even when the institutional arrangements conducive to enforcement are not controlled for, suggesting that **the inclusion of the TFP frontier itself clears the relationship between competition law and productivity**. Second, the coefficient of the distance to the frontier is positive and statistically significant in most of the specifications. It implies that **when a LAC country is closer to the United States' TFP, the underlying circumstances in the economy, law, or regulation are favorable for firms to be productive**. This likely includes unobserved levels of competitiveness. Therefore, strengthening competition law would have a greater effect where TFP is low.

However, the third and most relevant finding for us is the negative and statistically significant coefficient on the product between the competition law and the distance to the frontier. The finding implies that, **under certain conditions, a more robust competition law framework may not have the expected positive impact on firms' productivity, particularly when the country is closer to the technological frontier**. There are a couple of avenues to explain this result. First, it is plausible that as a country approaches the technological frontier, the incremental productivity benefits of a stringent competition law may diminish. In technologically advanced environments, firms may not prioritize innovation and technological advancements if competition regulation becomes more stringent. A dynamic where firms are pushing technological boundaries might be less conducive to gains in productivity if competition policies are more intense, and the focus could shift towards not fostering innovation. Second, a negative coefficient could also suggest that in industries at the forefront of technology, monopolistic or oligopolistic structures might be more prevalent. In such cases, a strict competition law may not be as effective in enhancing productivity if the market is dominated by a few key players. Third, it is conceivable that in advanced technological settings, an overly strict competition law might impose a regulatory burden on firms, potentially stifling innovation and agility. Finally, advanced technological markets may be inherently more complex, requiring nuanced regulatory approaches. Competition policies might need adjustments to address the intricacies of such markets effectively.

Going back to our results in Table 5, the product between competition law and size is positive and statistically significant only for the case of the competition-law dummy variable—that is, when we control only for broader institutional arrangements at the time of the enactment of the competition law (without considering further enforcements aspects that are in the CLIs but

not in the competition-law dummy). When considering enforcement by CLIs their coefficient is negative but not significant. Similarly, the triple product of the competition law, size and DTF is positive but statistically insignificant for all specifications, excepting the regressions where the competition law dummy is negative and significant, which points to the potential detrimental effect on productivity of, for instance, stronger enforcement institutions when competition legislation is enacted with firms closer to the technological frontier in larger firms.

**Table 5. Results Controlling for Distance to the Technological Frontier (DTF)**

	<i>Dependent variable: TFP based on value added</i>			
	No enforcement adjusted	Judicial independence	Impartial courts	Legal system
	<b>CL dummy</b>			
<b>Competition law_adj.</b>	1.238 (1.205)	6.931** (2.912)	4.455* (2.435)	2.959 (2.102)
<b>DTF</b>	-0.925 (3.836)	-7.613 (4.919)	-4.862 (3.924)	-1.551 (3.770)
<b>Competition law_adj.*DTF</b>	-1.344 (1.914)	-9.548** (4.272)	-6.005* (3.540)	-3.519 (3.083)
<b>Competition law_adj.* Size</b>	0.465 (0.283)	0.903* (0.476)	1.077* (0.558)	0.886* (0.455)
<b>Competition law_adj.* Size * DTF</b>	-0.664 (0.469)	-1.285* (0.728)	-1.502* (0.829)	-1.252* (0.695)
	<b>CLI overall</b>			
<b>Competition law_adj.</b>	21.76*** (5.086)	34.40*** (9.934)	41.97*** (13.560)	41.11*** (9.513)
<b>DTF</b>	24.16*** (3.243)	21.95*** (3.100)	21.44*** (3.508)	27.55*** (3.249)
<b>Competition law_adj.*DTF</b>	-34.46*** (7.142)	-53.44*** (13.840)	-64.55*** (18.870)	-66.01*** (13.250)
<b>Competition law_adj.* Size</b>	-0.249 (0.835)	-0.494 (1.593)	0.236 (1.835)	-0.42 (1.572)
<b>Competition law_adj.* Size * DTF</b>	0.71 (1.096)	0.985 (2.075)	0.311 (2.452)	1.128 (1.994)
	<b>CLI authority</b>			
<b>Competition law_adj.</b>	22.13*** (5.328)	40.13*** (10.670)	47.95*** (13.010)	44.85*** (9.554)
<b>DTF</b>	18.50*** (3.133)	19.39*** (2.857)	17.74*** (2.955)	22.97*** (3.014)
<b>Competition law_adj.* DTF</b>	-34.67*** (7.645)	-62.13*** (14.920)	-73.22*** (18.110)	-71.58*** (13.430)
<b>Competition law_adj.* Size</b>	-0.306 (0.865)	-0.458 (1.716)	-0.174 (1.992)	-0.33 (1.576)
<b>Competition law_adj.* Size * DTF</b>	1.007 (1.166)	1.271 (2.263)	1.098 (2.686)	1.432 (2.090)
	<b>CLI substance</b>			
<b>Competition law_adj.</b>	13.84*** (5.219)	16.50* (8.597)	<b>3.906</b> (10.580)	20.99** (8.672)

<b>DTF</b>	24.29*** (4.702)	17.51*** (3.973)	9.349** (4.019)	22.32*** (4.372)
<b>Competition law_adj.* DTF</b>	-23.88*** (7.381)	-27.58** (12.060)	<b>-11.14</b> (14.620)	-36.24*** (12.110)
<b>Competition law_adj.* Size</b>	-0.601 (0.744)	-1.021 (1.324)	-0.0384 (1.558)	-1.126 (1.351)
<b>Competition law_adj.* Size * DTF</b>	0.619 (0.976)	1.224 (1.743)	0.179 (2.081)	1.324 (1.741)
<b>CLI exemptions</b>				
<b>Competition law_adj.</b>	4.213 (3.975)	<b>19.44**</b> (7.804)	<b>-5.512</b> (10.230)	<b>28.64***</b> (9.121)
<b>DTF</b>	8.694*** (3.362)	13.79*** (2.936)	3.151 (2.933)	19.48*** (3.465)
<b>Competition law_adj.* DTF</b>	-6.958 (5.539)	<b>-31.54***</b> (10.770)	<b>5.379</b> (14.230)	<b>-46.79***</b> (13.040)
<b>Competition law_adj.* Size</b>	0.00336 (0.794)	-0.504 (1.531)	0.249 (1.797)	-0.746 (1.502)
<b>Competition law_adj.* Size * DTF</b>	0.188 (1.064)	0.914 (2.007)	0.25 (2.440)	1.54 (1.993)

*Source:* Authors' calculations.

*Notes:* \*, \*\* and \*\*\* refer to statistical significance at the 10, 5 and 1% level, respectively. Robust standard errors provided in parentheses. The estimations are based on the full equation (4), hence including firm size and the other descriptive variables, firm, country and time fixed effect, but these are not show due to space.

To illustrate the meaning of our results, we take a median firm with size of 30 workers, DTF of 69.3 percent; as well the median *large* firm (all firms over 50) which is sized 120 workers, DTF of 71 percent; and show how the marginal effect of CLI (overall) adjusted for enforcement on firm TFP varies across different levels of competition law variables, holding firm size and DTF constant at their median values (Figure 4a and Figure 4b, respectively). Note that the figures present the marginal effects with the impartial courts variable used to capture broader institutional arrangements for enforcement, and a regression without the explanatory variables for simplicity (coefficients remained largely the same as in Table 5).

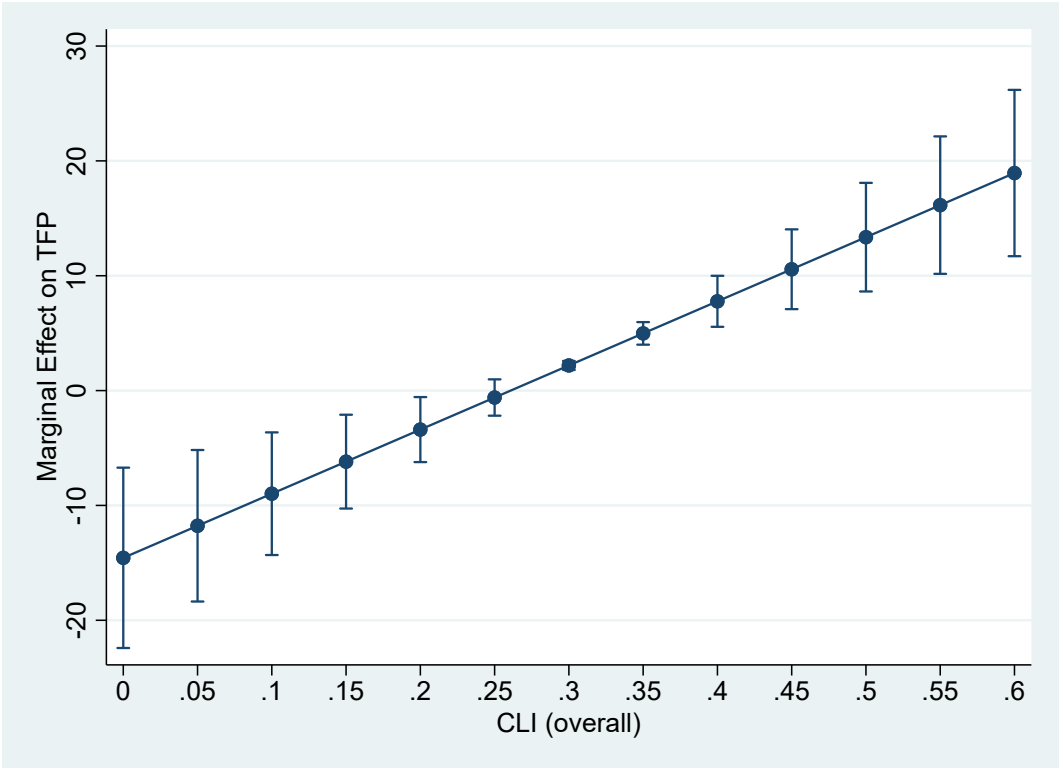
Figure 4a suggests that as CLI moves from 0 to 0.6 (the actual range of values; recall that the value of the CLIs range from 0 to 1, being 1 the more stringent competition law setting), we can observe an upward trend in the marginal effects, indicating that **as CLI adjusted for enforcement becomes stricter, median-firm productivity is enhanced**. The effect is statistically significant when CLI has a value of 0.3 and above. **For the median firm, when CLI increases, e.g., from 0.4 to 0.5, firm TFP is expected to increase by approximately 5.58 points, which is slightly over quadruple its standard deviation, hence representing quite a significant incremental effect.**

Figure 4b corroborates the upward trend in the marginal effects for the large firms, but with less steepness, indicating that **as CLI adjusted for enforcement becomes stricter, the**

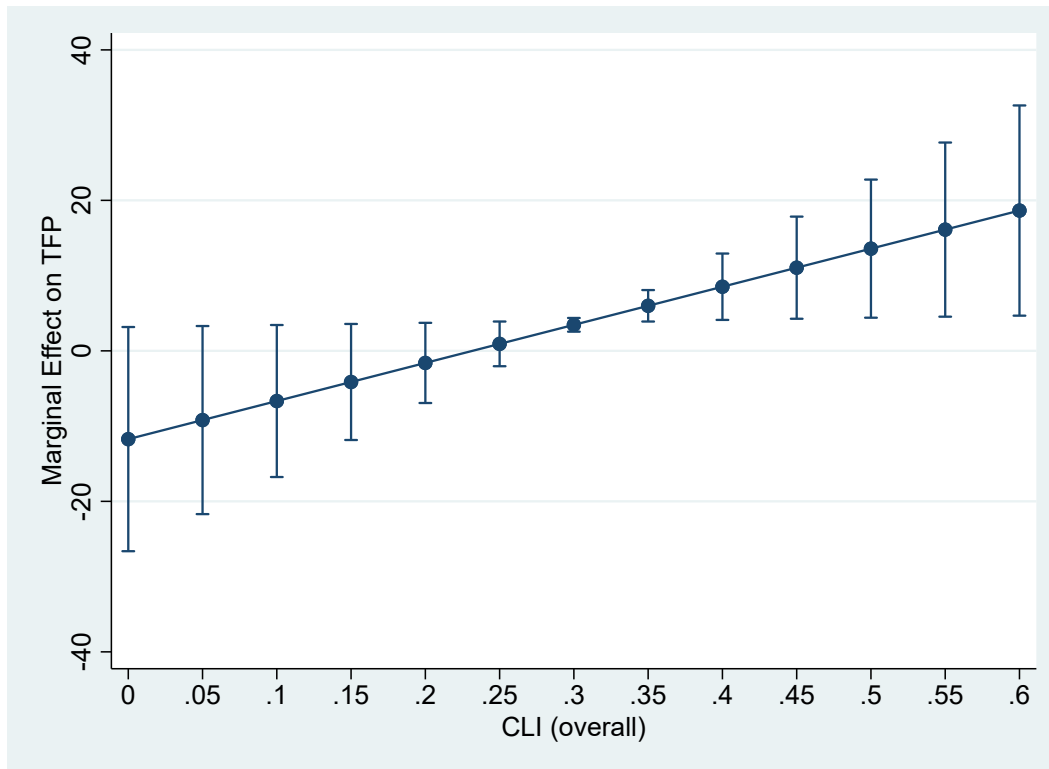
productivity of the median *large* firm is enhanced but to a lesser extent than that of the median firm. The effect is statistically significant when CLI has a value above 0.3. For the median large firm, when CLI increases, e.g., from 0.4 to 0.5, firm TFP is expected to increase by approximately 5 points, which is slightly lower than the effect for the whole sample.

Figure 4. Impact of CLI (overall) on Firm TFP

a) Marginal Effects for Median Firm



**b) Marginal Effects for Median Large Firm**



Source: Authors' calculations.

We consider the above results central to our analysis. As a robustness check and to mitigate potential biases arising from assuming a linear relationship between firm size (which is continuous variable in our case) and firm productivity, firm size was transformed into four categorical groups: small (1-9 employees), medium-sized (10-49), large (50-249), and very large firms (over 250). The results are presented in Table A5 in Appendix 1; they remained robust, confirming that the effects observed in the original specification with the continuous size variable were consistent even after adjusting for these categorical distinctions. This supports the validity of the earlier findings.

**6.4 Robustness Checks: Industry Differentiated Effects**

In Table 6, we disaggregate results from Table 5 by industrial branch. We use four industrial branches for which we had sufficient number of degrees of freedom: Food, Textiles, Garments, and Chemicals. Note that, to preserve space, we only adjust the competition law variable with the institutional enforcement based on EFW's index on *impartial courts*. Different industrial branches may have unique characteristics, market structures, and competitive dynamics that can influence

how competition law affects firms within each branch. Moreover, enforcement practices may vary across sectors due to industry-specific factors, such as market concentration, barriers to entry, and the nature of competition. By examining enforcement within each industrial branch, one can identify whether certain sectors face challenges or gaps in implementation, contributing to a more targeted and tailored enforcement strategy.

Results in Table 6 reveal some distinctive patterns at the industry-branch level. Our general finding that **competition law stringency—adjusted by broader institutional enforcement aspects—is positive for firms’ productivity is confirmed to a substantive degree in only three branches: textiles, garments and chemicals**. Competition law may act as a catalyst for firms in these sectors to adopt more competitive strategies, leading to increased productivity. On the other hand, the lack of significance in the food branch could be influenced by industry characteristics that make them less responsive to competition law or enforcement measures. For instance, these industries might face different market structures, with barriers to entry that competition law enforcement may not effectively address. Additionally, the regulatory environment, historical industry practices, or other external factors specific to each sector may contribute to the variation in findings.

Likewise, the closer the industries are to the technological frontier, the weaker the effect of competition law adjusted by enforcement for productivity. In the majority of the cases, this negative coefficient exceeds in size the positive coefficient on the basic variable, suggesting that closeness to the technological frontier could indeed turn the positive effect of competition law for productivity into a negative one, particularly in the aforementioned three industrial branches. Reasons for this have been elaborated in the paragraphs above.

An interesting result is that the product of the competition law (adjusted by broader institutional features of enforcement) and size gains significance for some industries. For example, in textiles, **larger firms are fairly consistently associated with a reducing positive role of competition law for productivity** (the sign is negative). This may imply various things happening in this sector. Firstly, larger textile firms may leverage their resource advantage, including legal expertise and financial resources, to mitigate the impact of competition regulations through lobbying or legal maneuvers. Secondly, economies of scale enjoyed by larger firms might diminish the incremental benefits of competition law enforcement compared to smaller competitors. Moreover, the dominance of larger firms in the market may reduce competitive pressure, thereby

limiting the effectiveness of competition law in fostering productivity gains. Additionally, the compliance costs associated with competition regulations could disproportionately burden larger firms, offsetting some of the productivity benefits. Then, the coefficient for the garments is opposite – positive, in some of the specifications, but not robust, while the coefficients in the other industries are statistically insignificant, altogether in line with our observations in Table 4.

**Table 6. Results Controlling for Distance to the technological Frontier, by Industrial Branch**

	Food	Textiles	Garments	Chemicals
<b>CL dummy</b>				
Competition law_adj.	2.683 (2.065)	7.615** (3.798)	12.18*** (2.451)	9.140*** (2.338)
DTF	0.792 (3.716)	1.199 (8.834)	-4.375 (5.732)	-8.145 (5.764)
Competition law_adj. * DTF	-4.016 (2.654)	-11.57** (5.041)	-17.66*** (3.192)	-12.31*** (3.125)
Competition law_adj. * Size	0.00794 (0.130)	0.103 (0.318)	0.346** (0.166)	-0.156 (0.195)
<b>CLI overall</b>				
Competition law_adj.	-2.116 (13.990)	132.9* (78.850)	56.13** (21.790)	58.73*** (18.880)
DTF	6.047 (4.379)	69.09* (39.380)	41.18*** (9.902)	34.18*** (9.957)
Competition law_adj. * DTF	-0.68 (19.710)	-181.7 (110.800)	-92.87*** (29.330)	-86.88*** (26.470)
Competition law_adj. * Size	0.385 (0.423)	-2.082** (0.900)	2.43 (1.710)	-0.48 (1.034)
<b>CLI authority</b>				
Competition law_adj.	7.85 (13.470)	53.92* (30.760)	64.26*** (19.730)	63.82*** (15.770)
DTF	7.465** (3.450)	23.17* (12.120)	32.32*** (8.057)	28.11*** (7.546)
Competition law_adj. * DTF	-13.99 (18.970)	-70.65* (42.570)	-104.8*** (26.210)	-94.44*** (21.810)
Competition law_adj. * Size	0.277 (0.438)	-1.748* (0.953)	2.623** (1.279)	-0.308 (1.125)
<b>CLI substance</b>				
Competition law_adj.	-17.07 (14.040)	-56.49 (47.330)	-17.54 (18.470)	22.9 (19.860)
DTF	0.136 (6.338)	-37.59 (35.180)	10.44 (11.690)	22.89* (13.080)
Competition law_adj. * DTF	18.04 (19.410)	85.61 (68.210)	19.79 (25.930)	-36.79 (28.310)
Competition law_adj. * Size	0.592 (0.470)	-1.906** (0.935)	-0.728 (2.230)	-0.666 (1.386)
<b>CLI exemptions</b>				
Competition law_adj.	-22.71 (15.490)	-37.16 (57.730)	-37.76 (32.450)	35.91 (46.510)
DTF	2.025 (2.583)	-11.42 (29.880)	6.795 (13.870)	22.74 (19.890)
Competition law_adj. * DTF	30.79 (22.120)	57.06 (81.410)	43.04 (45.940)	-56.02 (66.690)
Competition law_adj. * Size	-0.0264 (0.415)	-1.484** (0.711)	2.162* (1.232)	0.621 (1.050)

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Source: Authors' calculations.

Note: \*, \*\* and \*\*\* refer to statistical significance at the 10, 5 and 1% level, respectively. Robust standard errors provided in parentheses. The estimations are based on the full equation (4), hence including firm size and the other descriptive variables, firm, country and time fixed effect, but these are not shown due to space. The triple product of competition law, size and DTF is included, but estimates were not obtained due to insufficient number of observations.

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## 6.5 Endogenous Competition Law

Finally, we present the results with the instruments for Competition Law (adjusted for enforcement based on *courts' impartiality*) and its products with size and DTF (Table 7). Also, note that we instrument the competition law variable and its product with size (in each column denoted as 1); then we add the product with the DTF to the list of endogenized variables (in each column denoted as 2); we leave the triple product with the size and DTF outside the list of endogenized variables (due to estimation issues). Below each set of variables, two tests are provided to check the instruments validity: under-identification test and Hansen J statistics. For the former, we are guided by the general rule that the associated p-value needs to be lower than 5 percent, while for the latter we are interested to see a value exceeding 5 percent to claim instruments are valid. We could be generally satisfied with the instruments used, despite on few occasions (marked with italic), we failed to institute their suitability. Hence, these cases need to be treated with caution.

When instrumented, both the positive effect on productivity of competition law interacted with and controlled for institutional features of enforcement, as well the diminishing role of the distance to the productivity frontier (which was documented in Table 5) vanish, except when the CLI dummy is considered. Notably, in some specifications, the coefficient on the competition law becomes negative, but the effect is neither robust nor stable (the validity of the instruments in the case of CLI substance cannot be verified through the standard tests).

On the other hand, the consideration of endogeneity uncovers the positive effect of competition law and its enforcement strength onto productivity when size is considered as moderating variable. Results suggest that **increasing the stringency and enforcement of the competition law institutes a positive effect on productivity in larger firms**. Results still offer some prominence to the technological frontier. They suggest that the positive impact of competition law and stringency for productivity among larger firms is attenuated when a firm nears the productivity frontier. This is a result we earlier found (Table 5) for all firms, but the consideration of endogeneity clearly spells out that these relationships hold true for the larger firms

more so than for the smaller. This may be due to factors such as improved market efficiency, fair competition, and innovation incentives, which can disproportionately benefit larger firms when regulations are effectively enforced, particularly when they compare closer to the technological frontier.

Moreover, the consideration of endogeneity makes the triple effect of competition law corrected for enforcement with size and DTF clearly significant and negative, which was rather sporadic earlier. This suggests that **when a firm is larger and closer to the productivity frontier, the effect of increasing competition law enforcement becomes less beneficial or even negative.** This may be because highly productive firms nearing the frontier could be hindered by overly stringent regulations that limit their flexibility or ability to innovate further.

**Table 7 – Results with CLI and its products instrumented**

	<i>Dependent variable: TFP</i>									
	CL dummy		CLI overall		CLI authority		CLI substance		CLI exemptions	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
<b>Competition law_adj.</b>	46.98*	45.12*	-132.4*	-131.3*	-195.3	-197.8	-106.7**	-106.4**	-120.2	-116.5
	(26.780)	(25.230)	(72.400)	(74.150)	(137.700)	(135.200)	(46.180)	(46.420)	(82.800)	(109.100)
<b>Competition law_adj. * Size</b>	-11.11	-10.31	45.49**	45.26**	60.10*	60.64*	37.93***	37.82***	63.14***	63.20***
	(7.640)	(7.080)	(17.830)	(18.290)	(33.310)	(32.710)	(12.890)	(13.260)	(20.980)	(21.630)
<b>Competition law_adj. * DTF</b>	-68.34*	-64.08*	160.0*	156.7	248.2	254.2	120.9**	119.8**	160.1	152.9
	(39.250)	(36.310)	(94.330)	(105.300)	(182.900)	(192.100)	(57.790)	(60.920)	(115.500)	(194.200)
<b>Competition law_adj. * Size * DTF</b>	16.21	14.73	-56.56**	-55.80**	-76.74*	-78.10*	-45.91***	-45.59***	-87.32***	-86.93***
	(11.110)	(10.180)	(22.490)	(25.570)	(43.070)	(45.470)	(15.600)	(17.280)	(28.960)	(29.290)
<b>DTF</b>	-8.603*	-9.134*	10.65	11.1	5.076	4.425	14.00*	14.11*	28.10*	29.3
	(5.048)	(5.226)	(7.930)	(8.816)	(10.880)	(11.880)	(8.295)	(8.008)	(15.320)	(28.000)
<b>UT♣</b>	0.020	0.030	0.003	0.004	0.067	0.062	0.001	0.001	0.001	0.478
<b>HS♣♣</b>	0.315	0.319	0.631	0.349	0.935	0.722	0.107	0.037	0.842	0.601

Source: Authors' calculations.

Note: \*, \*\* and \*\*\* refer to statistical significance at the 10, 5 and 1% level, respectively. Robust standard errors provided in parentheses. The estimations are based on the full equation (3), hence including firm size and the other descriptive variables, firm, country and time fixed effect, but these are not shown due to space. ♣ Under-identification test (Kleibergen-Paap rk LM statistic) ♣♣ Hansen J statistic (overidentification test of all instruments). To attain better instruments' test result, the following four instruments are used: Regulatory Burden, Impartial Public Administration, Business Permits, Freedom to enter markets and compete.

## 7. Conclusions

The aim of this paper was to investigate the relationship between competition laws and regulations and firms' productivity in Latin American countries. Historically, business surveys conducted in LAC countries have consistently highlighted the complexity and burden of regulations aimed at fostering competition (Inter-American Development Bank, 2001; World Economic Forum Competitiveness Reports, World Bank's Doing Business Reports). In LAC, there has been a wave of enactment of competition law and regulations in the 2000s. Moreover, a generic goal of

competition has been more frequently stated in such laws than it was the case in the previous (and first) wave of enactments in the 1990s in LAC. Such widespread enactment begs the questions of whether competition laws have spurred productivity, and how. Both have been long regarded as central questions to economics.

Despite the importance of analyzing the connections between competition regulations, enforcement, and firm performance, research in this area has been limited, particularly in the context of LAC.. Our research fills this gap by examining the effects of competition laws and regulations on firms' productivity in LAC, utilizing a combination of empirical methodologies and firm-level data, as well as including in the analysis potential moderating variables (size, distance-to-the-frontier, and broader institutional arrangements). By focusing on the relationship between competition regulations and productivity, the study provides insights into the potential impacts of competition laws on economic efficiency and policy in the region, ultimately contributing to the broader understanding of the role of competition regulations in fostering economic growth and development in LACs.

The data and methodology sections of the study provide a comprehensive overview of the sources of data and the analytical framework employed in examining the relationship between competition laws and firm productivity in LAC economies.

Data analysis indicated heterogeneity in TFP across LAC countries, with some countries exhibiting significantly higher TFP levels than others. An indicator of the enactment of the competition legislation (dummy) as well as several indices of competition legislation (CLI) from the Comparative Competition Law initiative were used. Correlations between CLI and TFP measures were examined, revealing varying relationships between regulatory stringency and productivity levels across different years.

The empirical strategy focused on evaluating the relationship between competition law, enforcement practices, and productivity across different industries and countries, with a particular emphasis on the mediating effects of size and distance to the frontier on firms' productivity levels. The study also emphasizes the role of enforcement coming not only from the provisions and activities embedded in the CLIs but also from the institutional features conducive to enforcement presented in the EFW indices used. Instrumental variable (IV) approaches are employed to address concerns related to omitted variable bias and endogeneity of competition law variables.

The findings suggest that, while countries introducing competition laws may exhibit higher productivity levels initially, the overall relationship between competition law stringency and productivity appears to be mixed. Certain aspects of competition law, such as authority components, show a positive relationship with productivity, particularly when controlling for firm size. Moreover, stronger enforcement measures are found to weaken the positive association between competition law and productivity, possibly due to increased compliance costs and legal uncertainty.

When considering the distance to the technological frontier, the relationship between competition law and productivity becomes significant and positive in most specifications. However, there is a notable negative relationship between competition law stringency and productivity when countries are closer to the technological frontier. This suggests that as countries approach technological advancement, overly strict competition laws may hinder productivity growth, potentially due to stifling innovation or favoring dominant players in the market.

Disaggregating the analysis by industrial branch reveals mixed effects of competition law on productivity across sectors. While competition law stringency appears to positively influence productivity in sectors such as textiles, garments, and chemicals, it shows no significance in food industries. The impact of competition law enforcement also varies across industries by firm size, with larger firms in textile industries experiencing a reduced positive role of competition law on productivity, possibly due to factors like legal expertise, economies of scale, or dominance in the market, but an enhanced positive productivity effect in garments.

Finally, instrumenting the competition law variables reveals a further nuanced relationship between competition law, enforcement, and productivity. While the positive effects of competition law on productivity diminish when considering potential endogeneity, there is evidence suggesting a positive impact of competition law and enforcement on productivity in larger firms, although that effect diminishes when nearing the technological frontier. This underscores the importance of effective competition policies in fostering innovation, fair competition, and market efficiency, especially in advanced technological environments.

These empirical findings carry significant policy implications for policymakers and regulatory authorities aiming to enhance productivity and foster competitive environments within their respective jurisdictions. Firstly, the study suggests that while competition laws can initially boost productivity levels, policymakers need to carefully consider the balance between stringency

and enforcement. Overly strict enforcement practices may inadvertently stifle innovation and hinder productivity growth, particularly in industries nearing technological frontiers. Therefore, there is a need for a nuanced and adaptive approach to competition policy, focusing on fostering fair competition while ensuring regulations do not unduly burden businesses or deter innovation.

Furthermore, the study highlights the importance of tailored enforcement strategies across different industries. Policymakers should consider industry-specific factors, market structures, and competitive dynamics when designing and implementing competition enforcement measures. Additionally, efforts should be directed towards improving the effectiveness and efficiency of enforcement mechanisms, ensuring they incentivize compliance without overly burdening businesses. Overall, these policy implications underscore the need for a dynamic and responsive approach to competition policy that fosters innovation, promotes market efficiency, and ultimately drives sustainable productivity growth across diverse sectors of the economy.

Future research may explore the mediating effects of size and trade openness accounting for both direct and indirect channels. Another particularly important venue of future research on competition regulations and productivity in LAC, to the extent that enough and relevant data becomes available, is to explore the productivity effects of competition legislation in upstream industries (services where usually product market regulations prevail) on downstream industries. Finally, when accounting for the performance of competition legislation, the measure of competition law and regulations may include more “de facto” metrics (such as case-based analysis) that may better illustrate the role of enforcement and compliance in some firms and industries (particularly those that tend to be more concentrated).

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## Appendix 1. Tables

**Table A1.- Competition Law coded by each country, 2005-2010**

Year	Argentina	Bolivia	Brazil	Chile	Colombia	Costa Rica	Dominican Republic	Ecuador	El Salvador	Guatemala	Honduras	Mexico	Nicaragua	Panama	Paraguay	Peru	Uruguay	Venezuela
2005	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0
2007	0	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0
2008	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0
2009	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Comparative Competition Law Dataset. The dataset can be downloaded at <http://comparativecompetitionlaw.org/>

Anu Bradford et al. 2019. "Competition Law Gone Global: Introducing the Comparative Competition Law and Enforcement Datasets." *Journal of Empirical Legal Studies* 16(2): 411-443.

Note: "1" represents the enactment of some competition law and/or regulations in that year and country.

**Table A2. Competition Law coded in Latin American countries up to 2010**  
(Highlighting competition goal stated, if any, in the law)

<b>Argentina</b>				
Year enacted [1]	Law name	Generic goal [2]	Generic goal stated, text [3]	Note
1923	Law No. 11.210 antitrust, and repression of especulacion	0		
1946 (1947)	Law No. 12.906	0		
1980	Law No. 22.262 "Competition Defense Act"	0		
1999	Law No. 25.156: "Competition Defense Act"	0		
2001	Decree No. 396 that modifies Law No. 25.156	0		
2001	Decree 89 of 2001	0		
<b>Bolivia</b>				
Year enacted [1]	Law name	Generic goal [2]	Generic goal stated, text [3]	Note
1967	Political Constitution of the State 1967	0		
1994	Law No. 1600 for Sectorial Regulation System	1	The purpose of the law is to regulate, control and supervise activities within the field of telecommunications, electricity, hydrocarbons, transport, water and any other field that is incorporated to the sectorial system by means of a separate law as long as they are subject to regulation making sure that: a) The activities under its jurisdiction operate efficiently and contribute to the development of the domestic economy in order that all the inhabitants of Bolivia have access to such services; b) The interests of the users, undertakings and regulated industries, are protected by law [...]	
1997	Supreme Decree No. 24504	1	Idem	
1997	Supreme Decree No. 24505	1	Idem	
<b>2008</b>	Supreme Decree No. 29519	1	Article 1. The purpose of this decree is to regulate competition and the defense of the consumer in case of conducts that may harm or negatively influence the market, resulting in price and output speculation [...].	
<b>Brazil</b>				
Year enacted [1]	Law name	Generic goal [2]	Generic goal stated, text [3]	Note
1962	Law n. 4.137 from 1962	0		
1990	Law n. 8.137 from 1990	0		
1991	Law n. 8.158 from 1991	1	Art. 1º The National Secretariat of Economic Law (SNDE), of the Ministry of Justice, is responsible for investigating and proposing appropriate measures with the purpose of correcting anomalies in the behavior of economic sectors, companies or establishments, as well as their administrators and controllers, capable of disturbing or affect, directly or indirectly, price formation mechanisms, free competition, freedom of initiative or the constitutional principles of the economic order.	[4]
1994	Law n. 8.884 from 1994	1	Art. 1 This Act provides for the prevention and repression of infractions against the economic order, guided by the constitutional dictates of free enterprise, free competition, social function of property, consumer protection and restraint of abuses of economic power.	[4]
<b>2007</b>	Resolution n. 45/200 CADE. (Note: This acronym is not specified in this field of the database)	1	Art. 1 This Act provides for the prevention and repression of infractions against the economic order, guided by the constitutional dictates of free enterprise, free competition, social function of property, consumer protection and restraint of abuses of economic power.	[4]

<b>Chile</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
1959	Law 13305 Title V	0		
1973	Decree Law 211 - Establishes Standards for the Defense of Free Competition	0		
2003	Law no. 19.911	1	2003 modifying 1973 Art 1: "The purpose of this law is to promote and defend free competition in the markets."	[4]
<b>2004 (2005)</b>	Decree with Force of Law 1	1	Article 1 "The purpose of this law is to promote and defend free competition in the markets."	[4]
<b>2009</b>	Law 20361 - Modifies Decree with Force of Law No. 1 of the Ministry of Economy, Development and Reconstruction, of 2005, on the Court for the Defense of Free Competition.	1	2003 modifying 1973 Art 1: "The purpose of this law is to promote and defend free competition in the markets."	[4]
<b>Colombia</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
1959	Law 155 of 1959 which establishes provisions on restrictive business practices.	0		[4]
1992	Decree 2513 of 1992 by which the Superintendency of Industry and Commerce is restructured and other provisions are issued.	1	Article 2 specifies some goals which are actually referred to the establishment of the "Superintendencia de Industria y Comercio" rather than competition law in and of itself. The goals mentioned in Art. 2 are "improve the efficiency of the national productive apparatus, that consumers have free choice and access to the markets for goods and services, that companies can freely participate in the markets and that the market allows a variety of prices and qualities of goods and services."	[4]
2000	Law 590 of 2000 by which provisions are issued to promote the development of micro, small and medium-sized businesses.	1	Article 2 specifies some goals which are actually referred to the establishment of the "Superintendencia de Industria y Comercio" rather than competition law in and of itself. The goals mentioned in Art. 2 are "improve the efficiency of the national productive apparatus, that consumers have free choice and access to the markets for goods and services, that companies can freely participate in the markets and that the market allows a variety of prices and qualities of goods and services".	[4]
<b>2009</b>	Law 1340 of 2009 through which regulations are issued regarding the protection of competition.	1	Art. 1 "The purpose of this law is to update the regulations on the protection of competition to adapt it to current market conditions, facilitate users' adequate monitoring and optimize the tools available to national authorities for compliance with the constitutional duty to protect free economic competition in the national territory."	[4]
<b>Costa Rica</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
1949	Political Constitution of Costa Rica	0		
	Law For the Promotion of Competition and the Effective Defense of Consumer	1	Law No. 7472/1994 – Article 1 "Objectives and Goals": "The objective of the present law is to protect, effectively, consumer's rights and legitimate interests, the protection and promotion of the process of free competition, through the prevention, prohibition of monopolies, monopolistic practices and other restraints to the efficient functioning of the market and the elimination of the regulations unnecessary for the economic activities".	
1994 (1995)	Executive Decree 25234-MEIC - Regulation to the Law for the Promotion of the Competition and the Effective Defense of Consumer	0		
1996	Defense of Consumer	0		
2000	Law for the Protection of Worker	0		
<b>2008</b>	General Law of Telecommunications No. 8642	1	Law No. 7472/1994 – Article 1 "Objectives and Goals": "The objective of the present law is to protect, effectively, consumer's rights and legitimate interests, the protection and promotion of the process of free competition, through the prevention, prohibition of monopolies, monopolistic practices and other restraints to the efficient functioning of the market and the elimination of the regulations unnecessary for the economic activities". / TELECOMS – Law No. 8642/2008 –Article 2 "Objectives of this Law": "the following are objectives of this Law: [...] d) Protecting the rights of the customers of telecommunications services ensuring efficiency, equality, continuity, quality, broader and higher coverage, [...], more and better alternatives in the provision of the services [...]; e) Promoting effective competition in the market of telecommunications, as mechanism to increase the availability of services, improve the quality and insure accessible prices; f) Promoting the development and use of telecommunications services [...]; g) Ensuring the efficient and effective allocation, use, exploitation, management and control of the radio-electric spectrum and the remaining scarce resources; h) Incentivizing investments in the sector of telecommunications through a legal framework containing mechanisms which guarantee the principles of transparency, non-discrimination, equality, certainty of the law and which does not encourage the imposition of taxes; i) Ensuring that the Nation obtains the maximum benefits from technological progress and convergence".	

<b>Dominican Republic</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
2008 (2017)	Law No. 42-08 of 2008, on the Defense of Competition.		1 Law No. 42-08 on the Defense of Competition Art. 1.	[4]
<b>Ecuador</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
	No law coded up to 2010.			
<b>El Salvador</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
1997	Decree 1030: CRIMINAL CODE		0	
2004	Competition Law (Decree No.528)		1 Art. 1. -The purpose of this law is to promote, protect and guarantee competition by means of preventing and eliminating anticompetitive that limit or restrict competition or hinder market access in any way to any economic agent in order to increase economic efficiency and consumer welfare.	
2006	Decree No. 126 that approves competition regulations		1 Art. 1. -The purpose of this law is to promote, protect and guarantee competition by means of preventing and eliminating anticompetitive that limit or restrict competition or hinder market access in any way to any economic agent in order to increase economic efficiency and consumer welfare.	
<b>Guatemala</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
1945	Constitution of the Republic of Guatemala of 1945		0	
1970	Commercial Code, Congressional Decree 2-70		0	
1973	Criminal Code, Congressional Decree No. 17-73		0	
1985	Political Constitution of the Republic of Guatemala of 1985		0	
1997	Law for the Commercialization of Hydrocarbons, Decree 109-97		0	
<b>Honduras</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
1982	Political Constitution of the Republic of Honduras		0	
1995	Framework Law of the Telecommunications Sector - Decree 185-95		1 TELECOMS Framework Law of the Telecommunication Sector - "Whereas it is the duty of the State to regulate the activities of operating and exploiting telecommunications services in such a manner as to allow the technological development ("tecnificación"), modernization, and expansion of the telecommunications in the Country, by establishing the conditions necessary for satisfying the demand of these services in an efficient, constant, and reliable manner."	
1997	General Regulation of the Framework Law of the Telecommunications Sector - Agreement ("Acuerdo") No. 89-97		1 n.a.	

2002 General Regulation of the Framework Law of the Telecommunications Sector - Agreement No. 141-2002

1 TELECOMS Agreement No. 141-2002 – “Whereas CONATEL, with the objective to adopt the technological changes in the Telecommunication Sector [...], was of the opinion to amend the same [General Regulation]; whereas the General Regulation of the Framework Law of the Telecommunication Sector is a legal instrument of extreme importance for the development of the telecommunications in the Country.” / Framework Law of the Telecommunications Sector - “Whereas it is the duty of the State to regulate the activities of operating and exploiting telecommunications services in such a manner as to allow the technological development (“tecnificación”), modernization, and expansion of the telecommunications in the Country, by establishing the conditions necessary for satisfying the demand of these services in an efficient, constant, and reliable manner.”.

**2005 (2006)** Law for The Defense and Promotion of Competition - Decree No. 357-2005

1 Decree No. 357-2005 – “Whereas competition is indispensable to assure the national economic development, the efficient resources allocation and the consumer’s welfare” / TELECOMS Agreement No. 141-2002 – “Whereas CONATEL, with the objective to adopt the technological changes in the Telecommunication Sector [...], was of the opinion to amend the same [General Regulation]; whereas the General Regulation of the Framework Law of the Telecommunication Sector is a legal instrument of extreme importance for the development of the telecommunications in the Country.” / Framework Law of the Telecommunications Sector - “Whereas it is the duty of the State to regulate the activities of operating and exploiting telecommunications services in such a manner as to allow the technological development (“tecnificación”), modernization, and expansion of the telecommunications in the Country, by establishing the conditions necessary for satisfying the demand of these services in an efficient, constant, and reliable manner.”.

**2007** Commission for the Defense and Promotion of Competiton.

1 2005 Article 1:- Objective: The present law has as its objective to promote and to protect the free competition exercise in order to procure the efficient functioning of the market and the welfare of the consumers.

**Mexico**

Year enacted [1]	Law name	Generic goal [2]	Generic goal stated, text [3]	Note
1927	Regulation of the Organic Law of Article 28 of the Constitution.	0		[4]
1931	Organic law of article 28 of the Constitution, related to monopolies.	0		[4]
1934	Organic Law of Constitutional Article 28 on Monopolies of 1934.	0		[4]
1992 (1993)	Federal Economic Competition Law.		1 Art. 2: protect the process of competition and the free competition through the limitation and elimination of monopolies, monopolistic practices and other restrictions to the efficient functioning of the market.	
1998	Regulations of the Federal Economic Competition Law of 1998.	0		[4]
<b>2006</b>	Reform of the Federal Economic Competition Law of 1993.		1 Art. 2 - "This Law aims to protect the process of competition and free competition, through the prevention and elimination of monopolies, monopolistic practices and other restrictions on the efficient functioning of markets for goods and services."	[4]
<b>2007</b>	Regulations of the Federal Economic Competition Law.	0		[4]

**Nicaragua**

Year enacted [1]	Law name	Generic goal [2]	Generic goal stated, text [3]	Note
<b>2006 (2007)</b>	Law No. 601 "Law for the Promotion of Competition".		1 Article 1, Section 1: "The purpose of this Law is to promote and foster free competition among economic agents, to guarantee the market’s efficiency and the consumers’ wellbeing, through support to the culture of competition, prevention, prohibition and sanction of noncompetitive practices."	

<b>Panama</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
1996	Law No. 29 of 1996.		1 Article 1. Object. The purpose of this Law is to protect and ensure the process of free economic competition and free competition, eradicating monopolistic practices and other restrictions on the efficient functioning of markets for goods and services, to preserve the best interest of the consumer.	[4]
1998	Executive Decree 31 of 1998.		0	[4]
<b>2006</b>	Decree Law 9 of 2006		1 Law 29 of 1996, Art. 1.	[4]
<b>2007</b>	Law No. 45 of 2007.		1 Article 1. Object. The purpose of this Law is to protect and ensure the process of free economic competition and free competition, eradicating monopolistic practices and other restrictions on the efficient functioning of markets for goods and services, to preserve the best interest of the consumer.	[4]
<b>2009</b>	Executive Order 8-A of 2009.		1 Law 45 of 2007, Art. 1.	[4]
<b>Paraguay</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
	No law coded up to 2010.			
<b>Peru</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
1991 (1992)	Legislative Decree 701.		1 Article 1.- The purpose of this Law is to eliminate monopolistic, controlling and restrictive practices of free competition in the production and marketing of goods and the provision of services, allowing free private initiative to develop, seeking the greatest benefit of the citizens, users and consumers.	[4]
1996	Legislative Decree 807		0	
<b>2008</b>	Legislative Decree 1034		1 Article 1.- Purpose of this Law.- This Law prohibits and sanctions anti-competitive conduct with the purpose of promoting economic efficiency in the markets for the well-being of consumers. This Law prohibits and sanctions anticompetitive conduct with the purpose of promoting economic efficiency in markets for the well-being of consumers.	[4]
<b>Uruguay</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
2000	Law Nº 17.243, of July 6, 2000		0	
2001	Law Nº 17.296, of February 23, 2001		0	
2001	Decree about Defense of competition		0	
<b>2007</b>	Law No. 18.159, of July 30, 2007		1 Article 1 (Purpose) .- This Act is of public order and aims to promote the welfare of current and future consumers and users, through the promotion and protection of competition, encouraging economic efficiency and freedom and equal access of companies and products to markets.	
<b>Venezuela</b>				
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Generic goal [2]</b>	<b>Generic goal stated, text [3]</b>	<b>Note</b>
1992	Law to Promote and Protect the Exercise of Free Competition.		1 Article 1, Section 1. This Act aims to promote and protect the exercise of free competition and efficiency for the benefit of producers and consumers and prohibit behaviors and monopolistic and oligopolistic practices and other means that could prevent, restrict, distort or restrict the enjoyment of economic freedom.	

1993 Regulation No. 1 of the Law to Promote and Protect the Exercise of Free Competition.	1 Article 1.- The objectives of this Regulation: 1. Develop a System of Exceptions with temporary authorizations ... 2. Provide global exceptions that allow the simultaneous exercise of similar practices and behavior; ... 4. Contribute to the improvement of production, marketing, distribution of goods or services; promoting economic efficiency of the production system through technical or economic progress; and provide benefits to consumers of goods or service users.
1995 Resolution No. SPPLC/036-95 of August 28, 1996	1 Article 1, Section 1. This Act aims to promote and protect the exercise of free competition and efficiency for the benefit of producers and consumers and prohibit behaviors and monopolistic and oligopolistic practices and other means that could prevent, restrict, distort or restrict the enjoyment of economic freedom.
1996 Regulation No. 2 of the Law to Promote and Protect the Exercise of Free Competition.	1 Article 1: Object of the Regulation.- This Regulation aims to develop a system of evaluation and control of economic concentrations, in execution of the rule contained in Article 11 of the Law to Promote and Protect the Exercise of Free Competition.

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*Source:* Comparative Competition Law Dataset (CCLD) and Comparative Competition Law Documentation Dataset (CCLDD). Both datasets can be downloaded at <http://comparativecompetitionlaw.org/>. For more details on the CCLD, see Anu Bradford et al. (2019), "Competition Law Gone Global: Introducing the Comparative Competition Law and Enforcement Datasets." *Journal of Empirical Legal Studies* 16(2): 411-443.

*Notes:*

- [1] In the CCLD, the variable called "Year enacted" indicates the year in which the law or regulation was enacted. However, in the CCLD there is another variable called "year" (the year for a given observation) which in a few cases is different from the variable year enacted. The year in parenthesis reflects the variable "year". We highlight in bold the most recent year of a competition law enacted when both, it happens in the late 2000s and has a generic competition goal.
- [2] The variable "Goals, generic" indicates if any particular goals of competition law are specified in this law. This is a dummy variable, where "1" indicates that a particular goal of competition has been indicted in the law, and "0" is none. This table reproduces the values of this dummy variables found in the CCLD.
- [3] The variable "Goals, generic (text)", available in another dataset (the CCL Documentation Dataset, CCLDD) provides text information. In this case, provides information on the CCL researchers' decision when coding the variable "goals generic". Here we reproduce the text found in the CCLDD. We indicate when we have translated the text, otherwise the text is reproduced in English --as found in the CCCLD. Notice that there is text in this column, only if the dummy variable, in the previous column, takes the value of "1".
- [4] The text appears usually in English, if not, we translate the language (Spanish or Portuguese) into English. The instances when this happens are signal by note [4] on this column.

**Table A3. Competition Law Coded in Latin American Countries up to 2010:  
Goals, Other than Competition, Stated in the Law**

<b>Argentina</b>										
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export: Industrial poli	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1923	Law No. 11.210 antitrust, and repression	0	0	0	0	0	0	0	0	0
1946 (1947)	Law No. 12.906	0	0	0	0	0	0	0	0	0
1980	Law No. 22.262 "Competition Defense Act"	0	0	0	0	0	0	0	0	0
1999	Law No. 25.156: "Competition Defense Act"	0	0	0	0	0	0	0	0	0
2001	Decree No. 396 that modifies Law No. 25.156	0	0	0	0	0	0	0	0	0
2001	Decree 89 of 2001	0	0	0	0	0	0	0	0	0
<b>Bolivia</b>										
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export: Industrial poli	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1967	Political Constitution of the State 1967	0	0	0	0	0	0	0	0	0
1994	Law No. 1600 for Sectorial Regulation System	0	1	1	0	0	0	0	1	0
1997	Supreme Decree No. 24504	0	1	1	0	0	0	0	1	0
1997	Supreme Decree No. 24505	0	1	1	0	0	0	0	1	0
2008	Supreme Decree No. 29519	1	0	0	0	0	0	0	0	0
<b>Brazil</b>										
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export: Industrial poli	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1962	Law n. 4.137 from 1962	0	0	0	0	0	0	0	0	0
1990	Law n. 8.137 from 1990	0	0	0	0	0	0	0	0	0
1991	Law n. 8.158 from 1991	0	0	0	0	0	0	0	0	1 Correct anomalies in the behavior of economic sectors and their managers which may affect the mechanisms of price formation, free competition and freedom of initiative
1994	Law n. 8.884 from 1994	1	0	0	0	0	0	0	0	1 Free enterprise, free competition, social function of property and restraint of abuses of economic power
2007	Resolution n. 45/200 CADE. (Note: This acronym is not specified in this field of the database)	1	0	0	0	0	0	0	0	1 Free enterprise, free competition, social function of property and restraint of abuses of economic power

<b>Chile</b>											
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Consumer wel</b>	<b>Total welfare</b>	<b>Efficiency</b>	<b>Protect SMEs</b>	<b>Protect export:</b>	<b>Industrial poli</b>	<b>Social policy</b>	<b>Development</b>	<b>Other goal(s)</b>	<b>Other goal(s) (text, when available)</b>
1959	Law 13305 Title V	0	0	0	0	0	0	0	0	0	0
1973	Decree Law 211 - Establishes Standards for the Defense of Free Competition	0	0	0	0	0	0	0	0	0	0
2003	Law no. 19.911	0	0	0	0	0	0	0	0	0	1 Promote and defend free competition
<b>2004 (2005)</b>	Decree with Force of Law 1	0	0	0	0	0	0	0	0	0	1 Promote free competition
<b>2009</b>	Law 20361 - Modifies Decree with Force of Law No. 1 of the Ministry of Economy, Development and Reconstruction, of 2005, on the Court for the Defense of Free Competition.	0	0	0	0	0	0	0	0	0	1 Promote and defend free competition
<b>Colombia</b>											
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Consumer wel</b>	<b>Total welfare</b>	<b>Efficiency</b>	<b>Protect SMEs</b>	<b>Protect export:</b>	<b>Industrial poli</b>	<b>Social policy</b>	<b>Development</b>	<b>Other goal(s)</b>	<b>Other goal(s) (text, when available)</b>
1959	Law 155 of 1959 which establishes provisions on restrictive business practices.	0	0	0	0	0	0	0	0	0	0
1992	Decree 2513 of 1992 by which the Superintendency of Industry and Commerce is restructured and other provisions are issued.	1	1	1	0	0	0	0	0	0	1 Freedom of choice
2000	Law 590 of 2000 by which provisions are issued to promote the development of micro, small and medium-sized businesses.	1	1	1	0	0	0	0	0	0	1 Freedom of choice
<b>2009</b>	Law 1340 of 2009 through which regulations are issued regarding the protection of competition.	0	0	0	0	0	0	0	0	0	1 The law aims at updating the previous provisions of competition law in order for its recipients and authorities to be facilitated in ensuring free and undistorted competition.
<b>Costa Rica</b>											
<b>Year enacted [1]</b>	<b>Law name</b>	<b>Consumer wel</b>	<b>Total welfare</b>	<b>Efficiency</b>	<b>Protect SMEs</b>	<b>Protect export:</b>	<b>Industrial poli</b>	<b>Social policy</b>	<b>Development</b>	<b>Other goal(s)</b>	<b>Other goal(s) (text, when available)</b>
1949	Political Constitution of Costa Rica	0	0	0	0	0	0	0	0	0	0
1994 (1995)	Law For the Promotion of Competition and the Effective Defense of Consumer	1	0	1	0	0	0	0	0	0	0
1996	Executive Decree 25234-MEIC - Regulation to the Law for the Promotion of the Competition and the Effective Defense of Consumer	0	0	1	0	0	0	0	0	0	0
2000	Law for the Protection of Worker	0	0	1	0	0	0	0	0	0	0
<b>2008</b>	General Law of Telecommunications No. 8642	1	1	1	0	0	1	0	1	0	0

**Dominican Republic**

Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
2008 (2017)	Law No. 42-08 of 2008, on the Defense of Competition.	1	0	1	0	0	0	0	0	0	1 Promote and defend effective competition.

**Ecuador**

Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
	No law coded up to 2010.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

**El Salvador**

Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1997	Decree 1030: CRIMINAL CODE	0	0	0	0	0	0	0	0	0	0
2004	Competition Law (Decree No.528)	1	0	1	0	0	0	0	0	0	0
2006	Decree No. 126 that approves competition regulations	1	0	1	0	0	0	0	0	0	0

**Guatemala**

Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1945	Constitution of the Republic of Guatemala of 1945	0	0	0	0	0	0	0	0	0	0
1970	Commercial Code, Congressional Decree 2-70	0	0	0	0	0	0	0	0	0	0
1973	Criminal Code, Congressional Decree No. 17-73	0	0	0	0	0	0	0	0	0	0
1985	Political Constitution of the Republic of Guatemala of 1985	0	0	0	0	0	0	0	0	0	0
1997	Law for the Commercialization of Hydrocarbons, Decree 109-97	0	0	0	0	0	0	0	0	0	0

**Honduras**

Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1982	Political Constitution of the Republic of Honduras	0	0	0	0	0	0	0	0	0	0
1995	Framework Law of the Telecommunications Sector - Decree 185-95	0	0	1	0	0	0	0	0	1	0
1997	General Regulation of the Framework Law of the Telecommunications Sector - Agreement ("Acuerdo") No. 89-97	1	0	1	0	0	0	0	0	1	0
2002	General Regulation of the Framework Law of the Telecommunications Sector - Agreement No. 141-2002	0	0	1	0	0	0	0	0	1	0
2005 (2006)	Law for The Defense and Promotion of Competition - Decree No. 357-2005	1	0	1	0	0	0	0	0	1	0
2007	Commission for the Defense and Promotion of Competition.	1	0	1	0	0	0	0	0	0	0

<b>Mexico</b>											
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1927	Regulation of the Organic Law of Article 28 of the Constitution.	0	0	0	0	0	0	0	0	0	0
1931	Organic law of article 28 of the Constitution, related to monopolies.	0	0	0	0	0	0	0	0	0	0
1934	Organic Law of Constitutional Article 28 on Monopolies of 1934.	0	0	0	0	0	0	0	0	0	0
1992 (1993)	Federal Economic Competition Law.	0	0	1	0	0	0	0	0	0	1 Art. 2: protect the process of competition and the free competition through the
1998	Regulations of the Federal Economic Competition Law of 1998.	0	0	0	0	0	0	0	0	0	0
2006	Reform of the Federal Economic Competition Law of 1993.	0	0	1	0	0	0	0	0	0	0
2007	Regulations of the Federal Economic Competition Law.	0	0	0	0	0	0	0	0	0	0
<b>Nicaragua</b>											
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
2006 (2007)	Law No. 601 "Law for the Promotion of Competition".	1	0	1	0	0	0	0	0	0	1 Promote culture of competition
<b>Panama</b>											
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1996	Law No. 29 of 1996.	1	0	1	0	0	0	0	0	0	0
1998	Executive Decree 31 of 1998.	0	0	0	0	0	0	0	0	0	0
2006	Decree Law 9 of 2006	1	0	1	0	0	0	0	0	0	0
2007	Law No. 45 of 2007.	1	0	1	0	0	0	0	0	0	0
2009	Executive Order 8-A of 2009.	1	0	1	0	0	0	0	0	0	0
<b>Paraguay</b>											
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
	No law coded up to 2010.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<b>Peru</b>											
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export:	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1991 (1992)	Legislative Decree 701.	1	1	0	0	0	0	0	0	0	0
1996	Legislative Decree 807	0	0	0	0	0	0	0	0	0	0
2008	Legislative Decree 1034	1	0	1	0	0	0	0	0	0	0

<b>Uruguay</b>											
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
2000	Law Nº 17.243, of July 6, 2000	0	0	0	0	0	0	0	0	0	0
2001	Law Nº 17.296, of February 23, 2001	0	0	0	0	0	0	0	0	0	0
2001	Decree about Defense of competition	0	0	0	0	0	0	0	0	0	0
2007	Law No. 18.159, of July 30, 2007	1	0	1	0	0	0	0	0	0	1 Free competition and equal access of companies and products to markets.

<b>Venezuela</b>											
Year enacted [1]	Law name	Consumer welfare	Total welfare	Efficiency	Protect SMEs	Protect export	Industrial policy	Social policy	Development	Other goal(s)	Other goal(s) (text, when available)
1992	Law to Promote and Protect the Exercise of Free Competition.	1	0	1	0	0	0	0	0	0	0
1993	Regulation No. 1 of the Law to Promote and Protect the Exercise of Free Competition.	1	0	1	0	0	0	0	1	1	1 Develop a System of Exceptions
1995	Resolution No. SPPLC/036-95 of August 28, 1996	1	0	1	0	0	0	0	0	0	0
1996	Regulation No. 2 of the Law to Promote and Protect the Exercise of Free Competition.	1	0	1	0	0	0	0	0	0	1 Regulate merger control

*Source:* Comparative Competition Law Dataset (CCLD). The dataset can be downloaded at <http://comparativecompetitionlaw.org/>. For more details on the CCLD, see Anu Bradford et al. 2019. "Competition Law Gone Global: Introducing the Comparative Competition Law and Enforcement Datasets." *Journal of Empirical Legal Studies* 16(2): 411-443.

*Notes:*

[1] In the CCLD, the variable called "Year enacted" indicates the year in which the law or regulation was enacted. However, in the CCLD there is another variable called "year" (the year for a given observation) which in a few cases is different from the variable year enacted. The year in parenthesis reflects the variable "year".

[2] The variable "Goals, generic" indicates if any particular goals of competition law are specified in this law. This is a dummy variable, where "1" indicates that a particular goal of competition law has been indicated in the law, and "0" is none. This table reproduces the values of this dummy variables found in the CCLD.

[3] The variable "Goals, generic (text)", available in another dataset (the CCL Documentation Dataset, CCLDD) provides text information. In this case, provides information on the CCL researchers' decision when coding the variable "goals generic". Here we reproduce the text found in the CCLDD. We indicate when we have translated the text, otherwise the text is reproduced in English --as found in the CCLD. Notice that there is text in this column, only if the dummy variable, in the previous column, takes the value of "1".

[4] The text appears usually in English, if not, we translate the language (Spanish or Portuguese) into English. The instances when this happens are signal by note [4] on this column.

## **Table A4. Classification of manufacturing branches**

### **Consumables and Materials Production:**

- 15 Food
- 16 Tobacco*
- 17 Textiles
- 18 Garments
- 19 Leather
- 20 Wood*
- 21 Paper
- 23 Refined petroleum products*
- 36 Furniture
- (16, 20, 23 classified as 2 - Other)

### **Chemical and Heavy Manufacturing:**

- 24 Chemicals
- 25 Plastics & rubber
- 26 Non-metallic mineral products
- 27 Basic metals
- 28 Fabricated metal products

### **Technology and Electronics:**

- 22 Publishing, printing, and Recorded media
- 29 Machinery and equipment (29-30)
- 31 Electronics (31-32)
- 33 Precision instruments
- 34 Transport machines (34-35)

**Table A5. Results Controlling for Distance to the Technological Frontier  
(robustness check)**

	<i>Dependent variable: TFP</i>			
	No enforcement adjusted	Judicial independence	Impartial courts	Legal system
<b>CL dummy</b>				
Competition law_adj.	0.918 (1.262)	6.751** (2.991)	4.121* (2.490)	2.703 (2.193)
DTF	-1.075 (3.799)	-8.048 (4.930)	-5.181 (3.873)	-1.971 (3.731)
Competition law_adj.*DTF	-0.796 (1.983)	-9.176** (4.385)	-5.424 (3.611)	-3.058 (3.207)
Competition law_adj.* Size	0.843* (0.444)	1.525** (0.753)	1.746** (0.875)	1.501** (0.724)
Competition law_adj.* Size * DTF	-1.249* (0.725)	-2.234* (1.141)	-2.501* (1.290)	-2.172** (1.092)
<b>CLI overall</b>				
Competition law_adj.	22.58*** (4.578)	38.69*** (9.388)	45.59*** (12.420)	44.72*** (9.047)
DTF	24.35*** (3.244)	22.47*** (3.144)	21.45*** (3.454)	28.12*** (3.263)
Competition law_adj.*DTF	-34.92*** (6.402)	-57.88*** (12.920)	-68.31*** (17.460)	-69.84*** (12.580)
Competition law_adj.* Size	-0.617 (1.008)	-2.063 (1.874)	-0.987 (2.205)	-1.535 (1.923)
Competition law_adj.* Size * DTF	0.994 (1.298)	2.436 (2.443)	1.63 (2.882)	2.214 (2.378)
<b>CLI authority</b>				
Competition law_adj.	22.28*** (4.941)	43.82*** (10.180)	50.47*** (11.660)	46.74*** (9.080)
DTF	18.39*** (3.120)	19.72*** (2.873)	17.68*** (2.900)	23.09*** (2.982)
Competition law_adj.*DTF	-34.12*** (6.998)	-65.58*** (13.980)	-75.41*** (16.330)	-72.90*** (12.630)
Competition law_adj.* Size	-0.537 (1.081)	-1.85 (2.114)	-1.141 (2.466)	-0.909 (2.017)
Competition law_adj.* Size * DTF	1.233 (1.408)	2.592 (2.741)	2.161 (3.223)	2.029 (2.566)
<b>CLI substance</b>				
Competition law_adj.	15.06*** (4.761)	19.38** (8.215)	7.094 (10.260)	24.08*** (8.494)
DTF	25.38*** (4.837)	18.16*** (4.068)	9.302** (4.063)	23.25*** (4.544)
Competition law_adj.*DTF	-25.45*** (6.859)	-30.68*** (11.400)	-14.42 (14.360)	-40.15*** (11.920)

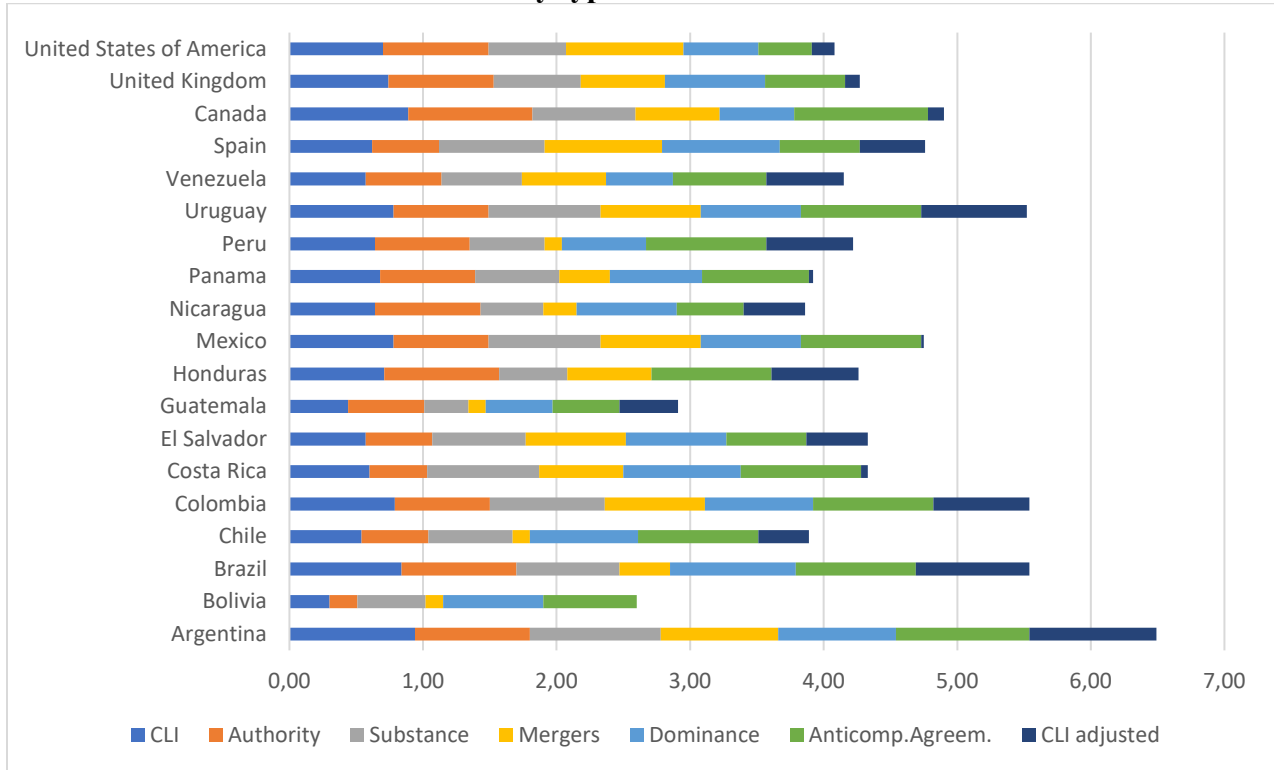
<b>Competition law_adj.* Size</b>	-1.014 (0.850)	-2.26 (1.557)	-1.303 (1.841)	-2.283 (1.660)
<b>Competition law_adj.* Size * DTF</b>	0.87 (1.119)	2.292 (2.064)	1.364 (2.416)	2.446 (2.043)
<b>CLI exemptions</b>				
<b>Competition law_adj.</b>	5.309 (3.694)	21.81*** (7.265)	-2.09 (9.338)	29.60*** (8.456)
<b>DTF</b>	8.723*** (3.331)	13.90*** (2.918)	3.318 (2.759)	19.34*** (3.437)
<b>Competition law_adj.*DTF</b>	-8.976* (5.080)	-35.57*** (10.040)	0.425 (13.270)	-48.69*** (12.090)
<b>Competition law_adj.* Size</b>	-0.399 (1.012)	-1.388 (1.901)	-0.769 (2.290)	-1.431 (1.934)
<b>Competition law_adj.* Size * DTF</b>	1.073 (1.352)	2.56 (2.471)	2.026 (3.011)	3.018 (2.494)

*Source:* Authors' calculations.

*Note:* \*, \*\* and \*\*\* refer to statistical significance at the 10, 5 and 1% level, respectively. Robust standard errors provided in parentheses. The estimations are based on the full equation (4), hence including firm size and the other descriptive variables, firm, country and time fixed effect, but these are not shown due to space.

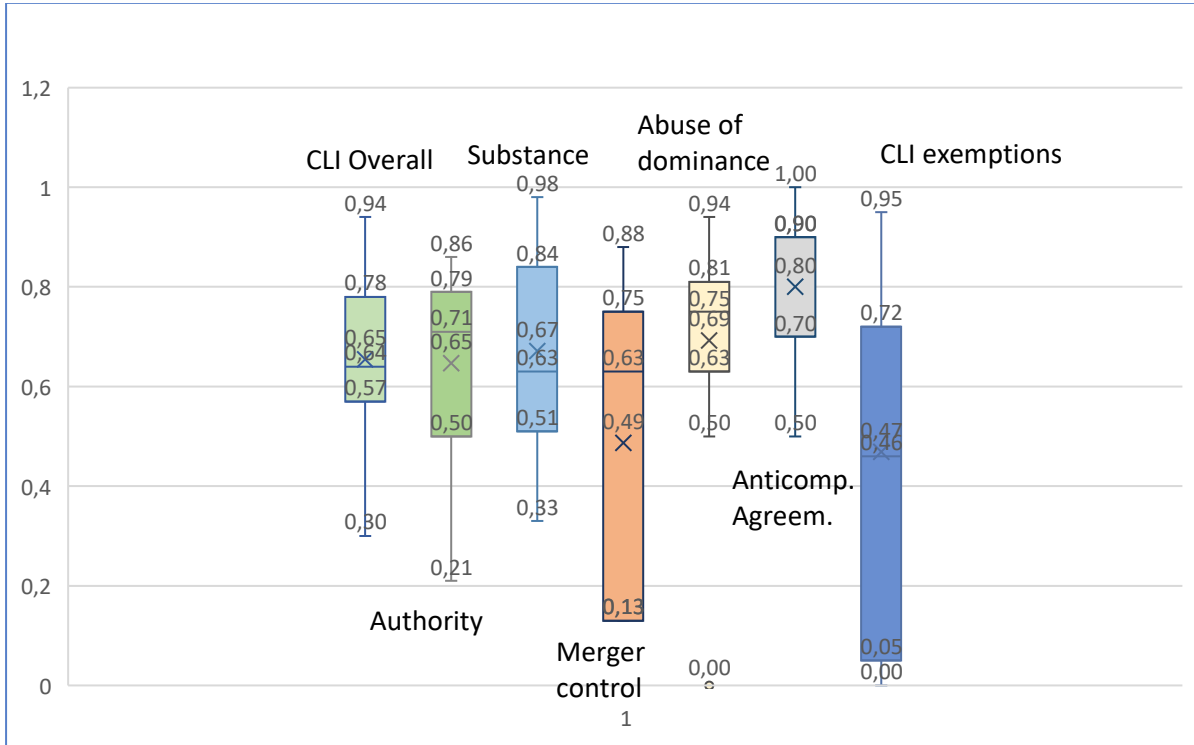
## Appendix 2. Figures

**Figure A1.- Competition Law Index (CLI) in selected countries, 2010, by types of CLIs**



*Source:* Authors' construction using data from the Comparative Competition Law Dataset (CCLD). The dataset can be downloaded at <http://comparativecompetitionlaw.org/>.

**Figure A2. Competition Law Index (CLI) in Latin American Countries, 2010  
by Types of CLIs**



Source: Authors' construction using data from the Comparative Competition Law Dataset (CCLD). The dataset can be downloaded at <http://comparativecompetitionlaw.org/>.